

# *Value for the Vulnerable?*

*Sustainable Smallholder Development in Northern Ghana  
and the Value Chains of Tomato, Chili and Rice.*

Inaugural-Dissertation zur Erlangung des Doktorgrades  
der Mathematisch-Naturwissenschaftlichen Fakultät der Universität zu Köln

vorgelegt von  
Jan-Niklas Bamler  
aus Kleve

Berichterstatter:

Prof. Dr. Boris Braun

(Gutachter)

Prof. Dr. Peter Dannenberg

Tag der mündlichen Prüfung:

15.01.2015

**Abstract:**

Ghana has managed to become one of the fastest growing economies in the world with a vibrant agricultural market. The country could be a prime example of successful, pro-poor development following economic liberalisation. Though first change is visible even in traditionally impoverished areas of the north, namely the Upper East Region, hunger and chronic poverty are still prevalent. Yet, after decades of restricted public expenditure, 'pro-poor' agricultural policies could now be put in place, to actively improve smallholder lives in the area by various forms of government support. Similarly, foreign development agencies have recently become more engaged in supporting the local agricultural sector. All actors of current relevance have thereby pursued a value chain approach to developing the markets and livelihoods of northern Ghanaian agriculturalists. The contribution to pro-poor, 'sustainable' development, however, remains unclear as at now. This study is therefore concerned with how market dynamics and interventions have influenced 'sustainable development' of the vulnerable and poor in an emerging economy like Ghana. To do so, the study takes a look at smallholder livelihood systems in the Upper East Region of the country. Here, local peasant society is confronted with environmental changes, economic globalisation processes and interventions in agricultural value chains by the local Ministry of Food and Agriculture and foreign donors like USAID.

To grasp the impact of market dynamics and interventions within this multidimensional context, this study argues for a combination of a holistic livelihood and a more specific value chain and production network approach as a useful conceptual background. Given this theoretic backdrop, data was collected for over 10 months in two villages of the Upper East, namely in Biu and Mirigu, with a focus on tomato, chili and rice, products of major significance to locals. The main methods applied in the field included qualitative as much as quantitative approaches. Farmer focus group discussions (n=37), in-depth farmer interviews and farm budgets (n=47) were the primary source of data gathered. Expert/key-informant interviews (n=70) and expert group discussions (n=2) were held. A household head survey (n=177) and an expert survey (n=25) were used to check hypotheses previously generated by qualitative methods. Primary and secondary data for tomato, chili, rice and partly also shea value chains was collected. Secondary data, such as confidential government and NGO documents, allow an insider view into farmers' access to subsidies and support. An archive survey of church diaries dating back to 1905, enable a view on local developments in a long-term, historic perspective.

This study thereby yields a number of insights with concern for conceptual approaches to the issue of understanding the pro-poor impact of markets, their dynamics and interventions within these. Livelihood analysis proved to be an indispensable approach to understanding

important aspects of people-centred, human development potentials and constraints in a local environmental and institutional context. Value chain and production network analysis provided further fruitful insights on market dynamics, their structural outlines, their basic rationales and market terms for the successful participation of locals. It can therefore be concluded that both of these basic notions, either people- or market-centred approaches, should be conceptually merged to advance future research on the pro-poor effect of markets and interventions within them, to specifically address questions of what is here understood as ‘livelihood upgrading’.

This study further contributes to an understanding of central aspects of local development and possible future avenues to achieving greater livelihood sustainability through government or donor development interventions. Most significantly, it became clear that ‘positive’, pro-poor market dynamics are also encountered at a local level, but cannot be made use of by spatially and socially marginalised, vulnerable and poor smallholders. That is mainly due to elite capture and corrupt practices, ultimately a question of mal-governance, a lack of grass-roots participation and a disregard for societal dimensions within which interventions are interwoven. Furthermore, neither environmental degradation nor present or future environmental changes, especially climatic ones and those with regard to soils, are accounted for. Interventions thereby remain far below their possible impact and even contribute to a loss of the natural resource base, aside the fact that they further increase an already high level socio-economic inequality. In the face of recent economic awakening, despite globalisation tendencies, future efforts in enabling sustainable development at local level must thus increasingly embrace environmental and, mostly, societal concerns in their concepts and daily practice.

## **Kurzzusammenfassung:**

Ghana hat es geschafft eine der weltweit schnellst wachsenden Volkswirtschaften mit einem besonders dynamischen landwirtschaftlichen Sektor zu werden. Das Land könnte ein Paradebeispiel für erfolgreiche, armutsorientierte Entwicklung im Zuge ökonomischer Liberalisierung sein. Obwohl ein Wandel auch in den traditionell verarmten Gebieten des Nordens, namentlich in der Upper East Region, sichtbar ist, ist hier Hunger und chronische Armut immer noch verbreitet. Allerdings konnten nun nach mehreren Dekaden beschränkter finanzieller Möglichkeiten auf Seiten des Staates neue, armutsorientierte, landwirtschaftliche Politiken eingeführt werden, die aktiv kleinbäuerliche Leben verbessern könnten, durch verschiedenste Formen staatlicher Unterstützung. Ebenso verstärkt sich in letzter Zeit das Engagement ausländischer Entwicklungshilfeinitiativen im lokalen, landwirtschaftlichen Sektor. Mit dem Ziel der Entwicklung landwirtschaftlicher Märkte und, hierdurch, einer Verbesserung kleinbäuerlicher Leben, haben alle Akteure von momentaner Relevanz dabei einen Wertschöpfungskettenansatz verfolgt. Der Beitrag dieser Initiativen zu einer nachhaltigen Armutsbekämpfung ist jedoch bis dato unbekannt. Diese Studie beschäftigt sich daher mit der Frage, wie Marktdynamiken und Eingriffe in diese „Nachhaltige Entwicklung“ der Vulnerablen und Armen beeinflussen in einem Schwellenland wie Ghana. Um dies zu tun, schaut diese Studie auf kleinbäuerliche Lebenshaltungssysteme in der Upper East Region des Landes. In der Region treffen Umweltwandel, ökonomische Globalisierungsprozesse und Eingriffe in landwirtschaftliche Wertschöpfungsketten, letztere durch das Ghanaischen Ministeriums für Ernährung und Landwirtschaft und ausländische Entwicklungshilfeorganisationen wie USAID, auf eine kleinbäuerliche Gesellschaft.

Um die Auswirkungen von Marktdynamiken und -eingriffen innerhalb dieses multidimensionalen Kontextes verstehen zu können, fordert und nutzt diese Studie einen holistischen Livelihood-/Lebenshaltungsansatz in Kombination mit einem konkreteren Wertschöpfungsketten- und Produktionsnetzwerkansatz als konzeptionellen Hintergrund. Auf Basis dieses theoretischen Herangehens, wurden über 10 Monate hinweg diverse Daten in zwei Dörfern der Upper East Region gesammelt, in Biu und Mirigu, mit Fokus auf Tomaten, Chili und Reis, ihrerseits Produkte von besonderer Bedeutung für örtliche Produzenten. Bei der Feldforschung wurden im Wesentlichen qualitative wie auch quantitative Methoden genutzt. Bäuerliche Fokusgruppendifkussionen (n=37) und vertiefte Einzelinterviews mitsamt Farmbudgets (n=47) waren die primäre Datenquelle. Experteninterviews (n=70) und Gruppendiskussionen mit Experten (n=2) wurden abgehalten. Umfragen unter Haushaltsvorständen (n=177) und unter örtlichen Experten (n=25) wurden genutzt, um zuvor durch qualitative Methoden generierte Hypothesen zu überprüfen. Primär- und Sekundärdaten über die Wertschöpfungsketten von Tomaten, Chili, Reis und teils auch Kariténüsse/-butter

wurden gesammelt. Sekundärdaten wie vertrauliche, interne Dokumente diverser Organisationen, erlauben andernfalls verborgene Einsichten in den kleinbäuerlichen Zugang zu Subventionen und Unterstützung. Untersuchungen von Aufzeichnungen der örtlichen Kirche, die bis in das Jahr 1905 zurückgehen, ermöglichen einen Blick auf lokale Entwicklung in einer längerfristigen, historischen Perspektive.

Diese Studie erbrachte hierdurch eine Anzahl von Einsichten mit Relevanz für konzeptionelle Ansätze im Bereich der Armutswirkung von Märkten, deren Dynamiken und Eingriffe in diese. Die Lebenshaltungssystemanalyse zeigte sich hierbei als unverzichtbar um wichtige Aspekte menschenorientierter, humaner Entwicklungspotentiale und -hemmnisse innerhalb des örtlichen Umwelt- und Institutionenkontextes zu verstehen. Wertschöpfungsketten- und Produktionsnetzwerkanalysen erlaubten weitergehende Einsichten in Marktdynamiken, deren strukturelle Gegebenheiten, deren Grundprinzipien und Konditionen für eine erfolgreiche Teilnahme der örtlichen Bevölkerung. Man kann daher folgern, dass beide dieser grundlegenden Ansätze konzeptionell miteinander verbunden werden sollten, um zukünftige Forschung zur Armutsminderung durch Märkte und Interventionen in diesen voranzubringen, um das zu adressieren was im Folgenden als Aufwertung („upgrading“) von Lebenshaltungssystemen verstanden wird.

Diese Studie leistet weiterhin einen Beitrag zu dem Verständnis zentraler Aspekte lokaler Entwicklung und zukünftigen Möglichkeiten um eine höhere Nachhaltigkeit von Lebenshaltungssystemen zu erreichen, durch Eingriffe seitens des Staates oder durch Entwicklungshilfeorganisationen. Vornehmlich wurde klar, dass „positive“, armutsmindernde Marktdynamiken auch auf lokaler Ebene wahrgenommen werden, jedoch durch räumlich und sozial marginalisierte, arme und verletzte Kleinbauern nicht genutzt werden können. Dies liegt primär an der Abschöpfung von Unterstützungsmaßnahmen durch lokale Eliten und an der allgemein vorherrschenden Korruption, letztlich eine Frage von schlechter Regierungsführung und Basisbeteiligung innerhalb der verschiedenen Entwicklungsprojekte, die jedoch soziale Dimensionen innerhalb derer sie sich bewegen vernachlässigen. Weiterhin adressieren diese Projekte weder Umweltdegradation noch heutigen oder zukünftigen Umweltwandel, insbesondere Klimawandel und Bodendegradation. Somit bleiben die genannten Interventionen weit unterhalb ihres möglichen Potentials, fördern sogar einen Verlust natürlicher Ressourcen und steigern weiterhin eine bereits stark ausgeprägte, sozioökonomische Ungleichheit. Im Angesicht des jüngsten, wirtschaftlichen Aufbruchs in (Nord) Ghana, trotz aller Globalisierungstendenzen, müssen zukünftige Anstrengungen die nachhaltige Entwicklung fördern wollen, ökologische und insbesondere soziale Dimensionen in Konzepten und Praxis berücksichtigen.

## Table of Contents

List of Figures .....	v
List of Tables.....	viii
List of Maps.....	ix
List of Photos.....	x
List of Abbreviations.....	xi
1. Introduction and Overview .....	1
2. Background: Development Policies and Northern Ghanaian Poverty .....	3
2.1. Pre-Independence .....	3
2.2. Post-Independence (1957 to 1983).....	4
2.3. Structural Adjustment and Economic Reform (1983 to the mid-2000s).....	9
2.4. The Cost of Adjustment.....	10
2.5. Post-Adjustment (the mid-2000s onwards) – New Opportunities for Northern Ghana? ...	14
2.6. Conclusion.....	17
3. Theory: Poverty Alleviation by Market Integration.....	20
3.1. Poverty and the Livelihood Approach.....	20
3.1.1. Overview of the Sustainable Livelihood Framework.....	23
3.1.2. Externalities: Structural Constraints and Incentives.....	24
3.1.2.1. Vulnerability Context.....	25
3.1.2.2. Transforming Structures and Processes .....	26
3.1.3. Internalities: Agency Constraints and Incentives .....	27
3.1.3.1. Livelihood Assets.....	27
3.1.3.2. Livelihood ‘Strategies’ or ‘Pathways’ .....	31
3.1.3.3. Livelihood Outcomes .....	35
3.2. Markets and Chain and Production Network Concepts.....	37
3.2.1. Global Commodity Chains .....	39
3.2.2. Global Value Chains .....	40

3.2.3.	Global Production Networks .....	42
3.2.4.	Development by Upgrading .....	44
3.2.4.1.	Concepts of Upgrading .....	44
3.2.4.2.	Upgrading in Agriculture by Contract and Outgrower Farming .....	48
3.3.	Theoretical Synthesis.....	55
3.3.1.	Arguing for a Combination of SLF and GVC/GPN Approaches.....	55
3.3.2.	Approach Taken .....	57
3.3.3.	Research Questions .....	61
4.	Methods.....	63
4.1.	Course of Action and Method Application.....	63
4.2.	General Field Access and Interaction.....	65
4.2.1.	At Community Level.....	65
4.2.2.	At Administrative Level.....	70
4.2.3.	At Trader Level .....	71
4.3.	Methods in Detail .....	71
4.3.1.	Farm Budgets and In-depth Interviews .....	72
4.3.2.	Expert and Individual Interviews .....	73
4.3.3.	Farmer Focus Group Discussions (FGDs) .....	74
4.3.4.	MOFA/Expert FGDs and Surveys.....	77
4.3.5.	Household Head Survey.....	78
4.3.6.	Secondary Data Collection and Archive Survey .....	79
4.4.	Triangulation .....	80
5.	Livelihood Systems under Investigation .....	83
5.1.	General and Spatial Principles of Livelihood Upkeep .....	83
5.1.1.	Crops for Food or Income .....	96
5.1.2.	Crops for Social Capital and Well-Being.....	101
5.1.3.	Major Issues Encountered in the Agrarian Cycle.....	104
5.2.	Environmental Assets.....	110
5.2.1.	Soil Properties, Changes and Sustainable Land Use.....	110



5.2.2.	Livelihood Impacts of Soil Changes .....	115
5.2.3.	Climatic Properties, Changes and Sustainable Land Use.....	121
5.2.4.	Livelihood Impacts of Climatic Change.....	131
5.3.	Man-Made Assets .....	138
5.3.1.	Basic Infrastructure and Services .....	138
5.3.2.	Housing Infrastructure.....	144
5.3.3.	Demographics, Health and Labour Force.....	148
5.3.4.	Education and Religion .....	153
5.3.5.	Finances.....	159
5.3.5.1.	Outlines of Savings .....	159
5.3.5.2.	Outlines of Liquid Financial Capital.....	161
5.3.5.3.	Sources of Credit and Support .....	162
5.3.5.4.	Crops and Possible Incomes.....	163
5.3.6.	Social Interaction and Cooperation .....	169
5.3.6.1.	Horizontal Social Capital .....	170
5.3.6.2.	Vertical Social Capital .....	174
5.4.	Major Livelihood Outcomes and Opportunities.....	184
5.4.1.	Food and Income .....	184
5.4.2.	Natural Resource Base Usage and Resilience to Climate Change .....	190
5.4.3.	Well-Being .....	195
5.4.4.	Summarised Insights Generated on Overall Vulnerability and Potentials	197
5.4.4.1.	Transformation, Results and Potentials of Environmental Factors.....	198
5.4.4.2.	Transformation, Results and Potentials of Social Factors.....	201
6.	Markets.....	204
6.1.	The Tomato Market.....	205
6.1.1.	General Overview.....	205
6.1.2.	Local Structure and Geography.....	208
6.1.3.	Access, Inputs and Outputs .....	213
6.1.3.1.	Fresh Tomato Trade .....	215

6.1.3.2. Public Tomato Processing.....	219
6.1.3.3. Private Tomato Processing.....	221
6.1.4. Governance Dynamics .....	223
6.1.4.1. Fresh Tomato Trade .....	223
6.1.4.2. Public Tomato Processing.....	231
6.1.4.3. Private Tomato Processing.....	235
6.1.5. Conclusion.....	239
6.2. The Chili Market .....	246
6.2.1. General Overview.....	246
6.2.2. Local Structure and Geography.....	248
6.2.3. Access, Inputs and Outputs .....	250
6.2.4. Governance Dynamics .....	256
6.2.5. Conclusion.....	260
6.3. The Rice Market.....	264
6.3.1. General Overview.....	264
6.3.2. Local Structure and Geography.....	268
6.3.3. Access, Inputs and Outputs .....	272
6.3.4. Governance Dynamics .....	281
6.3.4.1. Governance Dynamics in General Rice Trade.....	281
6.3.4.2. Governance Dynamics in Public Programmes.....	286
6.3.4.3. Governance Dynamics in the USAID ADVANCE Programme.....	297
6.3.5. Conclusion.....	304
7. Sustainable Livelihoods and Value Chains .....	312
7.1. Theoretical insights .....	312
7.2. Central Aspects of Livelihoods and Avenues to Sustainability .....	316
References .....	321

## List of Figures

Figure 1: Possible levels of engagement of sponsors/lead firms in CF arrangements .....	50
Figure 2: Risk and power allocation in CF and out-grower arrangements, according to models .....	52
Figure 3: Framework for livelihood sustainability under market effects .....	58
Figure 4: Research design and course of action in the field.....	64
Figure 5: Age and sex of survey participants .....	79
Figure 6: Model of sociological explanation.....	81
Figure 7: Cropping calendar for major rainfed crops in Bui and Mirigu .....	87
Figure 8: Cropping calendar for major irrigated crops in Bui and Mirigu .....	95
Figure 9: Trends in crops (2003-2013) by gender of respondent in Bui .....	96
Figure 10: Community events in Bui and Mirigu .....	103
Figure 11: Severity of issues within agrarian cycles/natural capital endowment and usage in Bui .....	106
Figure 12: Inequality in land use in Bui .....	107
Figure 13: Major trends in natural capital endowment as perceived by household heads in Bui .....	109
Figure 14: Trends in animal holdings as perceived by household heads in Bui .....	109
Figure 15: Trends in crop diseases as perceived by household heads in Bui .....	116
Figure 16: Long-term (1980-2005) average rainfall (mm), relative humidity (RH); potential evapotranspiration (PET) and temperature (T) for Navrongo .....	122
Figure 17: Timeline of floods, droughts and famines/food shortages (black boxes, with year) in the Bui-Navrongo-Mirigu area.....	128
Figure 18: Annual (green) and 5-year moving average rainfall (red) in Navrongo from 1961 to 2009 .....	128
Figure 19: Onset of wet-seasons in the Navrongo area, sowing time of millet and incidents of food shortages.....	129
Figure 20: Sowing times of millet from 1905 to 1950 and in 2012/13, and incidents of food shortages and famines in the Navrongo area.....	130
Figure 21: Vertically exaggerated land use profile of Bui from south-west to north-east .....	131
Figure 22: Population pyramid for Bui and Central Mirigu in 2010.....	151
Figure 23: Timeline of famines/food shortages and disease in the Navrongo-Mirigu-Bui area .....	152
Figure 24: Education levels among Bui's inhabitants.....	155
Figure 25: Allocation of savings in Bui .....	160

Figure 26: Average costs of selected, irrigated crops, expected yields, prices and net returns per acre in the 4th quarter of 2012 at common wage of 6 GHC/man-day.....	165
Figure 27: Estimated prices and production costs of 'optimal' shea nuts processing and butter production at minimum and common wage in 2012 .....	166
Figure 28: Estimated farm gate prices of rice, tomato, chili and shea in 2012 .....	167
Figure 29: Major (coloured) and minor (shaded) selling times of selected crops and their major planting times ('P').....	167
Figure 30: Trends in financial capital and its major sources.....	168
Figure 31: Annual inflation and adjusted growth in farm gate prices of selected crops in Bui and Mirigu .....	169
Figure 32: Gender and household decisions in Bui.....	171
Figure 33: Trends in the 'sweetness of business interaction' (0 = 'bad' to 10 = 'great') in Bui (above) and Mirigu (below) with regard to selected cash crops.....	178
Figure 34: Willingness to betray government and private entities among the thereby supported and the general public in Bui.....	179
Figure 35: Seasonality of 'severe'/'above normal' lack of finances and times of hunger among female and male headed households in Bui .....	186
Figure 36: Trends in food and finances as perceived by female and male household heads in Bui .....	186
Figure 37: Duration of money and food shortages according to attested difficulty in attaining inorganic fertilisers in Bui .....	190
Figure 38: Trends in major well-being indicators as perceived by female and male household heads in Bui .....	195
Figure 39: Major associations between relevant elements of vulnerability, as based on code co-occurrences in all qualitative data .....	198
Figure 40: Production, imports and exports of tomato products in Ghana.....	206
Figure 41: The Ghanaian tomato value chain.....	212
Figure 42: Intensity of associations made between tomato chain access and assets required (left) and chain outcomes for farmers' assets and livelihood outcomes (right) .....	214
Figure 43: Illustration of tomato production costs, expected yields, average prices (January-March 2012) and net returns per acre at minimum wage of 4.8 GHC/man-day .....	215
Figure 44: Tomato wholesale prices.....	216
Figure 45: Composition of the average kilo retail price of tomato from northern Ghana and Burkina Faso, sold in Accra from January to March 2012.....	217
Figure 46: Production of chili in Ghana.....	247
Figure 47: The (northern) Ghanaian chili value chain .....	250

Figure 48: Intensity of associations made between chili chain access and assets required (left) and chain outcomes for farmers' assets and livelihood outcomes (right) .....	253
Figure 49: Illustration of chili costs, expected yields, prices (2012) and net returns per acre at minimum wage of 4.8 GHC/man-day .....	254
Figure 50: Estimated average composition of the kilogram retail price of chili from Northern Ghana, sold in Accra during the 1st quarter of 2012.....	255
Figure 51: Production and major imports and exports of milled rice in Ghana .....	266
Figure 52: Hectares under rice cultivation at the Tono Irrigation Project from 1985 to 2011 according to season and usage.....	269
Figure 53: The northern Jasmine rice value chain.....	272
Figure 54: Intensity of associations made between rice chain access and assets required (left) and chain outcomes for farmers' assets and livelihood outcomes (right) .....	276
Figure 55: Estimates of paddy Jasmine rice production costs, expected yields, average prices (June – July 2012) and net returns per acre at minimum wage of 4.8 GHC/man-day .....	276
Figure 56: Prices of rice at district, southern Ghanaian and world level from 2009 to 2012..	278
Figure 57: Estimated average composition of the kilogram retail price of milled Jasmine rice grain from irrigation projects in Northern Ghana, sold in Accra in June – July 2012 .....	278
Figure 58: Illustrations of paddy Jasmine rice production costs, yields, average prices (June – July 2012) and net returns per acre at minimum wage.....	280
Figure 59: Illustration of margins per acre according to socio-economic stand of producer..	280
Figure 60: Allocation of all Block Farming subsidies in 2012 at anonymised district level....	293
Figure 61: Flowchart of all traceable, legal and illegal government subsidy usages .....	307

## List of Tables

Table 1: Relevant sub-topics and theoretical approaches used .....	62
Table 2: Sub-topics of research and their methodological approach.....	63
Table 3: Major primary data outcome of research by place .....	65
Table 4: Data types collected according to method and scale .....	82
Table 5: Ranking of crops .....	101
Table 6: Growth periods of major rainfed crops .....	136
Table 7: Population change in in the region and district of the study areas .....	149
Table 8: Costs of one emergency shelter.....	160
Table 9: Primary costs of production for irrigated rice at average intensity and an expected yield of 2 tonnes per acre.....	162
Table 10: Pearson correlations of land uses and the duration of food and income insecurity	187
Table 11: Estimated costs of NSTC's processing of 1 kilo of tomato paste in 2010 .....	220
Table 12: Development of yields, farm gate prices, farmers' net returns and margins under Expom's production model .....	222
Table 13: Estimated cost of Expom's processing of 1 kg of tomato paste in 2010.....	222
Table 14: Landed cost of 1 kg of imported tomato concentrate.....	222
Table 15: Planned and actual allocation of subsidised fertiliser bags (50 kg) among districts of the Upper East Region in 2012.....	289

## List of Maps

Map 1: The study areas, Bui and Mirigu .....	83
Map 2: Illustration of major land reserves and usages in Mirigu .....	85
Map 3: Illustration of major land reserves and usages in Bui .....	86
Map 4: Wet season, compound land use .....	88
Map 5: Growth in compound densities (per km <sup>2</sup> ) from 1967 to 2008 in Bui (left) and Mirigu (right).....	89
Map 6: SGI garden of five farmers in Mirigu .....	94
Map 7: Irrigated fields near Bui .....	94
Map 8: Bui's sections, its 'centre' (purple), irrigation user density and infrastructure with exposition to flooding in 1966/2010.....	132
Map 9: Mirigu's 'centre' (purple to blue) and infrastructure with exposition to flooding in 1966/2010.....	132
Map 10: Major infrastructure and houses in central Bui and Mirigu .....	140
Map 11: Major regions of rice production in Ghana, according to their contribution to total domestic production in 2011 .....	268

## List of Photos

Photo 1: Communal land preparation during the wet season in Biu .....	87
Photo 2: Sublateral canals at the Tono irrigation scheme near Biu.....	91
Photo 3: Furrow irrigation at the Tono irrigation scheme near Biu .....	92
Photo 4: Dry season river dugout near Mirigu .....	92
Photo 5: Dry season wells with bucket irrigation in Mirigu .....	93
Photo 6: ICOUR rice silo near Nasia .....	141
Photo 7: ICOUR rice scale and mill near Nasia .....	141
Photo 8: Broken and dismantled equipment at the ICOUR workshop.....	142
Photo 9: Broken sublateral canal serving low lands near Biu .....	143
Photo 10: Traditional compound structure cross section (upper left), mud compound (upper right), roofed square compound (lower left), concrete house (lower right) .....	148
Photo 11: Public school building in Biu.....	154
Photo 12: The NSTC paste factory in Pwalugu, UER, Ghana .....	211



## List of Abbreviations

AAGDS	Accelerated Growth and Development Strategy
Ac	Acres
ADVANCE	Agricultural Development and Value Chain Enhancement programme
AGS	Accelerated Growth Strategy
BF	Block Farming
BUSAC	Business Sector Advocacy Challenge Fund
CF	Contract Farming
CFA	Colonies Françaises d’Afrique
DCE	District Chief Executive
DS	Dry Season
ECOWAS	Economic Community of West African States
EDAIF	Export Development and Agricultural Investment Fund
EDIF	Export Development and Investment Fund
EPA	Economic Partnership Agreement
EPAG	Environmental Protection Agency
ERP	Economic Reform Program
FAO	Food and Agriculture Organization of the United Nations
FASDEP	Food and Agricultural Sector Development Policy
FBO	Farmer-based Organisation
FGD	Focus Group Discussion
GATT	General Agreement on Trade and Tariffs
GAWU	Ghana Agricultural Workers’ Union
GCC	Global Commodity Chain
GDP	Gross Domestic Product
GHC	Ghana Cedi
GIHOC	Ghana Industrial Holding Corporation
GIZ	Gesellschaft für Internationale Zusammenarbeit GmbH
GNAFF	Ghana National Association of Farmers and Fishermen
GPRS	Ghana Poverty Reduction Strategy
GSGDA	Ghana Shared Growth and Development Agenda
GVC	Global Value Chain
Ha	Hectares
HH	Household
HHH	Household Head
HIPC	Heavily Indebted Poor Country Initiative
ICOUR	Irrigation Company of Upper Region
IMF	International Monetary Fund
KfW	Kreditanstalt für Wiederaufbau
KND	Kassena Nankana District
M4P	Making Markets Work for the Poor
MDG	Millennium Development Goal
METASIP	Medium Term Agriculture Sector Investment Plan

MIDA	Millennium Development Authority
MOFA	Ministry of Food and Agriculture
MOTI	Ministry of Trade and Industry
MTI	Mercury Tomato Industries
N.P.K.	Nitrogen, Phosphorous, Potash/Potassium Fertiliser
NADMO	National Disaster Management Organization
NAFCO	National Food Buffer Stock Company
NDC	National Democratic Congress
NGO	Non-governmental Organisation
NLC	National Liberation Council
NPP	New Patriotic Party
NSTC	Northern Star Tomato Company
NTTA	National Tomato Trader Association
PFL	Premium Food Limited
PRA	Participatory Rural Appraisal
PRSP	Poverty Reduction Strategy Paper
PSI	President's Special Initiative
RADU	Regional Agriculture Development Unit
SADA	Savannah Accelerated Development Authority
SAP	Structural Adjustment Program
SGL	Shallow Groundwater Irrigation
SLF	Sustainable Livelihood Framework
TICFU	Tono Irrigation Cooperative Farmers' Union
UER	Upper East Region
UN	United Nations
USAID	United States Agency for International Development
USSR	Union of Soviet Socialist Republics
VC	Value Chain
WS	Wet Season
WTO	World Trade Organisation
YIAP	Youth in Agriculture Program
ZEF	Zentrum für Entwicklungsforschung

## ***1. Introduction and Overview***

This study is concerned with the sustainable development of smallholders' livelihoods in northern Ghana under climatic change and market influences, whereby the latter are altered by government and foreign aid interventions in agricultural value chains. Research was conducted in Ghana's north, in the Upper East Region, traditionally characterised as having the highest levels of poverty in the country (AL-HASSAN 2013: 226). In this regard interventions in the agricultural sector are of special importance, since farming directly employs almost the entire population (GHANA STATISTICAL SERVICE 2013: 285). Public agricultural development policies and programmes have attempted, with minor successes, to address the issue of poverty in Ghana's north since the country's independence. However, some of these policies have intensified nationwide disparities, to the disadvantage of the north (SONGSORE 2011; YARO 2013). In addition, smallholders in the region are nowadays confronted with severe climatic and environmental change as well as the effects of globalisation processes, a form of 'double exposure', and as such are said to be having severe difficulties in coping with these circumstances (LAUBE et al. 2011: 753). Yet, in recent years, public as well as externally funded approaches have placed a focus on the north through interventions aiming at smallholder market integration by the targeted support of crucial leverage points in selected agricultural value chains (GOVERNMENT OF GHANA 2010; OUMA et al. 2012: 227-228; PWC GHANA 2013: 5, 27; YARO 2013: 12). Among the value chains of special significance to northern Ghana are those of chili, tomato, and rice, parts of which are supported by public and donor endeavours. Since the effects of these public and donor value chain involvements on poverty are still mostly unknown, they need to be tested according to their local, pro-poor impact. Focussing on agricultural markets of chili, tomato and rice – products that are mostly grown in northern Ghana – and interventions within their value chain, this thesis thereby explores the potential for economically, environmentally and socially suitable, thus 'sustainable' development of male and female smallholders' livelihoods.

The theoretical framework of this study brings together human, market and environmentally orientated development approaches to conceptualise and test this policy-market-poverty nexus accordingly, to thereby enable a closer look into the implications, constraints and opportunities for sustainable smallholder development. It accomplishes this goal by applying the sustainable livelihoods approach, which covers aspects of agency in a given social and physical context. The approach is enriched with value chain analysis and elements of global production network analysis to emphasise the outcomes of market integration and intervention. Chapter 2 provides an introduction to the wider vulnerability context of the region by giving an overview of historical and contemporary policy and foreign aid interventions. Chapter 3 distils and presents the theoretical background and resultant research questions, the responses to which were obtained

using a methodology, which included diverse methods, outlined in Chapter 4. Chapter 5 narrows down the analytical view of the study to the livelihood system level. Using the data gathered over a 10-month stay (2012/13) in two villages – Biu and Mirigu – of the Upper East, the chapter centres upon the use people make of their changing natural and social environment. A major component of the peoples' livelihood outcomes relates to value chain integration of tomato, chili, and rice production, which are altered by government and development aid interventions. These, the resulting chains' structures, their avenues for access, their possibilities for upgrading and their contributions to livelihood sustainability are then examined in Chapter 6. Final conclusions are then drawn in Chapter 7.

## ***2. Background: Development Policies and Northern Ghanaian Poverty***

Ghana's economic and political history is generally subdivided into four phases: the pre- and post-independence period, the period of economic and structural adjustment and, the present-era, post-adjustment. This chapter summarises insights derived from this history, to derive crucial leverage points that can be observed in future attempts to bring pro-poor development to the Upper East Region, where poverty in Ghana has always been most severe.

### ***2.1. Pre-Independence***

In pre-colonial days the utilization of land and the seasonal cultivation of crops in northern Ghana and its Upper East Region were mostly governed by religious beliefs, embodied by so called 'Earth Priests' (the 'Tengnyam', a.k.a. landlords). These administered land decentrally and were political leaders of local settlements at the same time (TONAH 2008: 116). Peasant communities in northern Ghana were mostly characterised by a subsistence economy, the exploitation of the immediate natural environment. Yet, that is not to say that peasants had not become parts of larger, commercial trade systems. Since the fourth century, dense trade networks had been woven between Saharan, northern Ghanaian and more southern market towns. Trade across the desert and into today's Ghana was organised through multiple 'Saharan ports'. Until the middle of the 18th century it was mostly gold, ivory, cotton, ostrich feathers and slaves which were exported by camel, caravan trade. Furthermore multiple internal trade channels connected regions within Ghana, carrying mainly local products such as foodstuffs and local crafts, but also few European goods (GRÉGOIRE 1997: 91). Major trade routes – connecting what is nowadays southern Ghana to Burkina Faso – went through today's Upper East Region. As a result, the northern regions of Ghana had progressed prior to colonisation, due to the middleman role they played. Their strategically favourable location had initiated the formation of a small (upper) class of merchants, aside the aforementioned Earth Priests (SONGSORE 2011: 153).

Colonial rule under the British – following the annexation of northern Ghana by 1901 – then consciously induced socio-economic north-south disparities in Ghana, to the disadvantage of northern parts of the country, to attract labourers to the south of the country (AHWOI 2010: 4; LAUBE 2007: 60; SONGSORE 2011: 81-85, 153; YARO 2013: 6). Most economically useful infrastructure, commercial crop production, mining activities and general economic value of the land, became heavily concentrated within the southern parts of Ghana (SCHULTZE 1955: Beilagen 3-7). The 'golden triangle' between Accra, Kumasi and Sekondi-Takoradi prospered (GRÉGOIRE 1997: 92), while the north of Ghana was increasingly characterised by a mass of semi-proletarianized peasantry (SONGSORE 2011: 88-90), now partly under indirect rule of chiefs which had been enthroned by the British (AMANOR 2008: 63). On top of the severe conflicts that caused with the former leaders – the landlords – little to no positive socio-economic

development took place in northern Ghana under colonial government (YARO 2013: 7). But, with independence in 1957 under Kwame Nkrumah, the first indigenous president of Ghana, underdevelopment of the north gained more political attention.

## ***2.2. Post-Independence (1957 to 1983)***

Opposed to previous colonial policies and as a sign of independence, Ghana embarked on economic protectionism. Massive state participation in the economy and especially in agriculture, far beyond the Marshallian-type of intervention as found in Europe following World War Two, was seen as a historical necessity. In order to industrialise the country, to diversify the primary production portfolio of the economy and to create economic opportunities, import substitution policies were implemented in the early 1960s. Tariff and non-tariff measures were further used as trade barriers to limit imports. The importation of final goods was heavily restricted to protect domestic, especially government industries. Exchange control, tariffs and quantitative controls were introduced to encourage domestic manufacturing. Domestic infant industries were to grow, at the cost of restricting movement of goods, people, information and by keeping multinational enterprises out of the country (LARYEA & AKUONI 2012: 10-12; SONGSORE 2011: 102). Thus, the era from independence to the mid-1960s saw the emergence of the state as the engine of general economic growth (AHWOI 2010: 5-6), partly also in northern Ghana.

Economic programmes prior to independence had largely neglected/underdeveloped the north of the country. Nkrumah, however, wanted to turn Ghana's north into the bread basket of the country, essentially, by establishing agro-industries to be fed by large-scale irrigation projects (LAUBE 2007: 64). He envisioned an industrialisation of the northern countryside that was to initiate rural development with the help of out-grower, contract farming schemes. Improvements in food security and well-being were then to come from increased farmer incomes through better market access (AMANOR & PABI 2007: 56). State-owned industries were to be created throughout Ghana and especially in its north to source raw materials from large state farms and peasants (AHWOI 2010: 5-6). Another elementary aspect of the newly formulated policies was the promotion by the government of cash crops in northern Ghana. Seen as a way to diversify the economy, agricultural inputs, among them ploughs and tractors, seeds and fertilisers, were heavily subsidised (AMANOR & PABI 2007: 56; see also FAO 2005; LAUBE 2007: 64). The government constructed 104 small dams in the Upper East (LAUBE et al. 2008: 9) and dry-season cash crop gardening, such as tomato and chili, were actively encouraged (ADU 1969: 17-18). Furthermore, crops like rice and tomato from the newly envisioned 'Vea' irrigation scheme were to feed future agro-processing facilities in the Upper East Region (FAO 1970: iii, 1; LAUBE 2007: 92). As a result of government intervention, tomatoes became the main type of cash-crops. Further government initiatives included the construction of a rice mill in the regional capital

Bolgatanga. At the time, a rapid shift in consumer preferences to rice had taken place, owing to increased incomes in the urban centres of the south, government pricing policies, as well as the grain's good storability and ease of cooking. From 1957, rice production was greatly expanded in the north of Ghana. At least until the end of the 1990s, and if not until today, the rice processing factory and mill remained the region's largest agro-industrial establishments (ADU 1969: 17-18; CATHOLIC CHURCH NAVRONGO 1905-1920; GHANA STATISTICAL SERVICE 2005: 8-12; OTENG 1997: 38; VOSCON ASSOCIATES & MAGNA CONSULTING 1997: 5; YARO 2013: 6, 11).

Nkrumah's rule contributed to an economic upturn in the Upper East Region. The region was increasingly integrated into the domestic economy and was able to attract some investments in infrastructure and public services, which resulted in some poverty alleviation (ADU 1969: 17-18). However, Nkrumah's success in fighting poverty in the north was greatly limited since most of the support was captured by private, bureaucratic or political elites. Furthermore, distributional patterns of support corresponded with the geographical patterns of political interests, most of which were based in the south of the country. A wealthy, urban society, mostly southern-based, came to live off the rural poor, even by exploiting services that were specifically designated to serve the needs of the (northern) poor (SONGSORE 2011: 107, 154-155; YARO 2013: 8). Aside from this, government overrule of the economy, hoarding, speculation, illegal exchanges and contraband also diminished state resources, which led to shortages, created black markets and contributed heavily to the failure of Nkrumah's economic programmes (LAUBE 2007: 66). Economic activity took place underground, in a parallel economy known as the 'kalabule' system (SONGSORE 2011: 163). Therefore, the government's balance of payments came under pressure by financial constraints (LARYEA & AKUONI 2012: 10). Nkrumah was overthrown in 1966 as a result of growing public dissatisfaction and unrest (AHWOI 2010: 6).

The National Liberation Council (NLC) came into power and started privatising state-owned enterprises and farms in order to consolidate the economy (AHWOI 2010: 6). They pursued a neo-liberal approach to development at the nation-wide level, although this did not stop them from initiating a public tomato processing factory in the Upper East, the Northern Star Tomato Company (NSTC). Prior to this, little agro-processing had taken place in Ghana (ROBINSON & KOLAVALLI 2010: 1). This public industry was 'established with an over-optimistic expectation' which did 'not so materialise', due to a lack of quality personnel and final products (FAO 1970: 2). The processing industry depended entirely on domestic demand, but local consumers showed no interest in its products. Despite high duties, importation still offered a greater margin to vendors, and, moreover, consumers continued to prefer foreign products due to their perceived or real superior quality (SCHÜRMAN 1967: 4-11). Also, the tomato processing factory in northern Ghana operated for only three months of the year and entirely on diesel

generators, making it highly unattractive to producers (VOSCON ASSOCIATES & MAGNA CONSULTING 1997: 6).

Initiating such agro-processing to contribute to poverty reduction in the Upper East was of little success and the industry continued to suffer over the decades to come. The initiated factory was characterised by poor operational efficiency, underutilisation of capacities, thus high operation costs and could only survive behind high tariffs walls as they constantly made losses over the 1960s and 1970s. This not only further diminished government resources, but led to declining real incomes in agricultural, non-industrial areas, because these government industries, as much as other non-government industries, were greatly dependent on imported raw materials. The high production costs reflected in higher consumer prices, which disadvantaged the poorest in northern Ghana. As a result of the continued failure to improve lives in the north, disparities in Ghana kept on growing.

Ghana's southern 'golden triangle' continued to prosper, but not the north of Ghana as had once been planned. By 1969, 86 percent of all registered industrial enterprises, over 80 percent of the labour force and over 90 percent of the value added to industry, were found in the Accra-Sekondi-Takoradi-Kumasi area. The north of the country continued to suffer from severe poverty, leading to further migration to the cities of the south. Spatial concentration of the economy in the south was thus further cemented during immediate post-colonial times, because aside from the aforementioned tomato paste factory, the vast majority of government interventions had actually continued to foster the southern-based cocoa production and trade. Sharpening contradictions in nationwide socio-economic well-being and social marginalisation were the result. State-led growth in agriculture had utterly neglected the food crops sector, especially in northern Ghana, despite the fact that most of the North's peasants were engaged in food crop production. From the 1960s, domestic food demand began to outstrip the country's agricultural production. Food prices and imports rose steadily as a result, but imports were restricted by foreign exchange constraints and thus exacerbated demands made on the government's financial resources (SONGSORE 2011: 109-112, 126, 130, 171).

In 1969 the Progress Party (PP) tried to return the economy to a more market-oriented, capitalist system. It withdrew government support to agriculture and agro-processing as a result of its growing financial problems. Only minor macroeconomic management was able to take place before a military coup, in 1972, ended all economic consolidation efforts (LARYEA & AKUONI 2012: 12). The military National Redemption Council started to pursue a policy of food and raw material self-sufficiency that involved enormous government spending. Duty exoneration and subsidies on agricultural inputs were designed to attract private investors and ease peasants' production constraints (AHWOI 2010: 6-7; AMANOR & PABI 2007: 56; FAO 2005: 13). Reacting to rising food prices and imports, further investment in food crop production was made



under the names ‘Operation Feed Yourself’ and ‘Operation Feed Your Industry’ (SONGSORE 2011: 130). At no time in Ghanaian history were subsidies as high as they were at this time, i.e. the mid to late 1970s. Northern Ghana received considerable support to produce rice and tomato, among other products, to feed consumers in the south. Fertilisers, seeds, bullock ploughs, tractors, and combine harvesters were made available in local service centres at subsidised rates (YARO 2013: 8). Additionally, research was initiated to find further suitable places for large-scale irrigation in the north (SOIL RESEARCH INSTITUTE 1977: 1). The ‘Tono Irrigation Project’ – put in place by 1975 until the middle of the 1980s – became one of the largest agricultural dams in West Africa. It allowed production of rice and tomato on larger scales and irrigates an area of about 2000 ha, used by several thousand farmers coming from eight nearby villages. It also includes silos with a capacity of 700 tonnes as well as grinding mills for rice, aside 42 km of canals and 120 km of road networks. The project is managed by the “Irrigation Company of the Upper Region” (ICOUR), which further takes care of a smaller irrigation scheme nearby, the Veve irrigation project. Both, but especially the Tono irrigation project, sought to further integrate local producers into the national economy (i.e. the demand structures of the south), to provide economic opportunities to larger sections of the population, to ease perennial food shortages by the production of staples, and to counter the high rate of migration from the north (GHANA STATISTICAL SERVICE 2005: 8-10; ICOUR 2009: 2; LAUBE 2009: 2, 89; MDEMU 2008: 14-15; TONAH 2008: 113).

Despite a multitude of further projects put in place aside the above mentioned and an all-time high in public spending, often to support rice production, outcomes in terms of poverty alleviation in northern Ghana remained low during the 1970s. Public projects caused interregional disparities to increase, because from the beneficiaries of government subsidies were, once again, richer people, namely civil servants, businessmen, contractors and military officers, most hailing from the traditional industrial core regions of the south. Intraregional disparities grew similarly: though receiving considerably less in absolute amounts, the subsidies that reached the north of Ghana went almost entirely to local elites who earned high incomes through rice farming, comparable to cocoa farmers in the south. The vast majority of northern peasants were forced to remain at subsistence level (SONGSORE 2011: 130, 134, 178). The rent-seeking behaviour of local elites was partly the result of government intervention that excluded paying attention to most traditional crops in northern Ghana, which are also those produced by the poor. Thus effective purchasing power and also food security of the most vulnerable decreased, which overall led to a lowering of living standards in the north.

By the mid-1970s, the situation led to famines in northern Ghana ‘in the midst of plenty’ (YARO 2013: 9). Elite capture and government misconduct was also reflected in the management of the large-scale irrigation projects that had been erected in the north. Completion of the Tono

Irrigation Project ‘was the result of a long, opaque and wasteful process, which made it one of the most expensive irrigation projects ever constructed worldwide’ (LAUBE 2007: 89). Moreover, most lands in the project’s command area were overtaken by ‘richer farmers, allowing the poor ones, very little or no access’ (YARO 2013: 9). Many externally funded projects were of similar, minor success. Ambitious objectives, inadequate funding and poor coordination made these fail (Ibid.: 10). Potential investors and government officials ‘found it more profitable to engage in rent-seeking and other corrupt behaviours, rather than growth-enhancing activities’ (ACKAH & BAAH-BOATEN 2012: 33). At best one could say that governments from the 1970s until 1983 took decisions on political but not economic grounds, showing little understanding for the consequences of their actions. Furthermore, the country endured additional coups in 1979 and 1981, which came about mostly due to the persisting, poor economic conditions (LARYEA & AKUONI 2012: 12). It was a period of instability with ‘successive and frequent changes in political leadership through the barrel of the gun affecting both economic and agricultural policies’ (AHWOI 2010: 5), resulting in economic decay, mostly in the north (LAUBE 2007: 66).

From the mid-1970s to the early 1980s most (public) industries and economic activities collapsed. Government finances were ruined: by the early 1980s, 65 percent of total government expenditure had to go into deficit reduction. The economy shrunk drastically and was later forced to embark on recovery programmes prescribed by the World Bank and the International Monetary Fund (IMF). This structural crisis came earlier than most other African countries because of the severe mismanagement and excessive rent-seeking by the ruling military oligarchy. Only later were these trends exacerbated by the collapse of commodity prices and oil price shocks (SONGSORE 2011: 124, 163, 169, 207). In 1981, Jerry Rawlings initiated reforms characterizing the next era of the region’s agro-economic development: the Economic Reform Programmes (ERPs) and Structural Adjustment Programmes (SAPs). These were side-lined by several international trade agreements, namely the General Agreement on Trade and Tariffs (GATT), the World Trade Organisation (WTO), as well as the Bretton Woods institutions (LARYEA & AKUONI 2012: 10). Reforms were much needed, as ‘the country was on the brink of economic collapse’ (LAUBE 2007: 74). Given the state of the government’s financial resources and the economy as a whole, room for political decision-making was severely limited. ‘Neither the USSR, nor East European countries, Cuba or Libya would, or could, provide concessional finance on anything like the scale needed to restore the economic infrastructure and productive capacity of Ghana’ (RIMMER 1992: 181). Ghana was forced to rely on the IMF and the World Bank, who made strict neo-liberal reforms a precondition for support.

### ***2.3. Structural Adjustment and Economic Reform (1983 to the mid-2000s)***

In its period of economic reform, distortions in Ghana's economy were removed, trade and exchange rates were liberalised, and emphasis was placed on non-traditional exports and, moreover, export led industrialisation (AHOI 2010: 7; LARYEA & AKUONI 2012: 10). The Economic Reform Programmes (ERPs) and Structural Adjustment Programmes (SAPs) put emphasis on a free market system whereby market prices were given a central role in the allocation of resources (AHOI 2010: 7). The main function of the state was now to provide for not much more than 'an enabling environment for market driven and private enterprise-led economic growth' (SONGSORE 2011: 166).

ERPs started in 1983 and came in three phases. ERP I lasted from 1983 to 1986 and was primarily concerned with stabilising the economy, by reducing inflation and external deficits and by export rehabilitation through social and economic infrastructure restoration to promote economic growth (SONGSORE 2011: 167). SAPs followed in the same year. As a result, a foreign exchange retention scheme for non-traditional exports was liberalised and the proportion that could be retained was increased in 1987. Several initiatives were made in order to attract investments into agriculture. They included tax exemptions and rebates, investment guarantees, free trade zones with additional income and dividend tax cuts and the possibility of foreign ownership (AHOI 2010: 9-10). ERP II, from 1987 to 1990, also focused on macroeconomic stability through GDP growth, a lower inflation rate and an improved balance of payments. Import licensing schemes were abolished by 1988, because they were considered redundant since exchange rates were now market-determined. Taxes on imported fruits and vegetables were lowered severely (SONGSORE 2011: 167). To reduce government spending and because donors were no longer willing to support inefficient government industries, processing ventures, such as the tomato factory in the Upper East Region, were forced to close by 1989/1999 (CLOTTEY et al. 2009: 1437; LAUBE 2007: 197).

ERP III set a new emphasis from the early 1990s onwards. Instead of only focusing on economic recovery, it aimed at accelerated growth. The Accelerated Growth Strategy (AGS) was formulated, whereby sustainable development and poverty reduction, with the private sector as the engine of growth, were at the focus. Intersectoral linkages were promoted, especially in the agro-industry. Poverty was to be reduced by labour-intensive, high productivity activities and through better access of the poor to social services through decentralisation. Education and health gained more importance in policies besides capacity building, public sector management and private sector development (SONGSORE 2011: 167-168). In 1992, import quotas were completely abolished and tariffs for food commodities were reduced to 20 percent (ROBINSON & KOLAVALLI 2010: 2).

Adjustment efforts were continued over the decade. In early 2000, Ghana's simple average tariff was further lowered, but after only three months in effect special importation taxes were reintroduced at 20 percent. At the time, these were lower for members of the Economic Community of West African States (ECOWAS), but it took until 2002 for these tariffs to be entirely abolished, in order to bring regulations in line with ECOWAS and WTO provisions (ACKAH, ARYEETAY and MORRISSEY 2012: 104; LARYEA & AKUONI 2012: 14-16). ECOWAS, commissioned to promote economic integration across the region by gradually removing barriers and the eventual creation of a customs union, was established in 1975. However, trade liberalization was introduced after 1990 and showed little progress until 1993, when the treaty started to be revised which then led to a removal of all trade barriers by the year 2000. Additionally, until 2004, a common external tariff was to be established, but negotiations were delayed. Only members of the CFA zone, a bloc within ECOWAS, created a common external tariff. Negotiations on further alignments are still on-going and may include Ghana at some point (ACKAH, ARYEETAY and OPOKU 2012: 51; LARYEA & AKUONI 2012: 25).

These events were side-lined by a further relief measure to government finances that came in 1996, when the HIPC (Heavily Indebted Poor Country) Initiative was introduced by the World Bank, IMF and G8. It allowed the freeing of financial resources, which would have otherwise gone into the paying of debts. The HIPC Initiative came with the conditionality of designing Poverty Reduction Strategy Papers (PRSPs). The first outcome was the Ghana Poverty Reduction Strategy (GPRS I), covering the timeframe 2003 to 2005, and being the first to address poverty reduction directly. In its initial phase it aimed at macro-economic stability through economic growth, modernisation of agriculture, human resource development, good governance, and a focus on the vulnerable and excluded (SONGSORE 2011: 254-256). GPRS I was deemed to be 'a sound macroeconomic framework' (IFAD 2006: 5) and promised to target not only priority sectors, but especially those areas in which poverty was known to be chronic, i.e. northern Ghana (SONGSORE 2011: 261). Further support came from one of the largest externally-funded projects put in place since 2006, the Millennium Challenge Account grant. This US government supervised intervention aimed at commercializing agriculture, specifically to create a competitive horticultural industry (WHITFIELD 2011b: 31 & 32).

#### ***2.4. The Cost of Adjustment***

The reforms of the 1980s, 1990s and 2000s were somewhat successful at a macro-economic level, since they resulted in an increased growth rate, a reduced budget deficit and a lower inflation rate (AHOI 2010: 7). Yet, the overall effects of these reforms on poverty in the north were rather bad. Both Economic Reform Programmes (ERPs) and Structural Adjustment Programmes (SAPs) – the major guidelines to government policies – forced the government to cut

spending and withdraw most support for agricultural, especially for inputs and agro-processing, and to cut tariffs. Moreover, the various government agencies that had previously undertaken the production, import and distribution of farm inputs were forced to close. Input prices rose sharply, especially that of fertiliser. Nationwide fertiliser consumption fell drastically and did not increase again until the second half of the 1990s. Generally, due to devaluation and price-deregulation for consumer goods and farming inputs, prices escalated (AHWOI 2010: 8; AMANOR & PABI 2007: 56; FAO 2005: 13; KHOR & HORMEKU 2006: 4-5; LAUBE et al. 2008: 3; SONGSORE 2011: 179).

Moreover, the Ghanaian farmer increasingly faced stiffer competition from overseas markets. Overall, decreases in tariffs had led to rising imports of agricultural commodities, especially tomato paste, rice and chicken from Europe, the USA and China among other countries. Further imports of fresh tomato came from Ghana's ECOWAS neighbours, especially from Burkina Faso (FAOSTAT 2011). In combination with the forced withdrawal of government support for production, these factors were later blamed for severely undermining economic activities, and thereby human development, in Ghana's north. Newspapers reported tomato-farmer suicides in the Upper East Region on an annual basis, international NGOs talked of threats to farmers' human rights and food security (PAASCH 2008: 12-17) and scientific publications talked of economic practices that would devastate the livelihoods of northern Ghana's farmers (LAUBE et al. 2011: 753; PAASCH 2008; SEND FOUNDATION 2008; SONGSORE 2011: 263). Due to imports of rice, production in Ghana's Upper East Region decreased and its major mills closed down. Furthermore, tomato paste imports were blamed for making local production unprofitable (YARO 2013: 10-11) and for the shutdown of tomato processing in the Upper East (ROBINSON & KOLAVALLI 2010: 2), the showpiece of previous development approaches.

During the period of economic and structural adjustment, in terms of investment the government almost completely neglected the agricultural economy of the north. Government promotion of smallholder participation in the economy via irrigation schemes was of little success. Attempts to intensify agriculture failed, because people were unable to acquire the farm inputs needed, credit schemes collapsed and extension services were insufficient (LAUBE 2007: 75). Instead the government maintained its focus on the southern industrial core and cocoa producers (ACKAH & BAAH-BOATEN 2012: 45-47; SONGSORE 2011: 173-178; WHITFIELD 2011b: 31, 32). Within the 2005 District Industrialisation Programme, for example, Ghana's north received no attention and only little effort was indicated to modernize agriculture and support agribusiness in the region (AHWOI 2010: 9-10; KYEREMATEN 2007: 77). Of the GPRS I funds that came through the HIPC Initiative, the little that was spent in the north had a minor, positive contribution to poverty reduction. Although the programme specifically aimed to target vulnerable and excluded parts of society in regions characterised by chronic poverty,

regional prioritization of the allocation of funds clearly favoured Ghana's south, e.g. the money spent in all northern regions (with one of them being the Upper East) combined was about as much as some southern regions received for themselves (SONGSORE 2011: 260). Other government projects in the north remained only ad hoc interventions undertaken in pilot communities (YARO 2013: 11-12).

Externally funded interventions also neglected the north. The Millennium Challenge Account achieved little (WHITFIELD 2011b: 31-32) and did not even mention the poorest regions in Ghana – among them the Upper East Region – as a priority for investment (SONGSORE 2011: 264). Again, the core regions, the 'golden triangle', with its cocoa, timber and mineral export economy continued to get most of the support. Southern farmers received publicly funded, technical support and export promotion packages, while further benefiting from guaranteed prices and publicly financed spraying of fields. No comparable activities were pursued for food crop farmers in the north. Thus, these farmers were forced to continue their work under low productivity and income (ACKAH & BAAH-BOATEN 2012: 45-47).

Subsistence agriculture on degraded lands with declining yields and without government support, further intensified seasonal hunger in Ghana's north. Agriculture in the north was unable to keep up with developments in the south. As a result of the unequal allocation of economic stimuli and resulting lopsided growth, the terms of inter-regional trade shifted to the disadvantage of northern Ghanaian staple-crop growing farmers. Due to the SAPs, the terms of trade turned against food producers to the benefit of non-food consumer items, which came from the south. The major food crops grown in the north were not covered by a minimum guarantee price, resulting in the de-intensification of agriculture and low farm gate prices (LAUBE 2007: 75; SONGSORE 2011: 173-180, 264, 281-284). An increase in northern farmers' incomes would have been required to help the farmers deal with the SAPs-induced government withdrawal of support (SONGSORE 2011: 173-178). Policies pursued throughout the ERP and SAP period caused increased poverty among certain sections of the population, especially unskilled households content with agriculture (ACKAH, MORRISSEY, et al. 2012: 98) and food producers in the north.

Northern Ghana, since the 1980s, constantly accounted for the highest levels of poverty in the country (GHANA STATISTICAL SERVICE 2013: 184). In 1991/92 about 33 percent of all Ghana's poor came from the savannah of the north. By 1998/99 this number had risen to 37 percent and it kept rising to 50 percent in 2005/06. That meant that in 1991/92, 73 percent of the savannah population suffered from poverty, 70 percent in 1998/99 and 60 percent in 2005/06. During the 1990s, reduction of poverty mainly took place in Accra and the southern forest regions. 60 percent of the North's people constantly suffered from extreme poverty, whilst on a nationwide scale, levels dropped from 36 to 27 percent (SONGSORE 2011: 180-190, 261).

Spatial patterns of poverty in Ghana continued to follow a north-south stratification, boiling down to a north-south divide in economic prosperity. Those living in the dry northern plains had an especially harder time finding economic opportunities than those who lived in the south (GHANA STATISTICAL SERVICE 2013: 184, 2007: 8).

Due to the southern bias in the allocation of government funds, growth of the Ghanaian economy, especially from the early 1990s to 2006, was hardly pro-poor. The most poor, residing in northern Ghana, experienced little positive change in their lives, although there was a substantial decline in the incidence of poverty among southern export orientated farmers. Indeed, southern households practicing commercial farming for export were the primary beneficiaries (ACKAH & BAAH-BOATEN 2012: 45-47). In Ghana's north, women in particular suffered, since they dominated the food crop production sector (SONGSORE 2011: 173-178). Another impact related to government policies' main aim at shifting from staple food to cash crop production. Since it was mostly men that were responsible for the production of cash crops, agricultural development programmes were gender biased and enforced an already high level of discrimination against females in terms of access to productive resources and general livelihood assets (ACKAH & ARYEETAY 2012a: 204-205). Thus, 'by all indications' the north lagged behind the south, and the development gap seemed to widen (AL-HASSAN 2013: 226). The titles given to the development initiatives, therefore, were 'more grandiose than the actual actions involved, which were rather small in scope' (WHITFIELD 2011b: 31).

Throughout this period, Ghana's political parties pursued and implemented policies with short time horizons and without shifting the necessary resources towards building productive sectors that could allow for better poverty alleviation. While economic growth on a nationwide level took place, there was no real economic transformation, especially in the northern parts of Ghana (Ibid.: 6, 7). Regional elites rather than poverty levels influenced the allocations of government finances. While food crops production accounted for the majority of agricultural GDP and engaged most of the population, this sector was for the most part neglected by government policies (SONGSORE 2011: 199). The majority of subsidy recipients, the southern cocoa producers, constituted only a very small minority within the country, in fact only 1.1 percent of the agriculturally active population (GHANA STATISTICAL SERVICE 2013: 301).

Inequality in income, overall poverty and food insecurity therefore deepened, especially among food-crop smallholder farmers in the north, because the overall, nation-wide positive effects of export- and growth-oriented policies were not forthcoming in the region. The initiated pro-growth policies were by themselves not enough for broad-based poverty reduction. The 'institutional void left by liberalization policies dating as far back as 1990' were not filled by the private sector (IFAD 2006: 5-6). In fact, economic reform came with further social exclusion for northern Ghana, reproducing the colonial economy by a widening of the socio-economic gap

across the country and also within Ghana's Upper East Region. Critics have been rather sceptical about further government agreements, such as those found in the EPAs, that aim at trade liberalisation yet lack sufficient support mechanisms for the poorest (PAASCH 2008: 19). Clearly, any future policy that is 'to deal with poverty in Ghana will need to start to 'target [northern/] rural areas where the majority of the agricultural population resides' (GHANA STATISTICAL SERVICE 2013: 302).

### ***2.5. Post-Adjustment (the mid-2000s onwards) – New Opportunities for Northern Ghana?***

With oil reserves discovered in 2007, and oil production having begun in 2010, the possibility for Ghana to accelerate the pace of progress increased vastly, at least on the side of its public financial abilities (ISSER 2015). Ghana experienced exceptional GDP growth rates over recent years (WORLD BANK 2014). Moreover, recent policies have changed towards subsidising and protecting farmers again.

The first indications of policy changes were evident as early as 2003, when the New Patriotic Party (NPP) government tried to impose higher tariffs on imported rice, poultry and tomato. These were, however, never implemented, because development partners like the IMF refused. Furthermore, as critics have pointed out, the NPP preferred to subsidize urban consumption by cheap imports, due to the urban background of its voters, than to come up with profound strategies to improve domestic agriculture and agro-industries in rural, northern Ghana (LARYEA & AKUONI 2012: 17; WHITFIELD 2011b: 33). In 2004 the Ghana Trade and Livelihood Coalition was formed to lobby for policies to support rice, poultry and chicken. With their help, the Ghana National Association of Poultry Farmers took the government to court and won the case in 2005, 'but a week later the NPP government had the law repealed through its majority in Parliament' (WHITFIELD 2011b: 33). Tariffs on rice were later completely abolished, shortly before elections (Ibid.). However, in an attempt to revive processing in the Upper East Region under the Revitalisation of Distressed Industries Programme (RDIP) the restoration of the afore-mentioned tomato paste factory began (AHWOI 2010: 9-10; KYEREMATEN 2007: 77). Rehabilitation of old, state-owned processing factories, and the building of new ones using external expertise, was a central element of the then ruling NPP government's strategy (WHITFIELD 2011b: 31 & 32) and, in the case of the Upper East Region's factory, was pursued just in time for elections.

The NPP's strategy did not work out, for their rivals, the National Democratic Conference (NDC), won the election. Aside from their continued support for the tomato processing facility, the most decisive move to post-adjustment policies was made in July 2008 when the NDC became the first government to actively improve the production base of the agricultural sector through the introduction of a country-wide fertiliser subsidy (BANFUL 2009: 1). Furthermore 'the new NDC



government reinstated the rice tariff in 2010 and raised it to 35 % in 2011' (WHITFIELD 2011b: 34). These policies were one result of the 2008 food crisis. It had become clear, even in Ghana, that there was a need to 'seriously address the issue of future food insecurity in developing countries [...] to meet various challenges, including reaching the MGD [Millennium Development Goal] targets on hunger and poverty' (UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT 2009: 103). Another major effort of the NDC government was its 'Ghana Shared Growth and Development Agenda' (GSGDA), which comprised of four main pillars:

- Human development through access to quality healthcare and education, creation of jobs, increased productivity and a focus on the vulnerable in society;
- Greater resilience of the economy by economic stability, private sector competitiveness, trade and industry, agricultural modernisation and natural resource management;
- Infrastructure expansion with a focus on oil and gas, roads, ports and development zones;
- Good governance through transparent, decentralised and accountable governance, anti-corruption projects, decentralisation and citizen services (PWC GHANA 2013: 1).

The NDC attempted to address the issues of securing the raw material base for industry. It thereby tried to simultaneously improve food security and increase export revenues. 'Low productivity in staples and horticultural crops, inadequate research into the utilisation of selected crops as well as the inadequate investment in processing and value-addition' were to be tackled (GOVERNMENT OF GHANA 2010: 38). Selected staples (cereals, tubers, beans and pulses) as well as horticultural crops including fruits (mangoes, pineapples and bananas) and vegetables (okra and chili) were to be developed and promoted according to the country's agro-ecological zones, especially in the north. Modernisation of agriculture was to come from irrigation, subsidized inputs, mechanization services, better marketing, improved extension services and improved institutional coordination for agricultural development. Furthermore, from 2011 to 2015 the Medium Term Agriculture Sector Investment Plan (METASIP), in the context of GSGDA, was to implement the second phase of the Food and Agriculture Sector Development Policy (FASDEP II) (Ibid.: 38-39).

Trade and inequality issues were now being addressed by the allocation of specific funds meant to target the three northern regions. A large-scale mango project was started in 2009 by the Export Development and Investment Fund (EDIF), which later became the Export Development and Agricultural Investment Fund (EDAIF). 20,000 hectares of mango were to be cultivated in Ghana's north by 2015. Over 26 million Ghanaian Cedi were spent up until the end of 2012, yet by 2013 only 1600 hectares (8 percent of the target) had been established. Thus the project had a smaller impact than expected, though the north of Ghana got an exceptionally high share of the funds: a quarter of the lands established were in the Upper East. Nevertheless, only 25 people, of which just one was female, directly benefitted (EDAIF 2013: 5; EDIF 2011: 25).

The Northern Development Fund, which was expanded into the Savannah Accelerated Development Authority (SADA) by the NDC administration in 2010, provided further support (SONGSOE 2011: 264-265). Its projects specifically aimed to bridge the north-south development gap indicated by imbalances in social and economic prosperity (GOVERNMENT OF GHANA 2010: 95). SADA was set up precisely to coordinate a development agenda for Ghana's northern savannah. It attempted to provide opportunities for poor peasants, especially women, through the promotion of fruit trees such as Shea (MOFA 2013b). Though SADA's main aim was to improve livelihoods of the most vulnerable in Ghana's north, it also sought to deal with the effects of climate change, like floods and drought (Ibid.). Aside from the aforementioned decline in soil quality and resulting yields, one of the most important factors for sustainable development in contemporary, northern Ghana is the ability of local peasants to cope with climate change and variability, and related natural disasters. So, 'the development of adaptation strategies to reduce the adverse impacts of climate change and to enhance the resilience of social-ecological systems is, therefore, of highest priority' (WASCAL 2010: 11). The outcomes of SADA's projects have yet to be evaluated. 'Every effort must therefore be made to ensure that the [...] project succeeds and the lessons learnt applied to other deprived regions' (GHANA STATISTICAL SERVICE 2013: 231). Furthermore, more 'natural disasters will entail increasing the capacity of NADMO', the National Disaster Management Organization (GOVERNMENT OF GHANA 2010: 49).

The above-mentioned contemporary approaches to development of the North's agricultural sector have certain commonalities, namely that most of them ascribe a special role to agricultural value chains and out-grower schemes to support a new 'green revolution' to improve smallholders' livelihoods. Since around 2006, such value chain approaches became the main tool for enhancing agricultural development (GOVERNMENT OF GHANA 2010; OUMA et al. 2012: 227; YARO 2013: 12). To combat poverty, government interventions mostly aim at the market integration of smallholder farmers through specific support of crucial leverage points within value chains. This is to be achieved, under the 'Youth in Agriculture Programme', through the implementation of rice and maize 'block' farming, livestock, poultry and agri-business initiatives (PWC GHANA 2013: 5, 27). Key elements of the government's agenda to improve value chains include:

- Reducing the cost of doing business, which hinders both domestic and global private sector competitiveness. Thus, subsidies for producers and loans for traders are to be put in place.
- Improving productivity and efficiency in production, which requires an improvement in quality and efficiency of infrastructure. The availability of credit to farmers, by various private financial institutions, should be enhanced to increase productivity.

- Improvement of marketing through commodity brokerage services by the government, such as that provided by the National Food Buffer Stock Company (NAFCO).
- Better agricultural practices and farmer's knowledge, to be achieved through training and demonstrations.
- Small-scale production and the organisation of farmers, whereby the latter are to be organised as nucleus-outgrowers, in Block Farming schemes, to enable contractual farming that allows farmers to enlarge production (GOVERNMENT OF GHANA 2010: 23-24, 26, 36, 39).

These public undertakings are supported by a growing number of external interventions. The 'German Technical Cooperation' (GTZ, now GIZ), has started projects on the value chains for pineapples, mangoes, citrus, chili peppers, aquaculture, guinea fowls and maize. Equally, the United Nations has become active in this field. Other prominent interventions include continued support by the US-funded Millennium Challenge Account and its 'Agricultural Development and Value Chain Enhancement Programme' (USAID ADVANCE), which supports crops like maize and rice. In 2010 the German Development Bank 'KfW' established an 'Outgrower and Value Chain Fund'. Moreover, a 'Value Chain Practitioners Forum' is now trying to harmonize these various endeavours (OUMA et al. 2012: 227-228). However, none of these interventions target Ghana's Upper East Region, and the question 'to what extent government and NGO activities and value chains themselves are socially and environmentally sustainable' remains. How do or could value chain enhancements affect the livelihoods of the poor and vulnerable?

## **2.6. Conclusion**

Agriculture was, is and will probably remain the most common livelihood and way to make a living in Ghana, and especially in Ghana's north (GHANA STATISTICAL SERVICE 2013: 285). Therefore, progress to alleviate poverty can be achieved only by political interventions in this sector. Attempts to do so over time, this chapter has shown, can be grouped into several phases. Ghana's agricultural sector, and especially that of the Upper East Region, was shaped by trends in public policies. First mainly through exploitative colonial influences and accompanying innovations, then by heavy government interference, mainly aimed at agro-processing and subsidies on agricultural inputs, and then by liberalisation efforts, which greatly increased globalisation tendencies. The only commonality in the policies throughout the decades, aside from capture of public support by national and local elites, is probably the somewhat continuous neglect of northern Ghana's regions, .

Each era's policies altered the support provided to farmers, produce markets and thereby the outcomes of agricultural production. Most prominently since the beginning of the the 20<sup>th</sup> century, dynamics in the northern agricultural sector were shaped through attempts to introduce cash crops and especially dry season agriculture through irrigation. Namely tomatoes became the foremost

way of generating income in northern Ghana. A policy of import subsidising industrialisation was pursued to process and thereby market such non-traditional, dry season products. Western-style industrialisation of agriculture, through government provision of inputs and processing industries, was seen as the best way to economically empower northern farming households. Government-initiated advancement of farming households through value chain integration via contractual farming with industries, was deemed to be the way forward as early as the 1960s. However, deregulation and liberalisation, as major elements of the ERPs and SAPs, exposed local farmers to stiff, global competition. Ghanaian agricultural policies then experienced a strong shift to export-orientated development approaches, which in combination with inequalities in the allocation of economic stimuli and social services, gave rise to further disparity within the country. Tragically, the regions most affected by poverty were those that received the least support over time by government, but yet were the most affected by government withdrawal.

Thus, the outcomes achieved in terms of poverty alleviation have been far below the possibilities. In fact, due to past policies (and respectively, their neglect of Ghana's north), smallholders' livelihoods are nowadays challenged by multi-sided vulnerability contexts, namely globalisation processes as well as environmental changes (see also LAUBE et al. 2011). Vulnerability also arises from a profound lack of governmental support since the institutional context, from local to regional and nation-wide level, is crucial to development and hence poverty alleviation. Despite an overall growth in market chances, most of northern Ghana's mal-developments were made possible by clientelism pursued by political actors (see WHITFIELD 2011a), which led to little economic change and hardly any poverty reduction (Ibid.). Nationwide and northern inequality continues to increase as a result of this threefold vulnerability context (see before and SONGSORE 2011).

There is still room for hope, due to the fact that protective duties for rice and fertiliser subsidies may lead to improved yields, market access and thereby livelihood outcomes in Ghana's north. The same goes for the revitalisation of the tomato processing plant, which could serve as a market alternative for locals. Furthermore, government and donor (USAID) support are nowadays aimed towards region, product and producer specific value chain enhancements in chili, rice, maize and shea. Yet it remains questionable as to whether or not the government interventions will resemble those of the past. At the least, such tailor-made approaches enable Ghana's north to start to receive its fair share of assistance, increasing the potential for poverty alleviation. Secondly, interventions now aim at the micro-, production-level, while in former times government tried to advance macro-structures at the domestic level. Thirdly, the majority of past interventions did not have to account for international competition since high tariff walls protected them. Fourthly, recent initiatives take into consideration environmental change.

The similarities of today's interventions with those of the past, however, are striking: as already indicated, nucleus-out-grower farming schemes and contract farming were an integral part of import substitutions policies back in the 1960s and 1970s. The same goes for subsidies on agricultural inputs, which seek to induce a new green revolution. SADA's concept of initiating development by 'generating a market impetus as the main catalyst for stimulating farmers to produce, using a marketing-based outgrower system with improved technology and timely inputs' (AL-HASSAN 2013: 231), has been attempted before. It is old wine in a new bottle, in the sense that recent initiatives promote poverty reduction by agricultural industrialisation at the producer level through high-yielding fertiliser responsive crop varieties, agrochemicals and mechanization. Most traditional crops remain totally neglected. This neglect, in the past, had an eroding effect on quality of life. Moreover, government initiated agro-industries largely failed and it is questionable as to whether high-input agriculture can nowadays be considered as environmentally sustainable.

Compared to the former approach of 'roll back' in the SAPs era, recent approaches are really a 'roll out' strategy 'to actively prepare the field of the social for the market principle' (OUMA et al. 2012: 228). Contemporary approaches widely neglect to account for 'the global structural environment and power relations – even the usually omnipresent question of governance in value chains is rarely accounted for in practice – as well as what one could call the horizontal entanglements of vertical chains, their dependence on broader networks of social relations' (Ibid.). This may negatively affect the impact of interventions, since positive change in Ghana's north has most often been undermined by elitists' divergence of funds. As in the past, 'the dangers of an externally mal-articulated economy can be catastrophic to the northern rural dweller'. Government initiated, agricultural value chains could 'serve as conduits of exploitation and control without the right regulatory mechanisms which are non-existent in a regime of neoliberal globalization' (YARO 2013: 12).

The succeeding chapter sketches a theoretical framework designed to evaluate the contribution of recent rice, tomato and chili value chains dynamics and interventions to the improvement of local farmers' livelihoods. The analytical scope is then narrowed down to focus upon the livelihood systems in the study areas. The aim is to first grasp the basic foundation upon which livelihoods are built, to then be able to understand the effect of contemporary agricultural policies – which are development policies that affect agricultural value chains.

### ***3. Theory: Poverty Alleviation by Market Integration***

This chapter presents the conceptual background of this study, which should facilitate a thorough, theoretical understanding of the possible pro-poor effects of market integration, as related to the contemporary policy prescriptions described in Chapter 2. The framework includes aspects of the livelihood approach and value chain analysis enriched with elements of global production network approaches. Whilst the livelihood framework allows for a good understanding of the realities of the poor, value chain and production network analysis are used to generate an up-to-date understanding of markets and possible opportunities for smallholders within these.

#### ***3.1. Poverty and the Livelihood Approach***

The origins of the livelihood approach, according to some authors, date back as far as 1910 (DE HAAN 2012: 348), however, it was in the 1980s and 1990s that the concepts within the approach as practised today were developed (KAAG et al. 2004: 2-3, 50-51). The approach embraces the works of SEN, post-development critique and a growing societal awareness for environmental concerns. It became highly popular, as detailed below, in the form of the Sustainable Livelihood Framework.

The initial source of theoretical inspiration for livelihood approaches evolved against the background of devastating famines in the Sahel during the 1970s and 1980s. A debate emerged on the reasons for these human catastrophes. The discussion was essentially characterised by two contrary views: the food availability decline (FAD) and the food entitlement decline (FED) theses (BOHLE & GLADE 2008: 101). FAD, the traditional approach to famines, proposes that hunger and famine are caused primarily by ‘a sudden, sharp reduction in the food supply’ of a particular geographic locality (BROWN & ECKHOLM 1974: 25). FAD’s basic assumptions date back to the writings of Malthus in the 18<sup>th</sup> Century. Malthus believed to have found universally applicable principles by which population growth rates exceed the gains earned in agricultural productivity. This, in turn, produces an insurmountable barrier to the formation of an ideal and fair society. He concluded that population growth rates must be limited ultimately by a lack of food, once population has outweighed agricultural potential. Such limitation is necessary to acquire a desirable ratio of the two aforementioned variables. Malthus did not question social distribution mechanisms as such but referred to a lack of resources as incontrovertible proof that the hungry (the poor) are redundant in society, even an unnecessary burden to be overcome (ENGELKE et al. 2008: 116-117; KUHLMANN 2007: 27-28). FED, on the other hand, views famines only partly as a result of limited food availability. Based on the works of AMARTYA SEN (1985, 1981a, 1981b, 1981c), FED’s interpretations of famine instead emphasise entitlements to food, as generated by trade, people’s own production and labour, inheritance and transfers (Ibid.: 1981c: 1-2), and aspects of practical agency entitlement. With a context- and locality-specific view, SEN

confirmed that Bengal's famines occurred even when sufficient amounts of food had been produced, and showed that the erosion of people's entitlements in access to food was the cause of hunger (BOHLE & GLADE 2008: 101; DE HAAN 2005: 5).

The results of numerous livelihood studies, conducted at the household level in developing countries during the 1980s, somewhat compromised between these explanations. They attributed a certain degree of autonomy to local agency and thus survival strategies, which were sometimes already called 'livelihood strategies', yet at the same time, they also pointed to structural variables that constrain household decision-making and thereby livelihood outcomes (DE HAAN & ZOOMERS 2005: 28-29). WATTS (1983) and DE WAAL (1987) also contributed to the understanding of the causes of food crises and famines, suggesting that crises should generally be understood as resulting from processes that occur long before a potential famine takes place. WATTS and BOHLE (1993) further conceptualised the processual character of famines by distinguishing between a 'baseline vulnerability' and a 'current vulnerability'. Their work laid the foundation for social science-based vulnerability research in general, and for livelihood analysis in particular (BOHLE & GLADE 2008: 101, 103-104; DE HAAN 2005: 5).

Livelihood analysis became increasingly popular throughout the 1990s (DE HAAN & ZOOMERS 2005: 29), partly also as a result of the prevailing *Zeitgeist*. The end of the Cold War (the end of East-West bloc thinking and of communism in Eastern Europe), an already accelerated economic globalisation process, and economic developments in parts of the global South led to the realisation that established theoretical paradigms of development no longer fitted empirically grounded evidence (MÜLLER-MAHN & VERNE 2010: 4). The 'big' or 'global' theories, such as modernisation and dependency theories, were declared dead (OUMA & LINDNER 2010: 12). Instead, a more pluralistic spectrum of perspectives gained ground (RAUCH 2008: 210-211). One of these was the critique articulated by so-called 'post-development' approaches, which form another foundational component of the livelihood perspective.

Post-development strives to unmask theoretical concepts by revealing their ideological conceptions, and hence, the structurally defined and reproduced ideas of development incorporated in them. It thereby actively tries to deconstruct the ideological concept of (non-) modernity that dominated previous discourses (HAUCK 2004: 14). Its distinct characteristic is to articulate a fundamental critique. Whilst previous evaluations of development theories and policies pointed to partial shortcomings, post-development rejected the development paradigm altogether, not only invalidating the paradigm's capitalist premise with its focus on market integration and intervention, but also denouncing development as a myth and an ideology. This critique prompted post-development proponents to stimulate a theoretical renewal comprising new ideology-free concepts whilst primarily remaining engaged in the analysis of discourses on development and how ways of speaking and thinking about development are linked to power

relations (ZIAI 2011: 3-4). Furthermore, post-development engendered the idea of ‘alternative development’, in which the poor are to be empowered in and through research, whilst equally assuming that the knowledge of the poor should be the primary source of ideas on how to improve their living conditions (MÜLLER-MAHN & VERNE 2010: 5, 7).

Post-development critique contributed to livelihood analysis by demanding the incorporation of bottom-up approaches (KAAG et al. 2004: 52), in which the desired outcomes of development are to be partly defined by the poor themselves. Bottom-up, participatory data collection and analysis at the local level, and an increase in the efficiency of external aid were seen as desirable (CHAMBERS 1995; DE HAAN 2012: 346; DFID 2001: Section 1.1). Partly because of their local, bottom-up perspectives, livelihood approaches were considered representative of so-called ‘middle-range theories’. These gained momentum as a result of the perceived failure of previous approaches with proclaimed global explanatory power, and were adopted in an attempt to theorise development in manageable, local socio-economic contexts, through an explicitly actor orientated lens (MÜLLER-MAHN & VERNE 2010: 9). Livelihood analysis thereby managed to focus on the practical aspects of vulnerability, thus the structural constraints, with relevance to agency-centred, local development (RAUCH 2008: 210-211). It represented a new, holistic and critical manner of understanding poverty and a broader conceptualisation of vulnerability and resilience. Livelihood analysis questioned the prevailing values and norms of development, which were shaped by structural adjustment initiatives and thus market-orientated and neo-liberal ideologies arguing for government withdrawal (ARCE 2003: 199, 201-203). The approach achieved a compromise between previously initiated attempts, as it partly took up a history of ideas and critiques that had shaped the discourse on development over the previous three decades. Rather than being an entirely new set of concepts, livelihood approaches were holistic and synthetic (TANG et al. 2013: 17-18), and thus practical and less ideologically biased.

A further theoretical impetus was added by the works of ROBERT CHAMBERS and GORDON CONWAY (1991), for the additional spotlight they threw on environmental sustainability aside the social dimensions of development. Growing environmental concerns had arisen in public and academic debates at the time (e.g. the United Nations Conference on Environment and Development in Rio, in 1992), and most likely contributed to the consequent success of the approach. After the contributions of CHAMBERS and CONWAY, large-scale organisations such as the UNDP, Oxfam and CARE started to take up ideas for this enriched livelihood approach, incorporating them into their own approaches. Another important step for the global spread of the livelihood concept was made when the British New Labour government integrated the approach into its development policy in 1997. In line with its party philosophy at the time, New Labour perceived the livelihood concept to be an alternative route to development,



advocating a compromise between socialist and more conservative neo-liberal agendas, alongside addressing environmental concerns. The approach was operationalised by the British Department of International Development (DFID), which designed the Sustainable Livelihood Framework (SLF). The popularity of the approach subsequently increased drastically (BATTERBURY et al. 2011: 1; DE HAAN 2012: 346; DE HAAN & ZOOMERS 2005: 30-31).

### ***3.1.1. Overview of the Sustainable Livelihood Framework***

The SLF, as designed by DFID, presents an instrument useful to understand and improve, specifically, rural livelihoods in developing countries. The SLF can be used to evaluate and plan development strategies but also to check existing activities in terms of their sustainability. It offers a checklist of the most important aspects of development, focuses attention on core elements and processes, and underlines the multiple interactions of different factors that influence livelihoods (DFID 2001: Section 2.1). At a basic level, the SLF is concerned with the ‘means of gaining a living’ that are pursued by the poor or by those that the approach defines as ‘vulnerable’ (CHAMBERS & CORNWAY 1991: 5). The concept of livelihoods thereby espouses more than merely making a living, but rather an aspect of agency. Livelihoods are understood as a ‘function of assets and structures, and a source of subsistence, income, identity and meaning’ (TANG et al. 2013: 17). The approach further assumes that individuals (i.e. people or actors) are embedded in a changing structural context, which presents constraints and incentives. Within this context, individuals act purposefully to avoid risks, deal with crises, and improve their living conditions. Individuals therefore endeavour to secure their livelihood by a multitude of spontaneous actions, short-term coping and long-term mitigation strategies (or ‘pathways’) and, when possible, enhancements to their ways of living by using a collection of assets (their resources), which may provide the agency-based constraints and incentives necessary to achieve livelihood outcomes (DIDERO 2012: 28-29). Assets depend on the whole livelihood system, inter-linkages or rather influences and accesses to and between them, strategies and outcomes, mediated by structures and processes that make up a vulnerability context (GEISER, MÜLLER-BÖKER, et al. 2011: 259).

The central conceptual resource of livelihood analysis is its five capitals – human, natural, financial, physical and social – which individuals or households draw upon to make a living and to achieve livelihood outcomes. The vulnerability context and other external structures and processes define access to each resource, its values and inter-changeabilities. However, as previously discussed, livelihood vulnerability also depends on the individual combination of assets and what people do with these resources (DIDERO 2012: 28-29). Through these parameters, livelihood analysis distinguishes the ‘vulnerable’ from the ‘poor’ by emphasising that the approach revolves not only around a ‘lack or want’, but also around ‘defencelessness, insecurity, and exposure to risk, shocks and stress’. The concept of vulnerability thus carries with

it both external and internal perspectives because it refers to external and structural ‘risk, shocks, and stress to which an individual or household is subject’ whilst equally looking at individual actions. Defencelessness pertains to ‘a lack of means to cope without damaging loss’ (CHAMBERS 1989: 33). Vulnerability can thus be understood as the level of defencelessness of a person or group of people in the face of danger, risk, crisis and shocks or after the occurrence of such damaging events. The resultant harms then limit or prohibit the functioning of certain components of people’s survival systems. So, a prerequisite to being categorised as ‘vulnerable’ are insufficient coping mechanisms (BOHLE 2005: 72).

A general improvement in livelihood security is characterised by reduced vulnerability to enable the successful addressing of changes or shocks (ELLIS 2000: 42). Livelihood resilience is attained when those suffering from damaging events can compensate for the effects of the events, when they can restore the lost functions of their survival system or the capacity to deal with danger, and when they can repel damage (drawing from BÜRKNER 2010: 24). Moreover, a livelihood is popularly deemed socially and ecologically sustainable when it ‘can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base’ (CHAMBERS & CORNWAY 1991: 6). According to their individual socio-theoretical context (BÜRKNER 2010: 24), sustainable livelihoods should be resilient when confronted with external shocks and stresses; should be self-sufficient even without external support (even with the availability of such support, it should be economically and institutionally sustainable); should preserve the long-term potential of natural resources; and should therefore reinforce, instead of undermine, the livelihoods of others or their options. On this basis, livelihoods should achieve environmental sustainability by conserving natural resources, ensure economic sustainability by achieving and sustaining a baseline level of economic welfare, guarantee social sustainability by minimising exclusion and maximising social equity, and accomplish institutional sustainability when structures and processes have the ability to perform over the long-term (DFID 2001: see Section 1.4). Progress made, the status of livelihood coping, and adaptation capacity should be benchmarked by outcomes such as income, well-being, vulnerability to shocks, food security and sustainability of the natural resource base (Ibid.: Section 2.6). In this way, locally distinct and thereby adequate and long-lasting solutions to development may be found (BOHLE & GLADE 2008: 104). Successful developments are thereby understood as a function of two basic elements: an external and an internal side to overall vulnerability.

### ***3.1.2. Externalities: Structural Constraints and Incentives***

The external dimension of vulnerability, structural constraints and incentives, are defined in the livelihoods approach as the ‘vulnerability context’ on the one hand and ‘transforming

structures and processes’ on the other. Both influence access to ‘assets and livelihood opportunities and the way in which these can be converted into outcomes’ (DE HAAN 2012: 349). Of primary interest is an understanding of the vulnerability context, which can be altered by the institutional and political structures and processes that accompany it.

### ***3.1.2.1. Vulnerability Context***

The vulnerability context includes the broader external environment, exogenous factors or ‘stressors’ (BOHLE 2011: 48) that lie outside the immediate influence of individual actors (WIESMANN et al. 2011: 234, 236). It affects the options that people have to engage in meaningful activities. Gaining an understanding of the vulnerability context is therefore an elementary step in livelihood analysis (DFID 2001: Section 2.2).

Livelihood analysis involves an examination of the perceived and actual external ‘trends’, ‘shocks’ and ‘seasonality’ (TANG et al. 2013: 18) of social, demographic, political, economic, technological and environmental relevance, in accordance with local characteristics (ELLIS 2000: 39-40). These elements can be both positive and negative in terms of their effects on livelihoods, but they always change in accordance with their time horizons. In this regard, livelihood analysis provides three major distinctions: seasonality, trends and shocks.

Seasonality generally refers to the constant and continuous, and thus often repeating, shifts in prices, employment opportunities and food availability over a year; such shifts are often deemed ‘one of the greatest and most enduring sources of hardship for poor people in developing countries’ (DFID 2001: Section 2.2). Trends point to changes in populations, resources, national and international economic systems, tendencies in governance and politics, and technological developments, which are often unilateral and taking place over medium to long time frames, possibly years or decades. In contrast to these more or less foreseeable events, shocks occur rapidly and are mostly unpredictable. Such events may result from war and conflict, flooding or drought, and crop and human diseases. These suddenly occurring events can directly influence all five types of asset, thereby having a devastating effect on the survival of individuals and households (ELLIS 2000: 39-44). Significant long-term processes (i.e. vulnerability factors) that require an adaptation of farmer livelihoods in northern Ghana are of an ecological and economic nature, as reflected in climatic changes and economic globalisation processes (LAUBE et al. 2008; LAUBE et al. 2011; SCHRAVEN 2010: 18-21).

Because of their time-bound definition, the separation of these livelihood threats is difficult to accomplish. A shift in prices, for example, can be a shock when it occurs suddenly but is classified as a trend when its occurrence proceeds over an extended period. Flooding or drought may no longer be categorised as a shock when it happens on an annual basis. These categorisations merge and change over time, and therefore require flexible handling in analysis.

Irrespective of their time scales, however, these events always affect people's assets, which in turn are also influenced or 'transformed' by structures and processes.

### ***3.1.2.2. Transforming Structures and Processes***

Understanding transforming structures and processes involves a look at the prevailing social, cultural, institutional and organisational environments, including the private and public sectors and their respective policies and legislations (WIESMANN et al. 2011: 234-235). These areas are often viewed as the starting point for development interventions because they determine access to assets, terms of exchange among different assets, and the returns on or outcomes of livelihood strategies (DIDERO 2012: 17; OBRIST et al. 2011: 279; WIESMANN et al. 2011: 234-235). In combination with people's assets at hand, therefore, they define the 'sensitivity' of livelihoods whilst also serving as a response to vulnerability context stressors (BOHLE 2011: 48). Structures can be depicted as the 'hardware' of development, i.e. the concrete embodiment of public or private organisations and institutions, whereas processes serve as the 'software', which determine how these structures operate and interact through policies, legislation, culture or power relations (DFID 2001: Section 2.4.1 and 2.4.2). Nevertheless, public or private structures are not always external to livelihood systems but can partly incorporate and develop from these. A formal or informal coalition of households acting together can, for example, constitute an institution of its own (MENSAH 2012: 14). Democratic votes can determine government structures and processes. Social and cultural aspects, norms and values are driven by societal and human interactions and change, which necessarily also include the livelihoods of those being researched.

Apart from their immediate influence upon assets, structures and processes also determine the ability to respond to external vulnerability factors. Livelihood strategies are adopted, and in turn respond to the performance of structures and processes (BOHLE 2011: 48). For instance, general trends can be shaped by public structures through political processes (e.g. influences on economic trends) by fostering certain developments through fiscal policies. In the case of farmers, the production of a certain crop can be stimulated by alterations to structures and processes, thereby altering both livelihood strategies and outcomes. Structures (the government and private sector) can thereby considerably influence pro-poor development. The public sector, for example, can also alleviate external shocks by supporting people with food in times of nutritional crisis (DFID 2001: Section 2.4).

With regard to the private sector, trade among regions may help reduce the effects of seasonal food shortages by enabling people to generate income and secure the availability of food through markets. An important issue to keep in mind, however, is that the 'normal' functioning of markets can also cause food crises, famines and disasters. Hunger and famine are 'not the result of market failures, but, on the contrary, one of the basic principles of markets that respond to

demand backed by cash and not by the needs of the vulnerable' (BOHLE 2011: 49). Food entitlement can decline despite food availability. Famine can result from the erosion of people's purchasing power, among other factors, but not necessarily because of a lack of production and physical availability of food (see also BOHLE & GLADE 2008: 101). Market structures are thus central to defining livelihood outcomes. These structures can provide access to certain assets, determine the terms of exchange among different types of capital, and define incomes as well as food security, and thereby the major outcomes of a given livelihood strategy. As with other structures, they also affect people's sense of inclusion and well-being (DFID 2001: Section 2.4). If agricultural livelihood strategies are adjusted to market demand, then market structures effectively govern people's use of their main natural resource – their land; such governance can then alter the sustainability of land use. Thus the influence of markets on livelihoods is crucial and cannot be overemphasised. Nonetheless, socio-economic and environmental circumstances are not the only factors that determine livelihood outcomes. Outcomes are also heavily dependent on what people do with their livelihoods, which brings us to the internal dimension of vulnerability.

### ***3.1.3. Internalities: Agency Constraints and Incentives***

The internal dimension of vulnerability concerns itself with agency constraints and incentives. It examines the assets that people use to pursue strategies or pathways towards desired outcomes. These elements fall under contextual influence but can exert feedback onto structures and processes through the assets that are or are not generated by livelihood outcomes. The primary determinants of livelihoods in this regard are assets and people's access to them.

#### ***3.1.3.1. Livelihood Assets***

Assets are the most important part of the internal side of vulnerability (ETZOLD 2012: 74) because these resources define the level of exposure to external vulnerability stressors (BOHLE 2011: 48). A general lack of assets is a key issue for poverty alleviation because asset availability and access determine the direction of development and because a lack of such resources prevents people from escaping poverty; moreover, this deficiency causes social tensions (GEISER, BOTTAZZI, et al. 2011: 314). As much as any geographical vulnerability assessment, livelihood analysis is therefore primarily interested in the spatial dimension of the risk exposition of people's assets (BOHLE 2005: 73). Although some researchers have argued for other types of assets, such as 'political' or 'cultural capital' (BAUMANN & SUBIR 2001: 1; MENSAH 2012: 35; VAN DIJK 2011: 105, 110), these resources popularly comprise natural, physical, human, financial and social capital.

**Natural capital** pertains to the natural resource base; an examination of such capital explores issues concerning water, soil, air, land, pastures and forestry but also touches upon intangible goods, such as biodiversity, the hydrological cycle or the climate (DE HAAN 2000:

344; KANJI et al. 2005: 6; SCOONES 1998: 7-8). Natural capital is a dynamic asset that forms the production basis of agricultural livelihood activities. It is only partly renewable and therefore warrants use in a sustainable manner (ELLIS 2000: 32). Nonetheless, this resource can be partly substituted by physical capital.

**Physical capital** generally encompasses man-made objects that are often created by economic production processes. Examples are infrastructure, transport, shelter, water, energy and communications, as well as houses, streets, irrigation systems, factories, electricity, and tools and machinery, such as farm equipment. Physical capital serves as an economic and livelihood diversification measure, as well as an extension of operating range. Transport infrastructure, for example, enables trade with distant markets and generally increases the mobility of a population. Use of farming equipment can increase yields. Irrigation infrastructure enables year-round production in arid areas. Physical capital can thus increase the use and efficiency of other forms of capital (e.g. natural capital) or even substitute it (DE HAAN 2000: 344; ELLIS 2000: 32; KANJI et al. 2005: 6) if human capital is at hand to utilise it.

**Human capital** points first and foremost to labour, but it also pertains to skills, talents, experience, capabilities, knowledge and creativity, as well as health and individual issues, i.e. physical attributes that enable people to successfully pursue their desired livelihood strategies (DE HAAN 2000: 344; SCOONES 1998: 7-8). Under the assumption of a lack of physical capital (e.g. machinery), human capital is another central asset in livelihood upkeep because it positions human labour as a major input in agricultural production, especially in rural Africa. Furthermore, in relation to the complexity of an individual setting, sufficient education and knowledge (which may in turn require financial capital), both at individual and societal levels (ELLIS 2000: 33-34), are central to improving general livelihood outcomes. Human capital is constantly shaped and therefore dynamic because education and health issues are often determined by macro political developments and time.

**Financial capital** refers to money in a savings account or in an 'old sock', i.e. a loan or credit (DE HAAN 2000: 344). This asset represents the purely monetary and economic basis of livelihoods – its stocks and flows (KANJI et al. 2005: 6) – but it may occasionally be difficult to distinguish from other forms of capital. In rural settings, for example, financial capital is often invested in animals; these are often referred to as people's bank accounts. Rearing animals may afford farmers higher returns than offered by financial institutions. This situation stems from the fact that developing countries are frequently characterised by high and constant inflation, and therefore, the devaluation of currency. Furthermore, access to financial institutions is severely limited in the rural settings of many developing countries. Credit is even more difficult to access, and if offered at all, comes with exorbitant interest rates (ELLIS 2000: 34). Animals serve as

substitutes for bank accounts and credit, if credit cannot be acquired from family and friends via the possession of social capital.

**Social capital** points to the quality of relationships among people, e.g. relationships with family, friends or neighbours (DE HAAN 2000: 344). It is another elementary asset for earning a living because people are, by nature, social beings and thus embedded in a social environment where they are compelled to interact (SCOONES 1998: 7-8). Interaction in social networks or general structures allows (or excludes) the securing of benefits and immediate access to social support, as regulated by norms and sanctions (AßHEUER et al. 2013: 23). Social capital therefore refers to the degree to which one can act in a social context through networks, social relationships and affiliations with certain groups, as well as through individual positions (e.g. profession, class) within society. The latter partly derive from historical backgrounds and are upheld by norms and traditions. Social interconnectedness is thereby upheld as the basis for creating mutual trust, and thereby, mutual benefit or reciprocity within a group. At a basic level, social capital can be further subdivided into voluntary or horizontal, as well as forced or vertical, relationships (BOHLE 2005: 71; ELLIS 2000: 36-37). Thus, political capital is partly already incorporated in the analysis of social capital, since power relations can be described in horizontal and vertical terms. Elements of cultural capital are also captured in the social capital concept, due to the incorporation of (traditional) norms and values upon which social capital is built to attain a certain hierarchical level with proportionate benefits. When actors occupy a similar level and are possibly emotionally attached to one another, their social connections are often subsumed as ‘bonding ties’, pointing at friends and family. ‘Bridging ties’ exist between less attached actors, those of different groups or communities, but with similar socio-economic backgrounds. ‘Liking ties’ are understood as purely vertical, somewhat forced relationships, ‘such as employer and employee or landlord and tenant’. The setup of hierarchies defines the ability to ‘self-organise’, to ‘learn and act collectively’ for mutual benefits. The level of trust between actors is the most relevant indicator for the assessment of social capital among them (AßHEUER et al. 2013: 23-24).

Most often, if not always, in livelihood analysis, the above-mentioned assets are graphically arranged in the form of a pentagon; such an arrangement became the brand of livelihood frameworks (DE HAAN 2012: 346). The pentagon is supposed to visually emphasise the substitutability and the inter-relationships among the assets (DFID 2001: see Section 1.4 and 2.3), as a descriptive method for evaluating them (MENSAH 2012: 30). As previously indicated, all five assets can be combined, substituted and switched, thereby leading to the creation of highly varying portfolios (SCOONES 2009: 177). Yet, some assets are more important than others.

**Natural capital** is generally considered the most important in rural areas because residents depend heavily on farming, which in turn necessitates suitable lands for production. Most livelihood strategies are based on access to natural capital. In urban areas, this asset becomes less

relevant than **physical capital** (e.g. shelter) and **financial capital** (e.g. income earned from wage labour) (DE HAAN 2000: 344). Irrespective of the level of urbanisation, however, **financial capital** significantly influences the type of livelihood strategy that people pursue (SCOONES 1998: 7-8). Moreover, non-material assets now receive a greater prominence in studies on rural livelihoods (JACOBS & MAKAUDZE 2012: 577), especially **social** and **human capital**.

In the case of **social capital**, vertical relationships are limited by the manner in which they can be changed and influenced; e.g. the relationship between a worker and his employer. Given this backdrop, horizontal relationships (e.g. family or friendship) are often the last resort in times of crisis. Investments in **social capital**, especially horizontal relations that offer support, are therefore often seen as a way of securing the basics of livelihoods, and are of great concern for the poor (BOHLE 2005: 71; ELLIS 2000: 36-37). Poor people often live in an environment that compels them to rely primarily on their neighbours, family, extended kin and networks (WOOLCOCK & SWEETSER 2002: 26). Slum dwellers in Dhaka, for example, deal remarkably well with their high vulnerability to natural hazards, mostly through their high social capital (ABHEUER et al. 2013: 21). Yet, social capital is difficult to measure and analyse because the reciprocity that results from investments frequently occurs only in times of severe crisis (ELLIS 2000: 36-37). The growing importance of **human capital** arises from the fact that knowledge is often deemed key to poverty alleviation given that it enables people to independently advance their living conditions through the effective use of all their assets. Sufficient health and adequate nutrition are other basic needs for any productive livelihood and effective education (ELLIS 2000: 33-34).

Assets 'give people the capability to be and to act' (BEBBINGTON 1999: 2022; KANJI et al. 2005: 6); these resources therefore 'govern' livelihood options (MENSAH 2012: 30) by quantity, quality, tenure, control, need of and access to them. The generated strategies or pathways can thereby be transformed into different livelihood outcomes, which can then create or diminish other assets (KANJI et al. 2005: 6; SCOONES 2009: 177; SCOONES 1998: 7-8). Assets include both tangible resources and intangible claims and access (CHAMBERS & CORNWAY 1991: 9-12) – a definition that again underlines the importance of non-material assets, such as human and social capital. Beyond the immediate influence of social capital on an individual (household), therefore, assets also reside in a larger 'social fabric'. This position further intersects 'with technology, ecology and socioeconomic differentiation' (SCOONES & WOLMER 2002: 27), which can entitle or limit access to assets. The prevailing social environment as well as the broader institutional and regulatory setting determines access to assets their valorisation, and the possible combinations of assets (BOHLE 2011: 47). General access to assets is often defined by social categories, among them class, caste, gender, ethnicity and age (GEISER, BOTTAZZI, et al. 2011: 319-320). To identify these categories and their effects, inequality in the distribution of



access to and control over assets is accorded priority in livelihood studies (DE HAAN 2005: 2; JACOBS & MAKAUDZE 2012: 576-577). Furthermore, assets are activated when livelihood systems need to cope or adapt to change (KAISER & ROTHFUß 2013: 4). They thus define the level of exposure to stressors from the vulnerability context (BOHLE 2011: 48).

### **3.1.3.2. Livelihood ‘Strategies’ or ‘Pathways’**

Livelihood ‘strategies’ (as defined by DFID 2001) is the original term used for the actions people take to generate outcomes – their livelihood ‘responses’ (BOHLE 2011: 48). As explained in the course of this section, however, these strategies are better understood as ‘pathways’. This section examines how livelihood strategies are generally understood and challenges the rational choice theoretical underpinning of mainstream thinking. It then addresses this criticism by laying emphasis on those elements that crucially influence people’s actions.

**Livelihood strategies** generally emphasise ‘the active or even proactive role’ of the poor in advancing their own situation (DE HAAN & ZOOMERS 2005: 2) – a common and important characteristic of most livelihood approaches (KAAG et al. 2004: 49). Analysis focuses on the spatial articulation of strategies in general, and the strategies of vulnerable groups in particular (BOHLE 2005: 73). Strategies can be understood as what people do with what they have, because they are the choices that people employ when pursuing productive purposes (TANG et al. 2013: 18). All strategies are aimed at acquiring livelihood outcomes that ‘yield optimal returns’ (MENSAH 2012: 12). An important issue, however, is that strategies rarely refer to a single activity but also include complicated, multi-faceted schemes, in which contextual factors are incorporated (GAILLARD et al. 2009: 121). They are dynamic and therefore adjust in accordance with the different contextual and endowment situations in which people find themselves (START & JOHNSON 2004: 30).

Classification of livelihood strategies is problematic because the categories may interrelate and a mixing of strategies is possible (HUSSEIN & NELSON 1998: 4-5), indeed common. Strategies can be differentiated by their direct or indirect reliance on the use or exploitation of natural resources. Activities such as agriculture, gathering of food, and animal husbandry are natural resource based, but these also include off-farm activities, such as moulding of bricks for house construction, weaving or roof construction. Occupations such as trading or the provision of services are classified under the second form of resources (physical capital), for they are not natural resource based (ELLIS 2000: 40). In the case of farmers one can distinguish the most basic strategies as either on-farm or off-farm activities (JACOBS & MAKAUDZE 2012: 574). Referring to agriculture, SCOONES (1998: 9-10) differentiated three basic agricultural strategies: (1) the intensification or extensification of croplands; (2) the diversification of livelihood sources, thus venturing into the production of other crops or engagement in off-farm activities; and (3)

migration – whether seasonal or permanent – which is intended to provide a new or additional basis for securing livelihoods. Intensification can increase productivity and therefore result in higher outcomes in terms of money and food. However, it necessitates high inputs, and therefore, assets at hand. Extensification reduces input use relative to the area cultivated, thereby allowing for improved conservation of the natural resource base by stimulating savings on or the abandonment of inorganic fertilisers, herbicides and pesticides. It can also mean a diversification in crops to ease the negative effects of monocultures (LOHBERG 2001: 150; SCOONES 1998: 9-10). Extensification can be achieved by either using more land but each plot less intensively, or by integrated management that minimises the negative effects of chemical inputs or restores soil fertility with the help of ‘close-to-nature’ approaches. Such management is used to ‘maintain and restore soil fertility and to maintain sustainable production through practices such as low input resource-conserving technologies based on integrated management’ (IAASTD 2008: 1-2). A combination of strategies is always of special political significance because certain activities may have to be substituted should policies hinder people from engaging in them; the potential for changing strategies is subject to available options (ELLIS 2000: 40).

Other categorisations of strategies are based on time frames. Accordingly, strategies can be differentiated into spontaneous acts, short-term coping, long-term mitigation or enhancement (DIDERO 2012: 29). All of these require a mobilisation of assets (KRÜGER 2003: 11), but they entail either a high or low potential for flexible response. Depending on the vulnerability context that surrounds people, shocks will require short-term reactions (i.e. coping responses), and therefore, an immediate mobilisation of (the remaining) assets, especially social capital; possibly, such events will compel the sale of movable assets and access to new income sources or migration (ELLIS 2000: 39-44). Long-term changes (i.e. trends) will require adaptation, and thus, a long-term alteration of livelihood strategies, a reconfiguration of the use of assets, which will ‘either enhance existing security and wealth or try to reduce vulnerability’ (DAVIES & HOSSAIN 1997: 5). From a similar perspective but with greater emphasis on living conditions and life phases, ZOOMERS (1999) distinguished compensatory, security, accumulation and consolidation strategies. Compensatory strategies prevail among those dealing with sudden shocks and those having to deal with structural shortages of land or labour power. These individuals are often characterised by downward social mobility. Their survival strategies include migration, sale of capital and borrowing, and increased reliance on family social security. Security strategies are often implemented in areas where livelihoods are at risk for ecological reasons. These strategies include diversification by multi-cropping and multi-tasking, the exploration of non-agricultural opportunities, sharecropping and stockpiling. Accumulation strategies are used to create a minimum resource base for future expansion, and improvements for upward social mobility with a long-term horizon. Such courses of action can include migration, land acquisition and labour

recruitment. Consolidation strategies follow a period of social upward mobility, whereby now-wealthier households invest to stabilise their well-being and improve their short-term situation given that surplus assets are available (Ibid.: 48-51).

Together with the capabilities of individuals, assets are the single most important factor defining the scope of strategic action and forms of adaptation, coping and enhancement (DE HAAN 2012: 346; MENSAH 2012: 10). Assets and individual capability are accorded such importance because one cannot accomplish meaningful goals out of what one does not have access to. As previously indicated, however, strategies also depend on higher-ranking institutional and political-economic frame conditions, as well as on the actual and perceived vulnerability context (GERTEL 2007: 60; TANG et al. 2013: 18). With regard to these external factors, institutional processes are of particular interest because they guide strategies and mediate the ability to accomplish goals and achieve outcomes (SCOONES 1998: 3). Government decisions on agricultural policies, for example, set farmers' frame conditions and scopes of action. Similarly, the actions that farmers take may affect future policies (RAUCH 2003: 37). Primarily, effective agrarian policies require 'a solid understanding of the land-based livelihood strategies and aspirations of the rural poor' (JACOBS & MAKAUDZE 2012: 574). An assumption that remains questionable, however, is the ability of livelihood analysis in its current state to thoroughly elucidate aspirations and resultant actions. This question arises because of the underlying assumptions of the approach that surface when observing the concept of 'strategies'. The notion of actions being rational 'strategies' needs to be challenged.

Livelihood approaches, especially their concept of strategic behaviour, are orientated in accordance with the principles of rational choice theory (GERTEL 2007: 61). This orientation attests to a meaningful, utility maximising motive behind each and every pursued economic and social activity; this motivation is a homo oeconomicus ideal (SAKDAPOLRAK 2014: 20). In the case of farmers, however, such an assumption may not hold (SCHNEIDER et al. 2010: 333). JAKIMOV (2013: 499) emphasises that intentionality in livelihood strategies can be partly absent because alternative ways of living that contrast with parental lifestyles are 'seldom considered real possibilities'. Thus, the scope of action can be based on both rational and strategic thought but is most often also grounded on unintentional behaviour (DE HAAN & ZOOMERS 2005: 27). Part of this scope of action is influenced by social expectations and cultural and societal sensitivities (MENSAH 2012: 12). Therefore, the idea that people act entirely freely and rationally on the basis of their endowments is (science) 'fiction' (DÖRFLER et al. 2003: 13). A concept based on the assumption of the existence of a homo oeconomicus can lead to the neglect of aspects of people's lives that go beyond immediate political, economic and material dimensions (BOHLE 2009: 528). Among these aspects are people's perceptions, ideas, hopes and fears, norms and

values (KAAG et al. 2004: 54). Critics thus argue that in livelihood analysis, an ‘explicit reference to a theory that explains people’s actions is lacking’ (SAKDAPOLRAK 2014: 20).

In acknowledgement of this profound critique, it is appropriate to assume that important components of decision-making and learning processes that lead to action and adaptation are not necessarily entirely rational but embedded in a ‘social [or livelihood] context that is beyond the control of the individual decision-maker’ (CARR 2008: 690). This context offers only a limited space for decision-making and action and is permanently shaped by institutions and social arrangements (SCOONES & WOLMER 2002: 183). ‘**Livelihood pathways**’, but not ‘strategies’, arise through co-ordination among actors. This co-ordination is a product of individual strategic behaviour within a historical repertoire, and is a result of social differentiation, which thereby also includes power relations and institutional processes that pre-structure decision-making (DE HAAN 2005: 145). Thus, although the factual presence or absence of assets plays a role, the preferences of ‘other actors and the limitations imposed by these actors and higher-level institutions’ (DE BRUIJN & VAN DIJK 2005: 10-12) are equally important because they may grant or deny access to certain assets and pathways. For example, DE HAAN and KAMANZI (DE HAAN & KAMANZI 2011) demonstrate that objectives, policies and instruments can be challenged and altered by several actors in arenas at different scales to a degree wherein ‘their actual outcome and impact may have very little to do with any original goals’ (Ibid.: 119). Apart from acknowledging people’s perception, norms and values (KAAG et al. 2004: 54), therefore, livelihood analysis necessitates understanding aspects of power to thereby ‘effectively contribute to livelihood enhancement’ (DE HAAN 2012: 346). Scholars have attempted to acquire such an understanding by incorporating the aforementioned ‘political capital’ into the portfolio of assets. Others have looked into chain-like discursive arenas (see DE HAAN & KAMANZI 2011) and/or have included Bourdieu’s notion of habitus and social fields into their concepts (ABHEUER et al. 2013; DIDERO 2012; DÖRFLER et al. 2003; ETZOLD 2012; JAKIMOV 2013; SAKDAPOLRAK 2014; VAN DIJK 2011).

This interpretation of livelihood analysis as a whole and of livelihood strategies in particular, as well as the resultant critique, is not entirely applicable. As previously indicated, agency constraints and structural obstacles are elementary components of livelihood analysis. Social capital covers aspects of power. Furthermore, the understanding of livelihood activities has never been neutral to processes of inclusion, exclusion, and thus power because the examination of marginalisation processes is intrinsic to livelihood analysis. It is in itself a rights-based approach given that contextual or structural variables exercise influence and define access and entitlements to assets. An exploration of power is incorporated into livelihood analysis by (for example) the analysis of transforming structures and processes, and policies and their mediating effects on livelihood scopes of action. Thus, ‘power, politics and social difference – and the

governance implications of these – have been central’; though, many studies have factually remained at the margins of discussions possibly because economic approaches dominated their concerns (SCOONES 2009: 180).

In conclusion the livelihood approach does not require additional theoretical additives or enhancements to understand the role power exerts on livelihood pathways. However, special emphasis should be placed on the perception of norms and values, the pro-poor functioning of power and institutions in general, and how decisions are shaped in this context. Furthermore, people’s logic and reasoning – their decision-making – should be understood in local terms; which has consequences for the methodological approach taken by this research (see Chapter 4). The spectrum of individual activities that arise (from people’s reasoning) can be aggregated into higher-ranking, yet more complex understandings at the household, village or even district level (SCOONES 2009: 172). A systematic comparison of livelihood decisions in different geographical, socio-economic, cultural or temporal circumstances (including a consideration of power aspects, which are also based on social norms and aspirations) should therefore enable sufficient recognition of pathway patterns that go beyond a specific case (DE HAAN 2005: 146). Through such recognition, it is possible to derive insights into how these general pathways influence broad-based livelihood outcomes.

### ***3.1.3.3. Livelihood Outcomes***

Livelihood outcomes are generated by livelihood pathways, which in turn, depend on the assets at hand for a decision-making process in a vulnerability context and under the influence of transforming structures and processes (see before and WIESMANN et al. 2011: 235). Thus, livelihood outcomes are temporal results of the dynamics between socio-economic and ecological conditions, the external drivers of ‘adaptive capacities of exposed and sensitive agents’ (ETZOLD 2012: 72) who struggle ‘within unequal fields of social relations’ (SAKDAPOLRAK 2014: 24). ‘Outcomes’ are termed as such (and not as ‘objectives’) because the neutrality of the term enables the inclusion of local perceptions in defining sustainability, yet still underlines the strong achievement orientation of the approach (DFID 2001: Section 2.6). Outcomes are measured by combining a traditional view of poverty lines with a wider framing of well-being and sustainability (SCOONES 2009: 177), but are based on the perceptions of the poor (DE HAAN 2005: 10) instead of externally defined poverty lines. Through these indicators, livelihood analysis aims at efficient ‘achievements [...] and progress in poverty elimination’ because it focuses attention on exactly these accomplishments (DFID 2001: Section 2.6). Naturally they vary (SCOONES 2009: 172), not only in accordance with time, but also in accordance with the group of people being investigated. Five indicators of general welfare are central to any assessment of

outcomes: income, well-being, vulnerability (specifically to economic shocks and natural disasters), food security and sustainable use of natural resources (MENSAH 2012: 12).

- **Food security** is a primary indicator because it is the basis required to engage in meaningful activities and to stay healthy. It is thus elementary to achieving other outcomes, e.g. quality of life cannot be attained when an individual suffers from hunger or starvation. It is assigned a separate category owing to its fundamental importance. Hunger and dietary inadequacy are distinct dimensions of deprivation (DFID 2001: Section 2.6; ETZOLD 2012: 72).
- Very closely connected to food security is **income** because it is a main entitlement factor for food, but possibly also education and general quality of life. Income as an indicator acknowledges that people seek to increase their net returns on activities and is thereby an elementary part of economic and social sustainability (DFID 2001: Section 2.6).
- Although material or productive resources are the primary determinants of quality of life (JACOBS & MAKAUDZE 2012: 576), **well-being** explicitly prompts a focus on non-material aspects, such as personal sense of security, social status and identity (ETZOLD 2012: 76). Security in this context can be understood as guaranteed ownership of or access to resources and livelihood activities that are necessary to offset risk and ease shocks (BOHLE 2009: 521). Thus, individual material well-being often depends on non-material societal factors and vice versa. Nevertheless, what motivates people to undergo certain livelihood activities is ‘not simply the acquisition of more stuff or security’; but rather is a matter of ‘dignity, enjoyment and meaning’ (VAN DIJK 2011: 102). Livelihoods may advance through non-material improvements despite a continuous lack of material aspects (DE HAAN & LAKWO 2010: 542). ‘People [simply] value nonmaterial goods. Their sense of well-being is affected by numerous factors including: their self-esteem, sense of control and inclusion, physical security of household members, their health status, access to services, political enfranchisement, maintenance of their cultural heritage, etc.’ (DFID 2001: Section 2.6). Well-being comprises several factors and substantially embraces the bottom-up approach of livelihood analysis.
- The analysis of **vulnerability** looks into the available cushions against the negative effects stemming from the vulnerability context. It demands a holistic view of the interplay between contextual and internal factors, and tries to reduce the downside of external factors, with a focus on social aspects (Ibid.: Section 2.6). It thus identifies ways of minimising exclusion and maximising equity (Ibid.: Section 1.4) and is tightly interwoven with well-being and the other livelihood outcomes.
- The **sustainable use of natural resources** refers to environmental sustainability in general and thereby emphasises the long-term benefits of sensible resource use (Ibid.: Section 2.6). Especially in this era of increasing climatic and environmental change, this factor may have to be accorded increased attention.

Livelihood outcomes are affected by collective and household-level responses, which feed back into local conditions, institutions and pathways (DE HAAN & ZOOMERS 2005: 42), as well as the wider vulnerability context (TANG et al. 2013: 18). Outcomes will be more sustainable in terms of asset gains if an adequate mix of assets for value addition is present; this mix is adopted to address potential risks (BOHLE & GLADE 2008: 104). In agriculture, appropriate pathways and resultant outcomes of development depend mainly on current and potential comparative advantage in terms of three crucial interacting factors: agricultural potential, access to markets and population pressure. Agricultural potential includes dynamic aspects such as rainfall, altitude, soil type and depth, topography, presence of pests and diseases. Population pressure determines the work intensity of agriculture through the land-to-labour ratio and alters the comparative advantage of labour intensive pathways and returns on investments. However, it is mainly (global/globalised) agricultural markets that dynamically determine the comparative advantage of a location's absolute agricultural potential (PENDER et al. 1999: 36-38) and thereby overall livelihood outcomes. Therefore, it is necessary to incorporate approaches that specifically address market rationales; here chain and production network concepts.

### ***3.2. Markets and Chain and Production Network Concepts***

The origins of chain and production network concepts date back to the 1950s. Chains of (agricultural) products were observed by scholars and practitioners, resulting in the 'filière' concept of the 1970s (ERMANN 2005: 98). It served as a means of understanding organisational and spatial alignments of value-adding steps in production, processing and distribution processes, by describing linear input-output structures, flows of materials and market values among the different segments involved at micro to regional, and eventually to macroeconomic levels (BRAUN & SCHULZ 2012: 208-209; KULKE 2007: 118-119). Simultaneously, and especially since the mid-1970s shortly before the term 'globalisation' was popularised and global trade liberalisation became a more significant issue, IMMANUEL WALLERSTEIN was among the first to conceptualise the phenomenon of global market expansion and its effects on poverty.

WALLERSTEIN observed and defined historical, global trade interactions as relevant units and reference points for social, economic and political action. The world system that he described was a global economic system centred on mercantile exchange, by which he elucidated the actions, self-organisation and embedding of economic actors into the context of global markets. He attempted to understand the effects of market exchanges and the resultant modifications in social systems and thereby historical trends that pre-structure and limit the current scope of human action and agency (ZÜNDORF 2010: 10, 43-44). His approach acknowledged underdevelopment as a result of structural constraints, of integration into capitalist world trade and resultant unequal economic exchanges (BIERSCHENK 2002: 4). He further incorporated spatial, temporal,

quantitative and qualitative trade functions in relation to the value gains along a production and trade chain, from producers to consumers. WALLERSTEIN thus looked into product chains, within which production and distributional processes are interlinked and all involved activities are commodified. In these, he saw the key to processes that produce global inequalities (OUMA et al. 2012: 227; ZÜNDORF 2010: 29).

It was against this background that the notion of commodity chains then emerged on a broader scale (COE 2009: 556). But it was not before the 1990s that the analysis of such economic interrelations increasingly served as an avenue from which to comprehend global to local linkages. Increased interest stemmed from massively growing trade liberalisation, and thus, further and increasing economic globalisation processes (OUMA et al. 2012: 227). A multitude of research avenues emerged, some from business-orientated research and others from sociological literature, in which chains and later networks were used to conceptualise production systems (COE 2009: 556). Further initial theoretical enrichments came from Global Commodity Chain (GCC) approaches, which evolved primarily in the 1990s at a time when globalisation processes gave rise to the question of the extent to which GCCs would serve as opportunities for developing countries or create new dependencies.

Much of the ideas on GCCs are based on the works of GEREFFI, mostly in cooperation with KORZENIEWICZ (GEREFFI & KORZENIEWICZ 1994), who found that conceptual renewal was necessary because a growing complexity in production processes and their organisation increasingly limited the analytical capabilities of traditional views. Value-adding processes that involved several independent ventures in different countries could no longer be appropriately grasped and analysed. Conceptual predecessors had failed to consider non-material linkages, such as information, opportunistic behaviour of actors or the influence of governance and power. These aspects and especially issues of governance were later picked up by the Global Value Chain (GVC) approach (BRAUN & SCHULZ 2012: 207-211; KULKE 2007: 119). A further evolution of approaches was prompted by an ever-growing complexity in global economic transactions. The Global Production Networks (GPN) perspective emerged, which recognised the importance of and expanded the theoretical perspective to incorporate wider (social power) networks of production (COE & HESS 2008: 267; PATEL-CAMPILLO 2011: 80).

These approaches and concepts – aside from the rather technical notion of ‘*filière*’ – all address the question of development. This is reflected mostly in the idea of economic, social or environmental ‘upgrading’ of smallholder producers, as pursued since the establishment of the GCC approach. Parallel to this and within the broad field of pro-poor or inclusive market development, popularly termed ‘making markets work for the poor’ (M4P), such approaches have gained further momentum using the label ‘value chain development’ (BATTERBURY et al. 2011: 4). It is thus necessary to take a closer look at what these concepts encompass and how they try to



address questions of development and upgrading. In this regard, special potential in the case of agriculture is seen to reside in contract and outgrower farming.

### **3.2.1. Global Commodity Chains**

GEREFFI defines GCCs as ‘sets of interorganisational networks clustered around one commodity or product, linking households, enterprises, and states to one another within the world-economy’ (GEREFFI 1996: 2). The concept roughly differentiates between two types of chains – producer-driven and buyer-driven chains – each accompanied by power asymmetries that favour either side. Thereby, producer-driven chains were characterised by high technological competency and capital-intensive production, thus creating a quasi-monopoly with corresponding supremacy in control over an entire chain. Buyer-driven chains, on the other hand, were characterised by considerable flexibility in exchanging producers should price or quality specifications be unsatisfied. Such exchange was possible because of the simple nature of the buyer-driven chains: numerous manufacturers could produce their products. Because these manufacturers had no access to the end-consumers, they were dependent on so-called lead firms who provided market access and thereby controlled the commodity chain and dictated contractual terms, including prices. Consequently, buyer-driven chains provided only marginal opportunities to producers for value addition, capacity building and independent development (BRAUN & SCHULZ 2012: 209-210). GEREFFI and KORZENIEWICZ identified four major elements of global commodity chains (see also GEREFFI 1995; 1994):

- An input-output structure covering tangible and intangible flows, and thus, raw materials and semi-finished products on the one hand and information and knowledge on the other;
- A governance structure that determines how and by whom a chain is controlled and how resources and value addition are allocated;
- A spatial structure, a territoriality, that is expressed in the geographical concentration and dispersion of the chain and its elements; and
- An institutional structure that sets the reference frame for the interplay of chain elements by embedding these in regional, national and international rules and regulations.

The GCC approach was well received because it yielded a number of empirical works and deepened the scientific understanding of globalisation processes and their spatial effects. Nevertheless, its abstract, linear and sequential view was increasingly contested (DIETSCH 2011: 29). It became clear that reality is characterised by networks, not chains, of production and distribution. Furthermore, the institutional aspects of chains were often neglected and the dichotomist view of chains being either producer-driven or buyer-driven became increasingly questionable. As a result, further improvements to the conceptualisations were made through an

additional differentiation of typologies in global value chain (GVC) approaches (BRAUN & SCHULZ 2012: 210-211).

### **3.2.2. Global Value Chains**

Similar to its predecessors GVC analysis examines the line of value addition, from initial design and production to consumer delivery, thus covering the local, national, regional and international level, whereby at each step, the worth of a commodity increases. It looks into exchanges among stakeholders within a chain and attempts to explain the effect of revenues generated by consumer spending; such revenues are transferred to relative revenues for actors along the line (KANJI et al. 2005: 9). The analysis therefore devotes attention to cost structures in production, processing, transport and retail, as well as to opportunities for economies of scale and scope and the surplus generated for each partner in a chain (RUBEN et al. 2006: 6). The decisive difference that GVC analysis brought forth is a more detailed scrutiny of chain governance. Basing their assumptions on transaction cost theory, whereby companies minimise their costs in acquiring, processing and distributing a product (DA SILVA 2005b: 12-14; DIETSCHE 2011: 24-25), GEREFFI, HUMPHREY and STURGEON (GEREFFI et al. 2005) found three determinants for the type of governance established:

1. The complexity of transactions in terms of information;
2. The degree of codification of information for handing over; and
3. The competency of partners in the chain to live up to requirements.

GEREFFI et al. (2005: 84-85 and 89) singled out five different forms of GVC governance and coordination, differentiating between market-based, modular, relational, captive and hierarchical forms. Generally, companies seek to reduce transaction costs under the conditions of bounded rationality and opportunism of involved actors. If costs are low, they will tend towards market governance; though when costs are high, they will be inclined towards contracting or integration to reduce the costs. Transaction costs are thus largely explanatory for the governance structures in a chain (TRIENEKENS 2012: 54). Market-based types are characterised by a low degree of coordination and power asymmetry, whereas the other extreme – hierarchical forms – are fully ruled in a powerful lead firm (GEREFFI et al. 2005: 84-85 and 89):

1. Market relations are found mostly in classical foreign trade on world markets. With highly standardised products, transfer of knowledge is rarely needed. Many consumers face many producers, and prices develop in accordance with supply and demand. Transactions are thus often based on single sales and feature low complexity.
2. Modular relations imply some sort of information exchange between actors, even though producers work independently. Producers may accumulate some technical and mercantile expertise. As a result, some producers progress from component to full suppliers because of

their involvement in a producer-dominated chain. In modular relations, therefore, no single and powerful buyer, but many buyers and producers, are at work. With the help of turn-key suppliers and customers, products may be further developed. Turn-key suppliers may engage in contractual agreements with producers and lead firms.

3. Relational value chains are often based on long-term cooperation, and thus, trust. They are not necessarily formalised but imply more connectedness than that achieved with market-based relations; nonetheless, such connectedness may also be a sign of the weakness of lead firms. They may also be less coordinated and asymmetric in power relations than modular value chains.
4. Captive relations, on the other hand, are characterised by a strong lead firm, which signs formal contracts with independent producers. Producers have few but specific tasks under the control of the lead firm. The chain is thus heavily buyer driven, and producers encounter difficulties in identifying alternatives. Most of the components of a product's value chain are strictly controlled by the lead firm in terms of development, design, organisation from production to consumption, quality and efficiency.
5. Once an entire chain is under the complete control of one enterprise, this situation is referred to as a hierarchical chain (GEREFFI et al. 2005: 89; KULKE 2007: 121-122; SCHAMP 2008: 6-8).

A special focus of the GVC approach is its examination of the temporal dynamics in the coordination and governance of chains, and thereby, the advancement of producers, or rather, the acquisition of a more favourable form of governance through the attainment of competency. Many scholars have searched for possibilities to advance producers within chains through so-called 'upgrading' (see Section 3.2.4). Still, profound criticism against the approach arose from the fact that 'governance' and 'coordination' are weakly defined and often treated as synonymous (DIETSCHE 2011: 31, 33). In fact, the understanding of governance has been extensively debated in the literature on GVCs, thereby producing a vast number of definitions (NADVI 2008: 324).

In general terms, governance describes the institutional structures (including laws and norms) by which rules are set and implemented (Ibid.: 324). Governance should be understood as the broader institutional structures that guide a chain as a whole. Coordination is the relation and organisation of trade-offs among different elements at nodes of chains (i.e. at points where a product is exchanged or significantly altered) within the broader governance framework (GIBBON & PONTE 2005: 3; PONTE 2007: 4). Governance can influence coordination, although the opposite is rare. Such a conceptual divide is important when analysing manifold, fragmented and complex chains that may lack distinct lead firms but are practiced by a multitude of small-scale enterprises, as can be assumed to be the case in rural Africa. An overall governance structure, in the previous sense, may then simply be non-existent (DIETSCHE 2011: 34). Yet

capitalist principles governing the chain remain, indicating that coordination arrangements will generally be aimed at minimising total production and transaction costs. These arrangements depend on the items produced, how they are to be produced (including quality aspects), and how physical product flow in terms of quantity and timing is handled (HUMPHREY & SCHMITZ 2002: 1021). Another criticism against the approach points to the deficient analysis of the effects of institutions and external actors (DIETSCHE 2011: 31, 33), which led to the use of the Global Production Networks (GPN) approach. GPN defines governance and coordination as taking place in wider sets of actors and institutions, and partly independent of economic rationalities.

### **3.2.3. *Global Production Networks***

The GPN approach is based on GCC and GVC analyses and largely includes their analytical scopes while also encompassing other dimensions (PATEL-CAMPILLO 2011: 80), such as that of actor-network theory (COE & HESS 2008: 267). GPN evolved as a result of the criticism lodged against GCC and GVC approaches (DARBY 2013: 45), thus it explicitly focuses on the institutional and territorial embeddedness of ventures. GPN thereby widens the view of GCC and GVC in the sense that it enlarges its predecessors' analytical frame with social, political, societal and cultural dimensions. GPN thereby looks into vertical, often global, interconnections within value chains and into local horizontal embeddedness, i.e. a chain's entanglements with other actors in local environments (KULKE 2013: 146). On the basis of the central elements of GCC and GVC, the GPN framework additionally 'emphasizes the complex intra-, inter- and extra-firm networks involved in any economic activity, and how these are structured both organizationally and geographically' (COE 2009: 557). Thus, the GPN view encompasses a wider set of actors and institutions (including non-commercial actors) (ROSSI 2013: 224) that influence governance and coordination in complex production networks, as opposed to the previously proposed idea of linear chains. The linear chains remain a part of GPNs, because the approach acknowledges vertical exchange relations between producers and companies, but they are situated or embedded in wider horizontal entanglements. Among these is the immediate influence of NGOs, governments, unions and consumers and even actors who are not directly integrated in vertical relations but still exercise power (BRAUN & SCHULZ 2012: 210, 214-216).

Thus, the distinction between GPN and GCC/GVC is the former's explicit consideration of (extra-firm) networks instead of chains, and thereby, an increasing complexity in governance and coordination (COE 2009: 557). Drawing on actor-network theory, GPN emphasises 'the relationality of both objects and agency in heterogeneous networks [...], pointing out that entities in networks are shaped by, and can only be understood through, their relations and connectivity to other entities' (HENDERSON et al. 2002: 442). In doing so, GPN rejects the classic global-versus-local and structure-versus-agency dichotomies (HENDERSON et al. 2002: 442). Through

such rejection, it invalidates the idea of linear, vertical structures with unidirectional flows of power and replaces it with more dynamic structures that contain horizontal, diagonal and linear interconnections and multi-directional power relations. It thus advocates for a bottom-up perspective that ‘addresses social, political and cultural contexts ‘on the ground’ within which production processes are embedded and crucially the agency of those considered in the GVC framework to be most powerless’ (DARBY 2013: 45). Thus a GPN can be broadly defined as the ‘globally organized nexus of interconnected functions and operations of firms and nonfirm institutions through which goods and services are produced, distributed, and consumed’ (COE 2009: 557).

In the operationalisation of the GPN approach, processes of value creation, enhancement and capture are accorded as high a priority as are aspects of embeddedness and power (COE 2009: 557-558; HENDERSON et al. 2002: 448). ‘Value’ encompasses processes of value generation and addition on the basis of technology and knowledge transfer within networks and the binding of value in its concrete, spatial and regional context. ‘Embeddedness’ refers to actors within the immediate production network and beyond that, the social, political and cultural relations that are included in the network in territorial terms. Because these relations may cross global borders, they can establish connections to different supra- and sub-national institutional frameworks (BRAUN & SCHULZ 2012: 216; KULKE 2013: 146). Understanding the embeddedness of GPNs is elementary in terms of the constitution and reconstitution of a network by economic, social and political arrangements in the locations that they inhabit, and thus, in the network in a certain territory. Therefore, GPN perspectives require a highlighting of the socio-cultural and institutional contexts in which economic activities take place (COE 2009: 557-558). These are heavily shaped by ‘power’, which is classically categorised in accordance with its source. ‘Corporate power’ refers to elements of governance, similar to its definition in GCC and GVC. ‘Institutional power’ is understood as the level of influence of (supra-) governmental institutions and actors. ‘Collective power’ is attached to civil society actors, such as NGOs or unions (KULKE 2013: 146). The GPN approach presents tremendous potential as a tool for understanding the organisational and geographical dimensions of a global economy because it carries with it the following major advantages:

- Scrutiny of all actors, not only the producers of goods;
- Greater flexibility in terms of scale;
- Consideration of the influence exerted by the socio-spatial context;
- More detailed articulation of power dynamics;
- More effective identification of the points where and by whom value is created and captured, and therefore, how such value may be enhanced in terms of identifying points of possible intervention (COE et al. 2008: 289).

Publications have thus far suggested that GPN enables a thorough understanding of the influence of governmental policies on economic interdependencies. However, they also show the difficulties encountered in grasping the complexity of institutional contexts. The increased complexity of the approach brings with it the danger of diminishing its analytical strength (BRAUN & SCHULZ 2012: 216). Indeed, the results of many studies have been indicative rather than comprehensive (COE 2009: 561). Moreover, several researchers have identified shortcomings with regard to the notion of ‘embeddedness’ and have argued for the need for conceptual improvement (see MARKUSEN 1999; OINAS 1997; PIKE et al. 2000). Analysis is constrained mainly by the fact that the theoretical foundations of the approach, as provided by actor-network theory, lack an exploration into the structural preconditions and power relations that shape production networks (HENDERSON et al. 2002: 443). Thus, ‘for GPN research to be productive we need a conceptualization that operates at the interface of structure and agency’. Furthermore, dualisms of flows and territories, as well as of culture and economy, should be overcome. We need an integrative perspective ‘that combines the insights from political economy and cultural economy approaches [...] to describe and explain the complexities and emergent properties of GPNs’ (COE et al. 2008: 289), including a look at relevant actors and their strategies (COE & YEUNG 2015; YEUNG & COE 2015: 32).

Criticism has also been raised with regard to the neglect of intra-firm relationships and consumers in GPN analysis (COE 2009: 561; COE et al. 2008: 277, 286). Despite the soundness of such criticisms, however, definitive evaluation of the approach is difficult because little empirical work has been done and because theoretical discussions about the concept continue. At this point, enriched forms of GVC analysis may still be useful or yield even better results for some questions arising in the context of economic globalisation (BRAUN & SCHULZ 2012: 216). One such question is that of development at the producer level through upgrading.

#### ***3.2.4. Development by Upgrading***

GCC, GVC and GPN approaches, especially since the 2000s, have sought ways to foster development through so-called ‘upgrading’ (see for example BAZAN & NAVAS-ALEMÁN 2004; FOLD & LARSEN 2011; GEREFFI 1999; GIBBON 2001; HENDERSON et al. 2002: 448; SCHOLZ 2010). This section takes a critical look at the conception of upgrading. It proposes enrichments to the notion, and tries to narrow the concept down to the specifics of the agricultural sector to further enrich the theoretical framework of this study, based as it is in northern Ghana.

##### ***3.2.4.1. Concepts of Upgrading***

From a producer’s point of view upgrading is generally concerned with seeking ways to alter a chain’s coordination to create a more favourable form, ideally by morphing a buyer-driven chain into a form close to a producer-driven one through the attainment of competency and

knowledge (DIETSCHKE 2011: 31; SCHAMP 2008: 8). It thereby looks for ‘the possibility for (developing country) producers to move up the value chain, either by shifting to more rewarding functional positions or by making products that have more value added invested in them and that can provide better returns to producers’ (GIBBON & PONTE 2005: 87-88). The primary avenues to allow for such upgrading are the level of competency and knowledge, governance structures and power differences in upgrading prospects and wider regional development opportunities (COE & HESS 2008: 268). Upgrading is primarily achieved through economic improvements to business features, such as processes, products and functions (FOLD & LARSEN 2011: 42-44); thus, most studies investigate the technological sophistication of production, and thereby, value addition (MILBERG & WINKLER 2010: 1). Upgrading most often revolves around sheer economic advances (MILBERG & WINKLER 2010: 1). Early conceptualisations of upgrading addressed economies of scale by arguing for a general expansion of production, particularly for territorially limited producers. Other aims were to determine ways of economic sophistication and diversification, for example, by incorporating processing at intermediate stages to then enter into the production of final goods and new forms of existing commodities. These aims also encompassed the advancement of sales and marketing arrangements (GIBBON 2001: 352-354; SCHAMP 2008: 10). Such forms of producer advancements can be summarised as ‘economic upgrading’, often also referred to as ‘industrial upgrading’ (MILBERG & WINKLER 2010: 1). These commonly consist of several improvements to processing (process upgrading), to the product itself (product upgrading), and to the functions executed by suppliers (functional upgrading). Alternatively, advancements pertaining to the alteration of a chain into a new one altogether are understood as chain upgrading/inter-sectoral upgrading.

In detail, ‘process upgrading’ looks into the greater efficiency of the production process, and thus, a more efficient transformation of inputs into outputs, possibly through the acquisition of new machines, the implementation of a quality control programme, the shortening of delivery times and the reduction of waste. ‘Product upgrading’ deals with possibilities for generating more sophisticated commodities by introducing new products, changing designs or improving quality. ‘Functional upgrading’ means changing a portfolio of activities, including higher value-added activities; thus it also involves moving on to different stages (‘functions’) after production, suggesting a move into new links of a value chain, possibly resulting in a higher margin for suppliers and activities that are difficult to imitate, such as original designs, branding and marketing (NAVAS-ALEMÁN 2011: 1388; ROSSI 2013: 223). Therefore, when shifting to a higher value-added production chain altogether, one can also speak of ‘chain upgrading’ (ROSSI 2013: 223). Such upgrading can similarly occur through another sub-type of upgrading, i.e. ‘inter-sectoral upgrading’, whereby firms move into new productive activities by entering a new or related industrial sector but applying the knowledge and capabilities acquired in the former/‘old’

sector (HUMPHREY & SCHMITZ 2002: 1020, 1025; NAVAS-ALEMÁN 2011: 1395). Intersectoral upgrading is thus partly similar to ‘product upgrading’, which also includes introducing new products, and can be a form of diversification save that it involves a distinct change in sectors (e.g. a shift from producing televisions to PC monitors).

The fact that an enabling environment substantially influences the viability of value chains is widely acknowledged, especially in rural areas where producers are often unfavourably incorporated into markets (CHOUDHARY et al. 2014: 1059). Thus, another distinction in economic upgrading that surfaced with GPN analysis is the level of ‘contractualisation’ of arrangements. The analysis examines two dimensions: ‘vertical contractualisation’, in which long-term relationships or contracts are established between producers and buyers, and ‘horizontal contractualisation’, whereby producers organise and cooperate among themselves to advance their situation. Vertical forms can bring forth a more solid guarantee of market access, increase the overall size of demand and facilitate the creation of more comprehensive market information on quality, services and inputs. Horizontal forms, through collective action, can increase revenues, reduce costs or reduce individual risks through cooperation. These two forms are often connected because collective action, and thus horizontal contractualisation, may be needed to establish vertical forms (e.g. the case wherein many smallholders are organised into groups to produce for larger ventures) (BOLWIG et al. 2008: 13), thereby helping these ventures deal with numerous suppliers and reducing transaction costs.

All forms of upgrading possibilities come with certain preconditions. They require reward structures, roles that offer higher and more stable returns, as well as (maybe most importantly) routes for arriving at such roles (GIBBON 2004: 26-30). Furthermore, the initiation of learning processes through information dissemination is central (ROSSI 2013: 223). Such achievements can originate from lead firms through provision of specific support for their interests and through unplanned spill-over effects or imitation, as well as through government or NGO support. Producers can then improve their production processes, enhance spectrums and gains, establish forms of independent marketing and diversify into other markets and products (SCHAMP 2008: 10). Apart from economic advances, from a more normative perspective upgrading can also take place in environmental and social realms in the form of environmental or social upgrading.

Very generally, ‘environmental upgrading’ points to a modernisation of production technology for increased ecological sustainability. Improved technology often comes with more efficient use of resources, both in the economic and environmental sense (BRAUN & DIETSCH 2008: 13; DIETSCH 2011: 37). Strong lead firms mostly initiate environmental upgrading to address the ecological concerns of their critical (often Western) customers. Such upgrading is driven by economic concerns. The higher the vertical integration in chains, the greater the



possibility of implementing more environmentally sustainable forms of production (BRAUN & DIETSCHKE 2008: 13; BRAUN & SCHULZ 2012: 243-244).

‘Social upgrading’ is of critical concern in the context of poverty alleviation and is therefore discussed in detail in this thesis. Such upgrading can partly be understood as a conceptual counter-movement to the dominance of economic concerns in the search for supplier advancements (i.e. upgrading), because the wider external effects of upgrading (i.e. social influences) are often disregarded in analysis. Upgrading is rarely concerned with direct social issues of poverty alleviation. When pursued only in a purely economic sense, it does not mean that the working conditions of employees improve in any way or that the larger segments of the population involved progress in a manner that goes beyond immediate economic interests (i.e. income). Yet, because ideas of economic upgrading seek possibilities for providing ‘better returns’ to developing country producers (see before, GIBBON & PONTE 2005: 87-88), underlying assumptions point to a connection between economic and social progress in the form of pro-poor advancements through technology. This goal can be argued for by neoclassical economic theory, whereby technology largely determines labour demand and wages. Under this perspective, therefore, economics and social progress are interrelated. This view can be questioned, however, because from an institutionalist view, social progress is not immediately linked with technological advances but associated with social institutions; through this view, wages are the outcome of a bargaining process determined by the relative strength of employers and employees, including labour market institutions, such as minimum wages or unions (MILBERG & WINKLER 2010: 2, 16). Thus, though the presumption of numerous studies dealing with upgrading is that ‘economic upgrading brings [...] social upgrading’, or general social advances, this connection may actually be ‘much less tight’ (Ibid.: 3). Furthermore, economic upgrading lacks the analysis of socio-economic conditions at the ‘bottom’ of chains, where ‘socio-economic upgrading’ may be crucial for human development. Therefore, ‘analysis should break away from normative views of upgrading as moving up the value chain’ (PONTE & EWERT 2009: 1648) in purely economic terms.

Little research has been devoted to value chain upgrading and its effects on issues such as living standards, wages, work conditions, economic rights, gender equality and economic security (MILBERG & WINKLER 2010: see abstract). Addressing these issues in more recent times, some researchers have explicitly examined forms of ‘social upgrading’ (BARRIENTOS et al. 2010; MILBERG & WINKLER 2010; ROSSI 2013, 2010). In these works, social upgrading is conceptualised and operationalised primarily by an adaptation of the ILO’s notion of ‘decent work’, which has also become the central element of ILO’s declaration on ‘Social Justice for a Fair Globalization’. This notion centres on employment, social protection, workers’ rights and social dialogue (ILO 2008: 1-2). Thereby, employment should take place ‘under conditions of

freedom, equity, security and human dignity, in which rights are protected and adequate remuneration and social coverage is provided' (BARRIENTOS et al. 2010: 7). On closer scrutiny, social upgrading is thus defined as 'the process of improvements in the rights and entitlements of workers as social actors by enhancing the quality of their employment' (ROSSI 2013: 224). As the notion of employment indicates, however, such definitions hold only in the context of formal occupation. They thereby assume the existence of a capable (and hopefully willing) lead firm, which, as was explained, must not necessarily be the case. This could, therefore, be an inappropriate approach to examine self-employed smallholder farmers in rural Africa.

With a perspective more specific to the context of smallholder producers and agribusinesses in developing countries, BOLWIG et al. (BOLWIG et al. 2008: 17) adopt a more suitable definition of upgrading. They argue for understanding it as 'positive or desirable change in chain participation that enhances rewards and/or reduces the exposure to risks'. Somewhat similarly, PONTE and EWERT (PONTE & EWERT 2009: 1637) call for 'a better deal, including a balance between rewards and risk'. If this is the case, then one is left with the question of what is actually at risk beyond the immediate monetary interest of the 'deal'. Moreover, risk is as much a matter of exposure as it is of coping. Thus the idea of upgrading generally requires a reference framework from which the (external) risk that smallholder producers encounter can be comprehended, and which should consider internal coping mechanisms. The succeeding section explores further potentials and risks that originate specifically from upgrading in agriculture through contract and outgrower farming.

#### ***3.2.4.2. Upgrading in Agriculture by Contract and Outgrower Farming***

Contract farming (CF), also referred to as outgrower farming, is a special form of economic producer upgrading in the agricultural sector. CF has a long history that dates back to the beginning of the 20<sup>th</sup> century, when sugar cane and peaches were produced on a contractual basis for export in Central America. The majority of such export-orientated agricultural production was plantation based (DA SILVA 2005b: 11; KIRSTEN & SARTORIUS 2002: 507-508). Decisive changes in this regard began to be implemented in the 1970s, during which multinational companies sharply shifted from plantation-based models towards outsourcing production to farmers (EATON & SHEPHERD 2001: 17-18). These developments were supported by cheaper and faster means of transportation and information dissemination, and by a reduction in trade barriers (SIMMONS 2003: 9). Multinational companies increasingly secure their raw material base for processing or trade through contracts, may supply technical assistance for production, and are concerned with marketing. They espouse these responsibilities because acquiring inputs, selling or providing them on credit to farmers, and specialising in logistics and marketing are far more productive, lucrative and safer strategies than in-house production. Multinationals retain a

strong influence over farmers, despite outsourcing (DÜNCKMANN 2004: 6; EATON & SHEPHERD 2001: 17-18).

Contracting farming (CF) as a form of upgrading is of particular interest because, as previously stated, smallholders are frequently incorporated into markets in an unfavourable manner (see before and CHOUDHARY et al. 2014: 1059; RAUCH 2012: 2). It was a popular strategy for smallholder development for a long period, however, its popularity considerably soared in the 1980s, mostly in line with attempts to support export-led growth after structural adjustment (THRUPP et al. 1995: 27). Also, as a result of structural adjustment and government withdrawal of support for agriculture in many developing countries, hopes were placed on the private sector to balance these deficits (Ibid.: 27). CF schemes are generally said to be able to increase agricultural production through the provision of knowledge, market access and inputs and to thereby unleash the potential of small-scale farmers to enable sector growth, and thus, rural development (GLOVER 1984: 170-171; THRUPP et al. 1995: 27). Moreover, growth in the agricultural sector of developing countries is most effective in reducing the proportion of the poor in comparison with growth in any other sector (WORLD BANK 2007: 6). As with the analysis of commodity and value chains, this issue has therefore drawn great academic interest, mainly since the 1990s. Farmer integration into agricultural (world) markets, specifically into their commodity or value chains, through contractual farming (CF) or outgrower schemes became one of the most popular practices to be evaluated by scholars (OUMA et al. 2012: 227).

CF strategies the world over, and specifically in Africa, are extensively diverse such that generalisations (and therefore, theorisations) are difficult to formulate (OYA 2012: 1). The range of possible outcomes of CF schemes accordingly varies. Although a few measures have effectively alleviated poverty, especially for mid-field and higher-ranking farmers (RAUCH 2006: 52), a number of cases have fostered misuse and corruption, thereby limiting CF schemes in terms of pro-poor effectiveness. The market/value chain integration of farmers, such as that accomplished through CF and other means, requires further testing to ascertain whether sufficient opportunities in resource-poor environments can be generated (IAASTD 2009a: 23). Competing, sometimes conflicting narratives have emerged on determining how farmers can be integrated into markets/value chains and what possible pro-poor outcomes may be produced versus the risks involved (OUMA et al. 2012: 227). The highly individualised settings within which these schemes are placed may not allow for general conclusions to be made about pro-poor effects. Specific, often unique, economic, ecological, social and cultural variables are at play, and each of these variables can be crucial to success and thus requires attention within the process of research (see BEBBINGTON & BATTERBURY 2001; ESCOBAR 2001; IMBRUCE 2007; LONG & ROBERTS 2006). The basic elements of CF are explored in more detail below.

CF arrangements generally refer to formal or informal contractual agreements or mutual entitlements between the parties involved in an agricultural value chain, and specifically between producers of a commodity and so-called ‘sponsors’ (SIMMONS 2003: 3) or ‘lead firms’ in one or more segments of an agricultural value chain. At each stage of a product chain, traders, processors or other actors can more or less actively alter the coordination between segments. Their basic ranges of possible influences on CF arrangements include the acquisition and distribution of inputs, the production itself and/or the processing and distribution of a product (Figure 1).

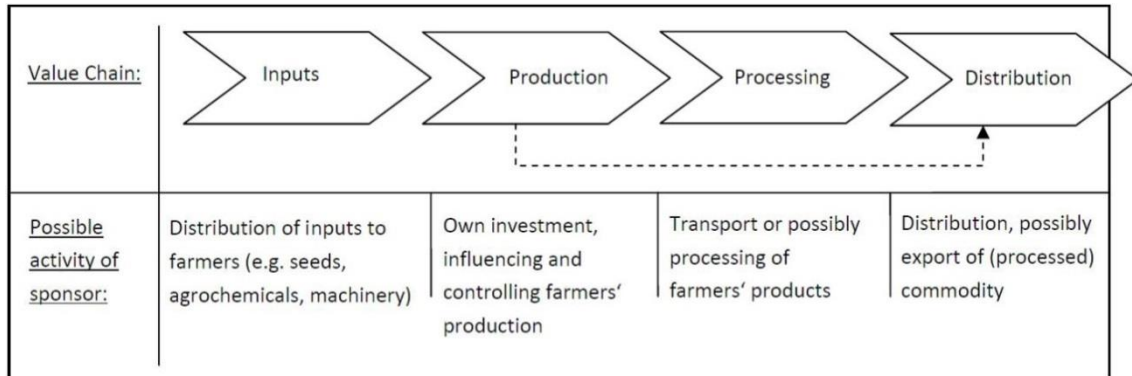


Figure 1: Possible levels of engagement of sponsors/lead firms in CF arrangements (own Figure, 2010, based on SIMMONS 2003: 3).

Five different models of relations or coordination are generally possible, and these models cover a vast range of possibilities. In ascending order and in accordance with the level of contractualisation, the main types are informal, intermediary, centralised, multi-partite and nucleus estate models. What is typically referred to as CF falls somewhere among formalised, centralised and multi-lateral, nucleus/outgrower models. These types are characterised by distinct features. In the ‘informal model’, traders often establish relations with farmers through informal verbal contracts, occasionally based on a single season. Such a form of CF is very close to average market relations and can be considered only as a very casual form of CF, if at all. Nevertheless, it also encompasses more moulded, possibly personal relations between producers and those further up a chain. Thus, this model is somewhat closer to modular and relational value chain set-ups, rather than being entirely based on market relations. In the ‘intermediary model’, middle-men arrange contact between farmers and lead firms through formal and informal contracts. In terms of contractualisation, this model may go beyond an informal model and extend to modular and relational value chain set-ups. In the ‘centralised model’, a central processor buys from many farmers or intermediaries with formal contracts as the basis for the interaction. It thus implies relational to captive coordination of the value chain. In a ‘multi-partite model’, organisations may also include several governmental, NGO and private organisations. Coordination of the chain is somewhat similar to the ‘centralised model’, except that more parties are involved which could also engage in activities that favour other types of smallholder farmer

upgrading. In a 'nucleus estate model', sponsors do their own cropping in addition to buying from farmers on a formal and long-term contractual basis. Coordination will most likely be relational to hierarchical (EATON & SHEPHERD 2001: 44-56; GEREFFI et al. 2005: 89; KULKE 2007: 121-122; SCHAMP 2008: 6-8).

Common to all these models is the fact that all contract forms, whether informal or formal, cover basic economic components, among them the allocation of benefits (the distribution of costs and gains), the allocation of risk, uncertainty (concerning possible problems) and responsibilities. Buyers and sellers of goods negotiate and agree on aspects of their exchange. Scrutinising the features of these arrangements then provides insights into exchange and is especially useful for describing power relations within chains (KANJI et al. 2005: 9-12; OYA 2004: 10; SIMMONS 2003: 3). These models' features are highly individual, yet in accordance with previously asserted differentiations, certain general assumptions can be made about power, risk and profit allocations.

As summarised in Figure 2, the informal model is more likely to come at great default risk for farmers because they cannot be certain as to whether their products will be bought at harvest time. Whether one can still speak of real CF in this instance is therefore questionable. Yet, substantial risk also arises in more formalised settings. Even formal intermediaries, for example, are likely to reduce possible incomes for farmers. For good or for bad, however, in such a model farmers experience very little external control and influence. Lead firms in these models, if existent, are compelled to engage only marginally with farmers to source their products. Thus, gains are mostly distributed to traders and intermediaries, whereas responsibilities, risks and uncertainties are left entirely to the producers. Only in a more formal CF model, possibly including a centralised processor, will the necessary engagement of sponsors increase; and thereby, will the risk presented by these be surmounted. Furthermore, because of the reduced costs involved in establishing a more sophisticated or more contractualised model, lead firms are more likely to attempt to uphold arrangements made with farmers (SCHAMP 2008: 9); their level of default risk hence decreases. As sponsors' levels of required engagements rise, therefore, risk and uncertainty are increasingly distributed among all actors involved.

The same goes for the allocation of responsibilities, but the more centralised the model becomes, the more likely that benefits are increasingly shifted to the sponsors of arrangements. Farmers are progressively influenced and controlled by external forces. This is especially true in nucleus models and when land rights are relinquished to sponsors. External control can expand up to a point where sponsors of contract and outgrower scheme arrangements become local monopolies and can then exploit farmers' dependencies, especially when extensive land rights are surrendered. Clearly, therefore, the level of contractualisation is only partly a useful indicator of the overall advancement or 'upgrading' of smallholder producers. Contractualisation may at least imply informal, modular to formal, yet captive relationships and can even become hierarchical

when land rights are relinquished, but CF value chains will remain buyer-driven. Hence, high contractualisation is not automatically correlated with farmer advancements but engenders high dependency on the well-meaning and integrity of farmers' business counterparts (see Figure 2).

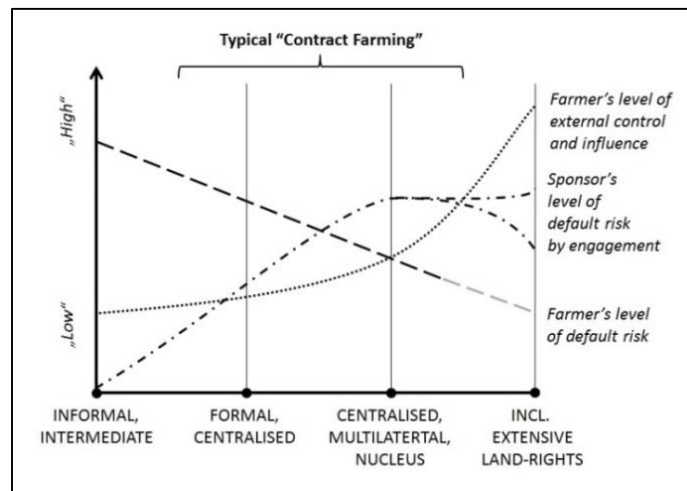


Figure 2: Risk and power allocation in CF and out-grower arrangements, according to models (own figure, 2014, based on DA SILVA 2005a: 15-18; EATON & SHEPHERD 2001: 44-56; SETBOONSARNG 2008: 7; SIMMONS 2003: 9-12; WARNING & SOO HOO 2000: 5).

Despite these potential pitfalls, however, the general assumption is that high levels of contractualisation can accompany other forms of upgrading, first and foremost in economic terms. The possible benefits that derive from such arrangements for producers are found principally in an enabling or increase of (global) market access for farmers. New and reliable marketing possibilities can arise by granting access to new (world) markets (LITTLE & WATTS 1994: 7; MORRISON et al. 2006; RAUCH 2012: 2). Adding CF arrangements to a portfolio of possible marketing arrangements can increase competition, and thus, prices for farmers. For example, other (centralised) processing facilities as competitors in already existing (intermediary) markets can increase demand 'and so [put] upwards pressure on the equilibrium price [...] compared with a no-processing scenario' (ROBINSON & KOLAVALLI 2010: 5). Monopolistic market structures are typically a threat to smallholder farmer development (RAUCH 2012: 4), more so to the food security of the most vulnerable. 'Disproportionate buyer power, which arises from excessive buyer concentration in food supply chains (among commodity buyers, food processors and retailers), tends to depress prices that food producers at the bottom of those chains receive for their produce. This in turn means lower incomes for these producers, which may have an impact on their ability to invest for the future and climb up the value chain, and it may lead them to lower wages that they pay the workers that they employ. There is thus a direct link between the ability of competition regimes to address abuses of buyer power in supply chains, and the enjoyment of the right to adequate food' (DE SCHUTTER 2010: 1). This, as shown in Section 3.1.3.3, is a major source of vulnerability, and thus a significant indicator of development. Yet, the same is

true in situations wherein no alternatives to engagement in CF schemes are available (IMBRUCE 2008: 73). Diversity and competition in marketing arrangements are therefore essential for farmer advancements. Only then can CF be a viable source of livelihood diversification, as proposed by RAUCH (RAUCH 2012: 5, 2006: 52).

Other means of economic upgrading arise from the fact that reliable pricing, such as that possible through contracts, can motivate increased planning reliability for farmers. CF is also deemed to exert a positive effect on technological improvements; increased productivity and access to inputs, such as fertilisers and high-yielding seeds and chemicals; and mechanisation. In theory, this then increases productivity, yields and income. The same goes for access to financial support, income and credit. Technological support and transfer can reduce losses and increase productivity along value chains. Thus the main potential advantages for farmers lie in product and process upgrading. Such upgrading should ideally facilitate the generation of multiplication effects in terms of economic prosperity for wider segments of the poor population, and create a middle class of farmers in developing countries by enabling easy shifting from subsistence to commercial agriculture and, more generally, by helping overcome gender gaps given that sponsors may not mind purchasing from either men or women (DA SILVA 2005a: 15-18; GLOVER 1984: 170-171; LITTLE & WATTS 1994: 7; RAUCH 2012: 1; SETBOONSARNG 2008: 7-9). As with upgrading in the broader scope of GVC and GPN approaches (see Section 3.2.4), the assumption is that economic advancements can lead to social improvements, thus, social.

Technologies provided through CF arrangements ‘such as high-yielding crop varieties, agrochemicals and mechanization have primarily benefited the better resourced groups in society and transnational corporations, rather than the most vulnerable ones’ (IAASTD 2009a: 23). CF arrangements have been occasionally described as fully externally controlled and exploitative, whereby farmers function as nothing but simple workers and cheap suppliers of land (CLAPP 1994: 79 and 81; OYA 2004: 10). The gender mainstreaming effect of CF is likewise questionable (BOLWIG et al. 2008: 3). Occasionally, CF arrangements exploit the traditionally lower bargaining power of women in developing countries. Arrangements made can also encourage child labour when family members are used as a source of work to thereby subsidise an otherwise unprofitable production (SINGH 2003: 2). Further criticism points to the loss of farmers’ bargaining power, oppression of union involvement and an (inevitable) widening of socio-economic gaps (IMBRUCE 2008: 1; RAUCH 2006: 52; WARNING & SOO HOO 2000: 21). Yet another criticism against CF is its negative effect on environmental resources. A growing number of scholars and international bodies have stated that instead of high-input agriculture, ecologically sustainable approaches are needed in times of climate and environmental change; accordingly therefore, a ‘radical readjustment’ in agricultural policies is needed to fight poverty in a socially

and environmentally sustainable approach that extends beyond pure economic advances (quoting HERREN 2009: 62; 2009a, 2009b; in reference to IAASTD 2008).

The degree to which an average contract farming (CF) arrangement may enable the achievement of the aforementioned goals is doubtful when examining the motivation of lead firms to engage in such goals. Their drive is stimulated mainly, if not entirely, by a reduction of risk and of transaction cost that increases shareholder or company value. Through CF, companies externalise their risks to a large extent by outsourcing production. Thereby, fewer labour costs are incurred, and employment law does not require consideration because farmers are formally independent sub-contractors. This situation may result in higher productivity because of the committed work of contracted farmers under risk. This increased productivity makes such schemes especially attractive to companies that are engaged in the manufacture/sale of high-value foods because of their high quality, and thereby, high labour requirements. CF offers more substantial flexibility to lead companies because they would otherwise be compelled to purchase or rent (more) land were they to desire in-house production. Thus, CF must constitute easy indirect access to and control over the land of others. Another motivation is to establish an alternative to commodity futures exchanges, which are rarely available in less developed parts of the world. Lead companies thereby further try to reduce the periodic price fluctuations that often occur in open markets. For these companies, this situation also improves the coordination of a value chain for optimal capacity utilisation and better control of compliance with customers' expectations and food safety concerns (DA SILVA 2005a: 19; SIMMONS 2003: 3-6).

Thus the interests of agri-businesses (i.e. lead firms) centre largely on profit maximisation for a specific commodity, but not for the people involved in the manufacture of the good. As much as any supply chain integration, CF comes with a product-centred, but not people-centred, support system and must therefore be unrelated to and even contradict the requirements of livelihood and farming systems. Most often, CF is unconcerned with environmentally sustainable production and incorporates actors who fit a chain but does not alter a chain in accordance with the needs of people or the environment. It must therefore exclude many, if not the majority of, farming households and can rarely contribute to environmental preservation or long-lasting socio-economic prosperity. Consequently, supply chain integration by itself – such as that achieved through CF or more generally through an increased level of contractualisation that may lead to other forms of economic upgrading – cannot deliver a comprehensive or sustainable solution for the development of smallholder farmers. This deficiency highlights the need to incorporate a livelihood systems approach that enables the integration of smallholder livelihood logic into the supply chain rationality of markets. Additionally, public-private partnerships are needed to avoid the misuse of monopolistic patterns of demand and to create diversity in demand. External brokers, and thus multi-partite models, are required to avoid opportunistic behaviour from all the



involved parties. Public or private extension services are equally essential to ensure quality control and provide incentives for better farming practices and sufficient soil management. All in all, a considerable effort is necessary to assure that the poor can benefit from a trend towards an outsourcing of production, a responsibility that cannot be left to the private sector alone but which requires public support and supervision. With a lack of quality governance in many developing countries, donor agencies and the wider civil society are called on to play a crucial role for a mutually beneficial value chain integration of smallholders (see before and RAUCH 2012: 3-5).

### ***3.3. Theoretical Synthesis***

This chapter has so far identified livelihood and value chain/GPN perspectives as suitable theoretical approaches to examine pro-poor development through markets. Yet, each comes with its specific weaknesses and strengths. This section presents the theoretical synthesis, or new framework, used in this study.

#### ***3.3.1. Arguing for a Combination of SLF and GVC/GPN Approaches***

The SLF approach was broadly acknowledged and managed to become a valuable, mainstream tool for developmental researchers and practitioners (RAUCH 2006: 52). It has become ‘one of the most comprehensive and popular frameworks’ (JAKIMOV 2013: 494) and has thus far retained this status (KAISER & ROTHFUß 2013: 2). It is also still the only fruitful approach to studying the vulnerability of social groups given that it incorporates social inequality and socio-spatial disparity, parts of which derive from power-allocation within society (BÜRKNER 2010: 36).

Yet, within the SLF approach markets often remain ‘a bit of a black box’ (KANJI et al. 2005: 8), and consequently this poses a severe obstacle to understanding poverty-market interactions. Livelihood perspectives have thereby ‘often failed to engage with debates about [economic] globalisation’ (SCOONES 2009: 187). Despite the meta-scale background of livelihood analysis, critics of the approach highlight its shortcomings in the analysis of global to local interrelations. These critics denounce the weaknesses of the analysis of structure-agency relations, as well as of power and societal dynamics more generally (MENSAH 2012: 18; MÜLLER-MAHN & VERNE 2010: 9; SAKDAPOLRAK 2014: 19). Yet past and present understandings of livelihoods strongly emphasise the relevance of interactions between local and global contexts. The observance of micro to macro interactions was already an integral part of the original livelihood concept (DE HAAN 2012: 348 and 351; DFID 2001). Additional supporting arguments can be found in even earlier research. In household studies from which livelihood analysis partly evolved, human agency was always understood as occurring within structural, possibly global constraints. BÜRKNER (2010: 25) goes as far as to call livelihood analysis a structuralist approach. Livelihood analysis can thus successfully negotiate between contextual

influences and aspects of self-defined and self-dependent human activity. While criticism of the SLF's deficits with regard to structure-agency and global to local (power) relations appear partly inappropriate, it is evident that livelihood analysis lacks the investigation of market performance.

Global Value Chain (GVC) and Global Production Network (GPN) analysis can facilitate such an investigation. Advocates of chain and production network concepts not only claim that these can serve as theoretical tools to facilitate a good understanding of how suppliers and producers are linked within the broader (global) economy and specifically within certain markets, but that they are able to illustrate the structures of labour division and value creation for the purpose of identifying sources of inequality, and therefore, development. In turn this advances the identification of critical aspects of markets with regard to their practical, pro-poor performance, and enables a linking of the political economy to the needs of business administration. Moreover, although the basic foundations for these approaches were laid out as early as the 1950s, advocates point out that they've been expanded considerably and encompassed geographical paradigms in their analysis of social change (and power) (BATTERBURY et al. 2011: 4; MÜLLER-MAHN & VERNE 2010: 9-10; OUMA et al. 2012: 227; RUBEN et al. 2006: 5).

Most GVC/GPN approaches still neglect social, thus horizontal, entanglements, as well as dependence on broader networks of social relations (OUMA et al. 2012: 228). Chain and network approaches can generate useful information on crucial elements of market performance and aspects of power asymmetries, but they lack a holistic analysis of socio-economic conditions, poverty, and thus, the possible scopes of action and aspects of power at the producer level. They may further bias analysis towards market principles instead of humane aspects of development. Thus, a future assessment of pro-poor market integration will necessitate a suitable reference framework that can grasp the realities of those who ought to be developed, as much as it needs a normative compass to evaluate changes. Such an assessment should be based on an indicator system that allows for the recognition of practical pro-poor outcomes. Indicators used should therefore be concerned with farmers' livelihood support systems, with a special focus on 'losers' and the 'mid-field' of society (RAUCH 2006: 52).

Such demands re-emphasise the relevance of livelihood analysis, which examines the vulnerability and coping processes of poor people living in developing countries (BOHLE & GLADE 2008: 102) and considers both the material and social resources needed to make a living (DFID 2001: Section 1.1). Livelihood sustainability can serve as an orientation or as a benchmark of pro-poor market integration (RAUCH 2006: 52), whilst GVC and GPN analysis provides an understanding of markets and their performance (OUMA & LINDNER 2010: 12-14). A theoretical framework that is based on livelihood analysis, including aspects of power and involving a serious attempt to upscale findings, can prevent deception by pre-set normative visions and the simplification of ideologies of market integration. Livelihood analysis can help

base ideas of market-based development on local definitions and priorities, in a manner similar to what post-development or alternative development advocates.

The substantial similarity between livelihood analysis and GVC/GPN approaches supports their combination. Both link micro to macro structures and processes, require holistic thinking, recognise the occurrence of change as intervention takes place, rely on existing strengths, and seek to achieve sustainable outcomes. They also complement each other because, in scientific practice, livelihood approaches are often human-/community-centric and thus micro-macro orientated, whereas pro-poor market analysis – here understood as GVC/GPN approaches – is system-centric and identifies meso-macro links. Furthermore, livelihood approaches have a wide scope, examining cross-sectoral types of rural development with a focus on social, natural, physical, financial and environmental factors. Conversely, value chains look into economical aspects and therefore focus more narrowly on sectoral or sub-sectoral development. Each requires the other to explore and exploit potentials for poverty reduction (BATTERBURY et al. 2011: 4). By combining the two approaches and thereby maximising mutual enrichments, negotiating among market and human necessities, contextual factors and their local perception, it is possible to engender valuable insights into the pro-poor performance of market integration.

### ***3.3.2. Approach Taken***

This theoretical synthesis is based in the SLF but supplemented and thereby enriched by GYV and GPN approaches and their aims for (livelihood) upgrading. This combination enables comprehension of economic (globalisation) tendencies, market dynamics and potentials, while it alludes not only to relevant aspects such as social, institutional and political contexts, but also to environmental concerns such as climatic change. For the reasons given before, broader social, economic and ecological dynamics and trends – the typical ‘three dimensions of sustainability’ (HURNI & WIESMANN 2011: 17) – are observed at the global, national and regional scales.

In a wider sense, this framework combines insights from several temporal and spatial scales and theoretical approaches, focuses on the interactions of these, distinguishes drivers and consequences, and takes account of the interplay and multi-directional influences of environmental and human conditions/spheres in all scales of analysis. It regards vulnerability as being place-based even though it is influenced by larger contexts, and emphasises the influence of markets, social and environmental concerns. The framework differentiates between general dynamics and direct influences and ways of access among sub-systems. As a whole it forms a cyclic process within which dynamics interact to emphasise the evolutionary nature of the dynamics and influences encountered. The approach thereby attempts to search for ‘linkages between the external and internal dimensions of vulnerability’, as well as ‘responses at the individual, aggregate and collective level’ (BRONS et al. 2007: 91). Though the framework puts

theoretical and thereby visual emphasis on livelihood analysis, the influence of markets on livelihood systems is of central concern. Selected markets, namely those for rice, chili, and tomato products, are conceptualised by a hybrid of GVC and GPN perspectives. Chains are embedded, at the local level, in any given livelihood system or wider (social) ‘production network’ (Figure 3).

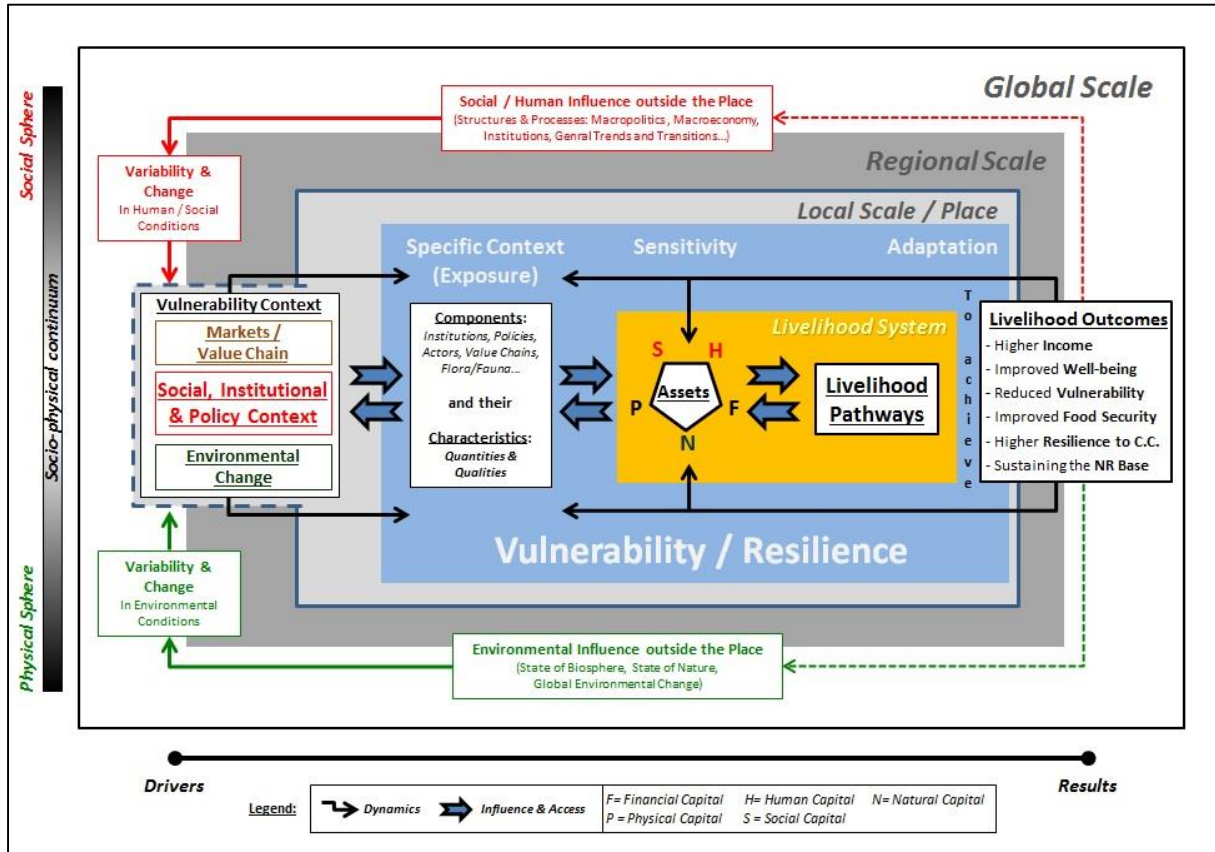


Figure 3: Framework for livelihood sustainability under market effects (own figure, 2014, partly based on DFID 2001: Section 1.1; TURNER et al. 2003: 8076).

External dimensions are conceptualised as the vulnerability context, the external side of vulnerability that constitutes itself by variability and change in social/human (including economic) and environmental impacts. External dynamics influence and access or specify components and their quantitative and qualitative characteristics at the local level. Thus, external vulnerability factors are internalised at this level. Through this internalisation, concrete components such as social and economic institutions, policies and actors, but also natural resource endowments and changes emerge at the local level and become part of the local livelihood system in terms of people’s perceptions and concrete spatial expressions.

Internal vulnerability factors and livelihood coping mechanisms are dynamically exposed to these externally generated but partly internalised components, in accordance with the significance of these components as well as their characteristics in quantitative (thus, numeric) and qualitative terms or meaning. The extent to which livelihoods are sensitive to external stressors is primarily determined by the assets that people have at hand when undergoing essential, yet not necessarily

strategic or fully rational livelihood pathways as agents. Such determination is attributed to actors' involvement in a wider social network that pre-structures their scopes of action through power, primarily through access to assets, which is either granted or denied. Assets available and pathways taken thereby constitute 'the ability to cope without irreversible loss of assets' under 'risks, shocks and stress to which individuals or households are exposed' (BRONS et al. 2007: 3).

Internal and external dimensions of vulnerability constitute livelihoods in a certain location, thereby expressing themselves in special terms and differentiating people by their degree of vulnerability or resilience. Quantities, qualities and the allocation of assets – in terms of social, human, financial, physical and social capital – are therefore of primary interest in people's efforts to engage in activities designed to achieve desired livelihood outcomes. A ranking of desirable outcomes is defined in accordance with local perceptions, but development will be indicated by food security and well-being. Well-being because it partly includes other dimensions and widens the conceptual view. A local definition of well-being also helps prioritisation among further outcomes like vulnerability, income, natural resources and resilience to climatic change.

BOHLE (BOHLE 2011) proposed a modified livelihood framework that adds to the conceptualisation of global commodity markets and enables a merging of Global Production Network perspectives (part of which are Global Value Chains) with that of the livelihood approach. BOHLE looks into social vulnerability and livelihood security, and thereby poverty alleviation, with regard to the new market risks involved. He argues that 'an integrated framework for market risk assessment that seeks to link all the major components of vulnerability in an integrated manner is still missing' (ibid.: 44) and proposes that spaces of entitlement, empowerment and agency must be identified in livelihood systems to understand the effects of possibly risky forms of market integration. He adopts a critical view of markets in terms of livelihood outcomes, which he summarises under the concept of 'real markets'. These markets, by their very nature, produce enormous risks and opportunities for certain segments of the population. He concludes that such 'real market' approaches must study markets as 'sets of social relations structured by institutions, interests and power' (Ibid.: 49), which create, contest, lose and win entitlements within wider, partly non-market contexts, such as economic, social and institutional spaces.

BOHLE builds on the work of WHITE (1993), who criticised the 'abstract conception of the market deriving from neo-classical economics' as overriding 'variations in real markets' which are very important for considering and tackling practical problems of development. [...] It also abstracts from social, political and institutional aspects of real markets which cannot be dismissed as 'exogenous' factors but are inherent, and indeed may be essential, characteristics of the functioning of markets in the real world. In particular, conventional economic analysis of markets by and large ignores or marginalises the presence of power which is a glaringly visible

characteristic of real markets' (Ibid.: 2). Thus in examining economically determined livelihoods, the notion of power in its social, political and institutional dimensions is as important and necessary as it is in the GVC and GPN perspectives (see Sections 3.2.2 and 3.2.3).

Value chains connect actors within real markets and broader institutional structures, and are useful for understanding the processes of a market for a particular good. The combination of a livelihood approach with value chain analysis is thus a practical approach to understanding 'the opportunities and constraints which small producers [...] face in increasingly globalised systems' (KANJI et al. 2005: 22). The approach pursued in this work attempts to elucidate the pro-poor effects of market integration by merging a livelihood approach and value chain analysis within an examination of institutional power settings, to explore how local institutions influence value chains. Value chains are regarded as the practical, concrete expression of BOHLE's 'real markets' but are nonetheless also understood in the wider perspective of GPNs, whereby a production network is considered as the wider local livelihood system in which production for a value chain takes place. In espousing this perspective, this study scrutinises local questions of 'governance' and horizontal entanglements of vertical chains; the dependence of these chains 'on broader networks of social relations' is thus an equally important focus of the analysis (OUMA et al. 2012: 228). Such scrutiny is accomplished by examining the context of institutional policies of state involvement, market organisation/governance and local embeddedness of each chain as an important but not sole element of livelihood upkeep.

Understanding the nature of the selected markets necessitates investigation of the material and monetary input-output flow of chain segments, their local geographic/spatial/territorial extents and chain governance and coordination, including the influence of local, non-commercial, extra-firm actors. With regard to smallholder producers' development potential arising from market-livelihood interrelations, further enrichments to the concept of upgrading encompass a holistic view of how smallholder farmers' lives are constituted and how these ought to be upgraded according to their own views and articulated needs. This standpoint also implies a prior and thorough examination of livelihood systems and desired outcomes, as well as a look into the dimensions of inclusion and exclusion of local population segments in these markets. Furthermore, rather than artificially segregating important dimensions of upgrading, these are brought together under the concept of 'sustainability', which partly includes social, economic and environmental upgrading. 'Sustainable' or 'livelihood upgrading' should be understood as a process with desirable economic, social and environmental effects, that enables the majority, or at least a larger part of the poor to 'cope with and recover from stresses and shocks and maintain or enhance' their 'capabilities and assets both now and in the future, while not undermining the natural resource base' (CHAMBERS & CORNWAY 1991: 6). Following the sustainable livelihood approach, upgrading or downgrading trends and the general effect of value chains are

assessed through an enquiry into income, well-being, food security, vulnerability and a sustained use of the natural resource base. The latter implies a higher resilience to climatic change on the side of small-scale producers and in accordance with the prioritisation of desirable outcomes. The concrete research questions that arise from this theoretical framework are discussed below.

### 3.3.3. *Research Questions*

The central research question that guides this thesis, and emerges from the combination of livelihood and GVC/GPN perspectives, is as follows:

*What potential for economically, environmentally and socially suitable, thus 'sustainable', development of male and female smallholder livelihoods can be found with regard to the agricultural markets of chili, tomato and rice and interventions in these?*

This general enquiry is broken down into the following sub-topics and their accompanying questions:

1. **Livelihood set-up and dynamics:** How are smallholder farmers' livelihood systems organised? What are the historical and contemporary dominant and socially differentiating external and internal dynamics of smallholder livelihood systems, and what are their strategies, pathways and outcomes?
2. **Market dynamics:** What are the dominant dynamics of agricultural market structures and their respective value chains with relevance to local farmer livelihoods?
3. **Relevant organisations and institutions:** What organisations, institutions and policies are involved in the governance and coordination of livelihoods and agricultural value chains at the producer level, and what is their effect on the socially differentiated integration of smallholders at the local scale?
4. **Social/livelihood embeddedness:** How are different value chains socially embedded in local livelihood systems?
5. **Livelihood outcomes:** Who is integrated into which value chains, and what are the outcomes of the interaction of livelihood systems and agricultural value chains for farmer livelihoods?
6. **Obstacles and incentives to sustainability:** What factors hinder and promote the sustainable outcomes of agricultural value chains for smallholders?

Classified by their explanatory potential, these sub-topics are discussed in accordance with selected theoretical elements of the overall approach, as shown in Table 1.

<b><i>Sub-Topic</i></b>	<b><i>Main theoretical approach</i></b>
1. Livelihood set-up and dynamics	SLF
2. Market dynamics	GVC
3. Social/livelihood embeddedness	SLF & GVC, GPN
4. Relevant organisations and institutions	SLF & GVC, GPN
5. Livelihood outcomes	SLF & GVC
6. Obstacles and incentives to sustainability	SLF & GVC

Table 1: Relevant sub-topics and theoretical approaches used (own table, 2014).



#### 4. Methods

To answer the central research question and its sub-topics ‘from the point of view of low-income producers [...] and to explore the implications posed by the chain’s functioning for their livelihoods and well-being and the levers for poverty reduction’ (KANJI et al. 2005: 12), qualitative and quantitative methods were used during field research. The main methods used were focus group discussions (FGDs), in-depth interviews, participant observation and oral history examination. These were enriched by spatial approaches, activity mapping and GIS analysis, which partly enables a quantification of qualities and an upscaling of findings. Farm budgets were formulated to quantify and thereby illustrate the individual economic constraints that households encounter. The generated hypotheses were validated by a household head (HHH) survey and augmented by the collection of secondary data, particularly an archive survey, and literature review. Focus was directed towards those methods that serve the needs of the SLF and are the most relevant for the theoretical background and research questions/sub-topics (see Section 3.3 and Table 2).

<u>Sub-topic</u>	<u>Qualitative /quantitative?</u>	<u>Main methods applied</u>
1. Livelihood set-up and dynamics	Both	FGDs with farmers and experts, HHH survey, expert survey, participant observation, oral history, activity mapping, farmer and expert in-depth interviews, archive survey, GIS analysis
2. Market dynamics	Quantitative	Farm budgets, gathering of secondary data, literature review, expert interviews
3. Social/livelihood embeddedness	Qualitative	Farmer and expert in-depth interviews, FGDs with farmers and experts
4. Relevant organisations and institutions	Qualitative	FGDs with farmers and experts, observation, background checks and investigation on key actors, finding and checking on informants,
5. Livelihood outcomes	Both	FGDs with farmers and experts, HHH survey, farmer and expert in-depth interviews
6. Obstacles and incentives to sustainability	Both	FGDs with farmers and experts, HHH survey, farmer and expert in-depth interviews, farm budgets

Table 2: Sub-topics of research and their methodological approach (own table, 2014).

##### 4.1. Course of Action and Method Application

The investigation was initiated with secondary data at hand and previous field experience in Ghana. Upon arrival in the field, investigation proceeded by conducting in-depth interviews with experts and farmers, farm budgets to understand the practicalities of farming activities; combined with semi-structured interviews focussing on the input-output structure of the farmers’ tomato, rice, chili and shea production. Farmers were mostly visited individually whilst on their fields working. Discussions with farmers facilitated the conceptualisation and formulation of the hypotheses and the selection of participants for the FGDs, which covered livelihood systems, institutions, environmental change and hazards, and tomato, rice, chili and shea markets. Participants were informed of the schedule for the FGDs two days in advance. A reminder was

issued before the day of discussion. The participants welcomed the topics for discussion, and the outcomes of the FGDs became a major source of information for the succeeding research. Poring through and examining the generated data required substantial investment in terms of time and organisational skills. At the very end of the research visit to Ghana, a head of household (HHH) survey was conducted to verify the previously generated hypotheses. Six professional interviewers, each having long-term experience in administering quantitative surveys in the area, were employed from the Navrongo Health Research Centre. The interviewers helped with the translation of the HHH survey, and were trained for another three days. The questionnaire was then pre-tested, and after final corrections, the HHH survey was carried out over the course of 10 days in Biu, one of the two researched communities. The survey results were later used to re-evaluate the FGDs and individual interviews, as well as the hypotheses. The survey was also administered to those interviewees who participated in the qualitative and farm budget interviews. Other methods utilised included participant observation, researcher mapping of village and land structures, the collection of secondary data through official means, use of informants, and hidden surveillance and investigation of key actors (Figure 4).

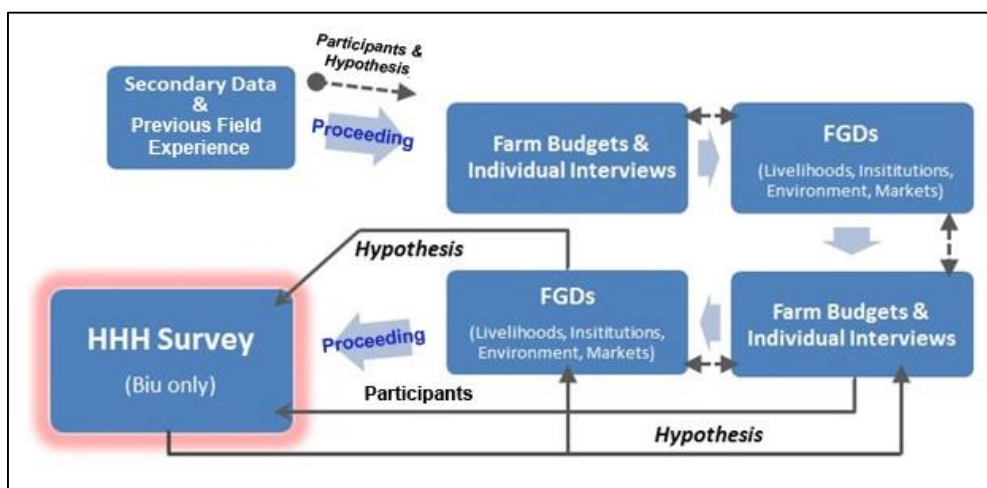


Figure 4: Research design and course of action in the field (own figure, 2014).

Farmer and expert FGDs and in-depth interviews were the primary sources of data, gathered throughout different areas in Ghana, mostly in the north of the country, in the Upper East Region (see also Map 1, Chapter 0). More than 150 hours of transcribed recordings were generated. Statistical analysis was conducted with IBM SPSS®. Maps and spatial statistics were created with ArcMap®. With Atlas.ti®, all the datasets, especially the interview transcripts, were coded in accordance with the theoretical framework. Coding was carried out to generate conceptual categories for use in later sequencing, comparison and analysis. It was further done, because interviewees frequently pointed at coherences between different phenomena. During analysis, several codes would then be applied to exactly the same passage, or coded passages would overlap, because they were associated with each other. The ‘co-occurrence tool’ of Atlas.ti® was

then utilised for a quantitative exploration of the qualitative data, mainly to derive insights on the numeric strength of associations made by interviewees between conceptual categories. The tool was able to give information on the intensity of associations by calculating a normalised co-occurrence coefficient between pairs of codes. It did so by counting text passages that have been assigned with at least two codes, to then indicate their level of association through the generated coefficient. This coefficient ranges from 0 to 1, with 0 meaning that these codes never co-occur when they are used, and 1 meaning that they are always used together. Such sequencing, comparison and analysis of the intensity of conceptual associations gives ‘clues about contextual factors and how these factors shape the specific manifestation of a given phenomenon’ (CONTRERAS 2011: 5) at individual and group level. It helps to derive insights on general coherences and to upscale the findings derived from qualitative individual or group data, by examining the quantities of qualitative associations. Doing so gives a more objective idea of the relationship between conceptual categories, and allows for easier handling of the vast amounts of qualitative data at hand. After identifying the most relevant associations in numeric terms, these are explained by selected, individual, meaningful qualitative quotations. An overview of all data gathered is provided in Table 3.

Method	In-depth Interviews & Farm Budgets	‘Expert’ & Individual Interviews	Farmer FGDs	MOFA/ ‘Expert’ FGDs	MOFA/ ‘Expert’ Survey	HHH Survey
Place	<i>Biu &amp; Mirigu</i>	<i>South Ghana, Tamale, Biu, Mirigu</i>	<i>Biu &amp; Mirigu</i>	<i>Navrongo &amp; Paga</i>	<i>Navrongo &amp; Paga</i>	<i>Biu</i>
Result	<i>Text (&amp; numbers)</i>	<i>Text</i>	<i>Text</i>	<i>Text</i>	<i>Numbers</i>	<i>Numbers</i>
Sample Size	<i>n=47</i>	<i>n=70</i>	<i>n=37</i>	<i>n=2</i>	<i>n=25</i>	<i>n=177</i>
<i>= 150 hours of transcribed recordings</i>						

Table 3: Major primary data outcome of research by place (own table, 2014).

#### 4.2. General Field Access and Interaction

Owing to contemporary, methodological needs, the context of scientific findings, should be illuminated (ATTESLANDER 2003: 108-110; FLICK 2007: 147-149; PRZYBORSKI & WOHLRAB-SAHR 2014: 39, 49; ROTHFUß 2009: 177-178; WACQUANT 1992: 51). Therefore, this section provides an impression of field access, including the interactions and conceptions that accompanied data collection at various levels and with various actors. It thereby reveals some of the limitations of the derived information.

##### 4.2.1. At Community Level

At the community level in Biu and Mirigu, farmers and their representatives were interviewed to understand the livelihood systems and the relevance of markets within these. A

major factor in field access at the community/farmer level is the gatekeeper (FROSCHAUER & LUEGER 2003: 54). Upon arrival in the focus community of this study, Biu, contact was established with a local gatekeeper, Mr. Francis Asangkame. Asangkame, due to his high level of education and self-set standards, had already served as an assistant in several research projects in the past. He served diligently not only as a translator, but also as an excellent door-opener to local hearts and minds, given that he is well known and respected in the community. The initiation of the research depended on his help because he established initial contact with locals who may otherwise have been unwilling to participate owing to a lack of trust in most researchers.

Once contact was established, people were generally very welcoming of the interviews, as long as sufficient respect, in local terms, was extended to them. In the case of the local leaders, especially the chiefs, such expression of respect often meant monetary compensation and the provision of beverages and tobacco. The majority of participants appreciated humbleness and respect in interaction, especially in the interviews and group discussions. The respect required also includes reverence for customs and cultural values. Furthermore, the people appreciated minor symbolic help with their work. Helping with weed pulling, for example, extensively eased the atmosphere when farmers were interviewed in their fields. Yet, an undeniable observation was that the people often showed tired of hearing and having to answer questions from researchers, due to the fact that many researchers have visited their village over the last decades. People expressed concern over the interviews taking up an excessive amount of their time, yet doing little good for them:

*'Many things have happened like this, many books have been written concerning farming and they have come to interview us on so many occasions on these sorts of things. So many years it happened and they are all saying to us that they'll help us. So anytime they want to write something they will gather us, the poor people, together like this and then they begin to ask us. [...] They'll come [...] to interview us on things pertaining to farming, but if there is even any help coming as a result of that, we never know.'*<sup>1</sup>

The people were rightfully concerned with the outcomes of research on their communities. They perceived interviews and discussions to be part of an exchange of mutual benefits, whereby the benefits for a researcher, in the form of a Ph.D., should be balanced by benefits for interviewees. In general, the people were motivated to participate in the interviews and group discussions by an expectation of some sort of practical assistance that would result from the research. They expressed the wish to be helped by provision of fertilisers or money. Some even asked for infrastructure and processing plants to be built or for access to markets to be provided

---

<sup>1</sup> FGD with farmers, 09.10.2013, Biu, Ghana.

through the donation of trucks. Twice, people offered to hand over their infants to the researcher so that they could have a better life in Europe. Thus, because people had high expectations for support, the number of people who joined the discussions, for example, was often greater than originally anticipated. After the schedule for the group discussions was announced and after participants were invited, news about the gathering spread fast within the villages. The number of participants also increased because of money initially provided as a form of compensation. Due to the rising number of participants, this form of compensation was then switched to food and drinks, served during the discussions, which helped reduce the number of participants in the group discussions to a manageable size. Nevertheless, the switching of the remuneration, from cash to kind, initially aroused frustration.

People's idea to acquire help or monetary compensation for their participation in interviews, as well as their manner of self-portrayal during the sessions, is partly influenced by previous research and NGO projects that have been carried out in the area. People often emphasised their suffering by contrasting it with the circumstances and wealth of Western researchers. Such suffering may be true, but to a certain extent one could sense that the people actively highlight the impression of suffering from severe poverty. The logic behind emphasising one's poverty became more evident when relatively rich local elites, despite their more than sufficient livelihood outcomes, started begging for money or other items – a practice that they preferred to carry out in public. To some extent, therefore, the participants responded to the questions strategically but not necessarily honestly. They were used to hearing questions on poverty and attempted to make themselves appear poorer than they actually were, in vain attempts to satisfy the criteria for obtaining external help:

*'They [researchers and NGOs] have polluted people's minds; they have made them identify themselves as poor people. So once they are recognised as poor, then you have to give them [help] [...] NGOs and researchers resort to giving them the packages for farming or money and so they [in turn] get their results. You know, they [the researchers] are often funded by external donors and so they need some results to write their reports and to make themselves a name and so they trade results for money or other things.'*<sup>2</sup>

Thus, the responses given must be treated with caution. Such prudence is necessary also because the socio-economic and socio-cultural differences between the researcher and the interviewees are vast. The people were very conscious about public interaction with the researcher and gave the impression that handshakes and successful openly expressed requests for money were partly used to improve and manifest social standings in the communities. Language barriers

---

<sup>2</sup> FGD with MOFA extension officers, 14.02.2013, Navrongo, Ghana.

further increased perceived differences. Moreover, the interviews revealed that people think very much in terms of racial categories in the sense that they assign common characteristics to people of ‘white’ or ‘black’ skin colour. With the researcher being of Caucasian origin, therefore, certain barriers of prejudice needed to be overcome. ‘Whites’ are frequently associated with colonial rule, through which the colonised were exploited and mistreated, but they are also associated with incredible riches, a happy life, and NGOs and large-scale infrastructural projects, such as the local irrigation schemes. Thus, perception of the researcher was not free of historical, yet stereotypical, attributes. As an elder person put it:

*‘In the olden days we used to run away when we saw white people, but now we are ok with them, we are friends. We now know that even if you touch a white man you would not die, but rather it will help you.’<sup>3</sup>*

‘Whites’ in general are regarded as having the power to bring change to people’s lives, and thereby, are considered vastly superior to black people. ‘Whites’ are even perceived as being (the only ones) able to create significant change in local lives through their own financial abilities and through contact with decision makers on developmental aid. Moreover, one of the interviewees stated that he perceives ‘whites’ to be closer to God because their general standard of living is higher than that of ‘blacks’ and because ‘whites’ have the ability to build airplanes; through such innovation, therefore, they are closer to heaven. White people are also perceived to live a better life as a result of morally just behaviour, whereas the people in the villages blame their own societal grievances as the reason for their own misfortune and poverty – a punishment from God. Yet, these perceived differences were greatly eased by a thorough introduction to all the chiefs and local elites; festivities designed to further introduce oneself in a relaxed setting and to announce the commencement of research activities; continuous visits to the communities; and attendance in all the major social events in the communities, especially funerals. With time, the biases that stemmed from the misconceptions diminished.

The use of bottom-up approaches was appreciated. Participatory research at the grass-roots level was especially welcomed, for participants had experienced that researchers, institutions and organisations visiting the village acted on hearsay derived from their leaders, instead of information from the people themselves. Consequently, they were happy to be able to express their own opinions. They also welcomed participatory approaches because they could thereby evaluate such external interventions. The people held high hopes with regard to the fact that a publication that advocates research in the community can facilitate the entry of more external help into the village and the modification of current initiatives into programmes that favour their poor.

---

<sup>3</sup> FGD with farmers, 11.12.2013, Mirigu, Ghana.

In previous initiatives they had been rarely afforded the chance to have their voices heard. Furthermore, culture prevented them from bypassing the authority of their leaders and directly complaining to officials:

*'Our culture does not even allow you to complain to them! No matter how we feel the pain, we cannot come and complain directly to somebody like you, unless we are given the chance by somebody who is friends with you. [...] Culture does not allow that in this village and so we just have to swallow it or be directly invited and asked critically.'*<sup>4</sup>

The participants were thankful for the initiated lively discussions and mutual learning processes. Exchange regarding mutual problems created a unifying atmosphere among the discussants. Women were particularly happy to have their voices heard – another rarity in the communities visited. Women often disguised their actual experiences by describing the problems that they experience in their own households in more general terms. They often emphasised that they were not describing their own life realities and that others present in the discussions should not draw conclusions regarding their individual behaviour by what had been said. They were afraid that by expressing criticism during the discussions, they would lose their reputation. It was also stated that a foreigner conducting research was viewed as an avenue from which they could express issues of concern to a more neutral observant. Such a view is attributed to the perception of the local leaders and officials as being biased towards their own interests. Participants were occasionally afraid to speak their minds because they rightly feared that members of the group would pass on critical statements to local leaders:

*'Surely somebody from our group will go and tell them [the leaders]. It is because these big, big people will go and want to block any help that is coming to our village. [...] That is why I'm asking concerning this research work and writing of a book that is to be exposed to NGOs. [...] If it so happens that this book is exposed to NGOs and the international community and people from outside or wherever, [...] how can we, [...] which are suffering from this frustration, how can we get the help, if it then comes?'*<sup>5</sup>

The information gathered during the interviews and group discussions with smallholders was used to develop critical questions that were later put to local leaders, administration and foreign aid organisations. This provided room for criticism that would have otherwise remained unarticulated.

---

<sup>4</sup> FGD with farmers, 10.08.2013, Biu, Ghana.

<sup>5</sup> FGD with farmers, 10.08.2013, Biu, Ghana.

#### ***4.2.2. At Administrative Level***

At the administrative level, high-level officials, extension officers and individual experts were interviewed. Field access at this level was initiated in Ghana's capital, Accra. Key players, such as the Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), diverse government ministries, NGOs and expatriate consultants, were contacted for data collection and to establish contact with their associates at national and regional levels. Being referred from one (high-ranking) actor to the next (subordinate) was the most efficient way of proceeding because it substantially reduced the time required to establish contact and obtain information. These forms of cooperation mostly proceeded informally and were sometimes accompanied by exchange of data and at times, the offer of bribes. Government agencies most often requested the provision of a project description and an introductory letter. The ministries and government administration at the district and local levels, in particular, gave the impression of endeavouring to do their best in helping the research progress. The administrator of the local irrigation project, Irrigation Company of Upper Region (ICOUR), was interested in exchanging ideas and information and provided excellent assistance. The FGDs with the district extension officers from the Ministry of Food and Agriculture (MOFA) helped to establish contact and a base for mutual trust, thereby enabling access to other partly classified intra-organisational data.

Cooperation was most difficult and time consuming to forge at the regional government level and more so at the national level. Officials from the Ministry of Food and Agriculture (MOFA) were rarely prepared to respond to the critical questions that arose from the village-level FGDs. This setback resulted in extreme frustration, especially when the interviews had been planned ahead for a long time but had to be repeatedly re-scheduled moments before they were supposed to take place. Often, long distances had already been covered to make these interviews possible. Yet, certain key actors re-scheduled their interviews more than four or five times. When the interviews finally took place, after months of repeated postponement, some of the interviewees were unprepared for certain questions. Transparency and the willingness to cooperate or respond to questions were low to non-existent at the regional level and partial at the national level. This obstacle may have originated due to the ongoing ministry and journalist investigations in to corruption and mass smuggling of fertilisers through government officials in the region. Consequently, data collection at the regional and national administrative levels occasionally necessitated the use of unorthodox methods, such as searching for informants; collecting background information on key players, especially on large subsidy recipients; surveillance of these players; and acquiring intra-organisational data through unofficial channels.



### ***4.2.3. At Trader Level***

Traders were interviewed to help understand tomato, chili, rice and shea value chains, whereby the latter were examined and analysed only partly due to time constraints. Traders pointed out crucial leverage points within the value chains, as well as major trends and dynamics. Initial field access at the intermediary and wholesale trader level was relatively easy. The merchants and their (union) representatives frequently gave the impression of being flattered when asked for individual interviews or requested to participate in FGDs with their colleagues. Even on short notice or whilst they were conducting trade, they took no issue with being interviewed directly or arranging additional meetings. On the contrary, they gave the impression of being highly motivated and welcoming. Communication with traders was easier than with most of the people at the community level because the majority of traders can speak at least some English and showed a high level of eloquence due to their professional backgrounds. As a result, a translator was rarely required and the interviews proceeded smoothly without much explanation needed.

The data acquired through qualitative individual interviews and FGDs included the drawing of timelines for understanding value chain dynamics and trader budgeting. The latter was difficult to accomplish because traders were reluctant to disclose their costs and profits. Often, budgeting resulted in calculational loss, which may occasionally be possible but invalid as an explanation for their professional activities. Thus, the traders downplayed the profits that they earned, especially in comparison with the revenues generated by farmers. Calculating whilst inquiring, critical probing of the figures given, and a discussion of these in the FGDs were used to generate more accurate results. Nevertheless, the figures generated can only serve as an orientation. Far more difficult and often impossible was the acquisition of value chain data from large-scale companies involved in export, specifically in shea trade and processing. These companies mostly refused to be interviewed, and when they were ready to be questioned, they were unwilling to discuss figures, particularly profits. Analysis had to rely on estimations and especially on secondary data from the NGOs involved in the issue. As a result, analysis on shea value chains remained entirely at the village level.

### ***4.3. Methods in Detail***

Having accessed the social fields at the community, administrative and trader levels, data were gathered by multiple methods. This section provides a more detailed discussion of the methods used, specifically farm budgets and in-depth interviews, expert and individual interviews, and farmer and expert FGDs, as well as the HHH survey conducted and the collection of secondary data.

#### **4.3.1. Farm Budgets and In-depth Interviews**

Farm budgets, in combination with qualitative interviews, were formulated to gain a better understanding of the fixed and variable costs involved in producing tomato, chili, rice and shea; to estimate their effects on monetary incomes; and to characterise the livelihoods of those involved in the production of these crops. These methods advanced understanding of the social/livelihood embeddedness of the value chains and related livelihood outcomes, as well as obstacles to greater economic sustainability. Initial budgeting was also favourable for building rapport and easing the atmosphere for the raised open-ended questions, which approached the aforementioned sub-topics and respective questions in more detail. These were semi-structured and provided explicit room for the qualitative interpretation, with help from the respondents, of the numerical facts. The farmers were also asked to express their views on the following issues:

- Access to inputs and outcomes and the difficulties experienced in production of a crop;
- Trends and changes in production and sales;
- Governance of and access to the product's value chain;
- Their own livelihood outcomes and the role of the crop in achieving these outcomes;
- Their own and others' producer-related livelihood characteristics; and
- Crucial leverage points for the pro-poor development of the product's value chain.

Thereby, livelihood trends and outcomes created through interaction with a certain value chain were measured beyond simple income-related figures. This enabled the acquisition of further qualitative insights into issues such as food security, well-being, sustainability of the natural resource base and the effects of hazards, climate change and social vulnerability factors.

The participants were selected by the size and type of their agricultural production and outcomes. Preference was accorded to 'smallholders', classically referred to as people who work on up to 2 hectares of land (WORLD BANK 2014). This criterion, however, includes an excessive number of people in Ghana's north and could induce a failure to detect existing inequalities. The definition of the term was therefore left to the discretion of the agricultural extension officers assigned in the regions where the research was conducted. Two group discussions and surveys with 25 participants were carried out to more definitively define the sample group and to access the right groups of people to participate in further proceedings. According to these experts, the '*poorest in society*' – that is, smallholders and those that represent about 40 percent of the population – work on no more than 0.6 hectares of land during the wet season (WS) and 0.5 hectares in the dry seasons (DS). These figures naturally differ with regard to population pressure and access to irrigation. '*Average*' farmers easily work on double the size of land, whereas '*rich*' or '*commercial*' farmers work on up to 10 times as much land, as indicated by the experts. To achieve a compromise, therefore, '*smallholders*' are defined in this work as people whose livelihoods depend mainly on agriculture with a generally low asset base and who

work on less than 1 hectare of cropland per season. Diverse types of farming households were included so that a greater spectrum of patterns of action could be understood and to reach a higher level of theoretical saturation. Farmers were selected purposefully or strategically via snowball sampling (HAY 2005: 72) to identify typical and critical, as well as extreme and deviant, cases. Males and females and small-, medium- and large-scale households of different socio-economic levels, in and outside of the local irrigation project's command area, were interviewed individually. Farmers were guaranteed anonymity to ensure freedom of speech and to comply with ethical considerations.

### **4.3.2. *Expert and Individual Interviews***

Assistance was solicited from experts to acquire access to their views as observers familiar with the issues indicated in the research (sub-) questions, especially regarding information on the interrelation of micro and macro scales. These experts were later also used to gain access to other experts and local opinion leaders of different backgrounds. The aim was to gain insights from different sub-systems and sub-contexts.

The term 'expert' is not necessarily understood to mean a highly educated and high ranking official. Experts are understood in a wider sense that does not discriminate against the experiences common to the less privileged of society (see critics such as WEIL 2008; WINTER 2011). Following this idea, 'system-internal expertise' can provide primary experiences that arise from interaction within a system, irrespective of that expert's societal standing. All people create practical, first-hand, subjective experiences, thus heterogenic knowledge can be generated through interviews. People possess special knowledge within a certain field, which offers a first-hand database for research. 'Field-internal expertise' is generated from individuals who are at the interfaces, yet also part of the social system. Such experts possess rational, abstract and reflected knowledge about larger contexts that go beyond practical understanding. 'External expertise' refers to versatile theoretical knowledge, often irrespective of any system-internal expertise. Nevertheless, transitions are easily possible.

The information given by a particular expert is not an objective fact but a story told from a certain perspective, with varying levels of rationality and scale. The term 'expert' refers to people being able to deliver 'field-internal' and 'external expertise'. External experts should only be defined as such according to their professional specialisation related to the topic of enquiry, their formal knowledge and competency, and their possession of at least 10 years of practical experience (MIEG & BRUNNER 2001: 6). Experts of different sorts thus assisted in preliminary hypothesis testing, as well as in the generation of ideas for the group discussions and the succeeding survey. During the course of the research, information on so-called 'system-internal expertise' was primarily obtained with methods such as FGDs and semi-structured farm budget

interviews. Interviews designed to generate information on both ‘external’ and ‘field-internal expertise’ featured unique questions that were formulated on the basis of the interviewees’ field of skills. The topics covered in the interviews with external experts were as follows:

- Smallholder livelihood outcomes;
- Qualities of smallholder interaction within value chains and smallholder assets that are required to be part of a certain chain;
- Qualities of informal and formal contracts within value chains;
- Views and rationalities of actors within chains; and
- Set-up of chains and markets.

The oral histories shared by especially knowledgeable, older village members enable the collection of field-internal information and the linking of smallholder actions, responses and adjustment to environmental and social change. These interviews were less structured and highly adaptable to the respondents’ courses of narration. The following topics were covered to gain such intra-field information:

- Influences of institutions and the environment on farmer asset mobilisation, and thus, explanations for certain livelihood strategies and trends;
- Environmental and climate change;
- Livelihood trends; and
- Traditional and contemporary beliefs and norms.

### ***4.3.3. Farmer Focus Group Discussions (FGDs)***

FGDs were used to collect first-hand general information and identify issues of concern; to generate intermediate hypotheses but also to establish further contact with the participants; and to build rapport for further individual in-depth interviews and questionnaire distribution in the future. The topics discussed in each FGD were as follows:

- Land use, general livelihood upkeep and outcomes;
- Actors and institutions;
- Climate change and environmental degradation; and
- Markets for and production of tomato, chili (‘pepper’), rice, shea nuts and shea butter.

Further discussions were conducted to understand trends of farm gate prices and yields of shea trees. The mapping of village land uses and ‘activity mapping’ were performed to identify gaps in the coverage of services; to collect information on ‘predefined series of activities, their implementing agencies, their target groups, their outreach coverage’; and to ‘quantify the intensity of the activities’. Visual methods were used to present and discuss results during the meetings, as a visual process is easy to grasp for participants, allowing them to relate physical and social information in spatial terms (VON FRANZ & SCHAL 2009: 3). In combination with the digital

elevation models of the sites where the research was conducted, transects were mapped and enriched by qualitative data. The aim was to later be able to assign location and allocation of resources, forms of land use and the constraints and opportunities these bring about for livelihoods in different environments along the transect (Ibid.: 3). Thus, the FGDs (including mapping exercises) revolved around all the major sub-topics of the main research question (see Section 3.3.3).

The FGDs were moderated with the help of an assistant who was thoroughly trained, briefed, supported and occasionally prompted by the researcher. Both the translator and the researcher took note of the group dynamics during the discussion. The goals for every discussion were to capture findings in retraceable and comprehensible paper form and to explain the findings to the researcher. Some sessions within the group discussions assumed more of an interview character. Depending on the topic, the FGD results included drawings and mappings, timelines, categorisations and sorting and ranking of encountered phenomena. Each session was also recorded. Occasionally, photos that depict different phenomena were used for illustration and ranking purposes, to help illiterates provide ideas and discuss results. Each FGD lasted for about 3 hours per topic.

In accordance with the topic and community, the farmer groups participating in the FGDs each consisted of eight (rarely up to 15) farmers (as approximately recommended by LAMNEK 2005: 438). Most participants were recruited during the aforementioned interviews. Each participant was asked to produce at least one of the crops relevant to the research (tomato, pepper, rice or shea). Each relevant crop that is grown in a certain community was to be represented by at least one participant in the discussion. Each group was required to be somewhat representative of the diversity of people in each community, although the focus was on ‘smallholders’. The groups comprised people coming from one community but from several sections of the community, with equally mixed genders and with diverse socio-economic backgrounds. Partakers were ‘everyday’ people, explicitly exhibiting the following attributes:

- Coming of their own free will and accord, although compensation in the form of food and drinks were provided during the discussions;
- Having no monetary or ego-centric motives in mind when participating in FGDs;
- Not belonging to any powerful elite in the community; and
- Not directly dependent on any other person in the group.

Potential participants were contacted individually with the help of knowledgeable community members and assistants. Other potential participants were questioned in informal interviews to determine the extent to which they were related to others and to which they fulfilled the criteria. These interviews intended to ascertain what kinds of groups would be the best

participants. The aim was to enable plausibility, not statistical representativeness (REUBER & PFAFFENBACH 2005: 150).

FGDs were used to determine initial ideas of typical, critical, extreme or deviant cases of communities and individuals as a way of orientation into the field. They served as an additional entry point to the communities' social field. The degree of rapport built between the researcher and the field/people and the site of investigation partly determined which individuals were to be more closely examined in the subsequent in-depth interviews. Discussions and rankings permitted an understanding of how decisions are made within a certain socio-environmental context, what priorities are, and how outcomes of livelihood activities are valued. This study relied mostly on FGDs because when well conducted, they are a tremendous source of information on the content and tenor of collective orientation structures, informal opinions and institutions and ideologies that shape everyday thinking, feeling, decision making and action. This value is attributed to the fact that such information is heavily connected with social interaction; thus, it can best be observed and studied when such interaction takes place in a group setting. Group dynamics and mutual stimulation can generate more genuine information than individual in-depth interviews. FGDs represent settings within which interviewees can easily interact naturally, groups reflect their own ideas and thoughts, and general consensus is likely to be reached. At the same time, researchers may be able to determine how this consensus was reached.

A highly effective group discussion method is beneficial for inductive and deductive approaches, may be used to commence research for the purpose of generating initial ideas and testing concepts or to advance later research phases for testing and adjusting preliminary findings. This method, however, is most useful when used to generate new hypotheses in an explorative manner and when used in an effort to understand the setting within which behaviours and attitudes are embedded. Group discussions can also serve as a platform for reflection and learning by the discussants involved. FGDs can thereby help make research more interactive, friendly, respectful and empowering for participants whilst being beneficial for generating data for research purposes.

The downside of FGDs, however, is that discussion is heavily differentiated by group dynamics, thereby presenting difficulty in comparing several discussions. The social pressure, dominance and submission of certain participants have to be skilfully managed, and FGDs must be standardised to some extent (CAMERON 2005; DUGGLEBY 2005; HOLLANDER 2004; LAMNEK 2005: 408-474; RABIEE 2004; see also SKOP 2006). FGDs are only as good as their participants, or rather, as good as the process that underlies participant selection. Although FGDs enable the acquisition of insight into generic trends and patterns, they are never fully representative of the totality of a target group (GÖLL et al. 2005: 8). Often, details may be missing in the explanations that groups provide. Additional problems and limitations occur in intercultural research given that an interpreted FGD is 'a highly complex event, [...] a complex

communicative setting, [with] specific spatial and temporal constraints and a high degree of cultural embeddedness' (PRZEPIORKOWSKA 2010: 21). Understanding the non-verbal expressions of participants seems impossible in the absence of sufficient insight into the local context of communication. Constant interpretation additionally delays exchange of thought in a group setting that can otherwise be a fast, dynamic, and thereby, far more revealing process.

Furthermore, the parameters analysed in interpreted FGDs bear on the roles of not only all participants and the moderator, but also the interpreter. Thus, the results of FGDs in settings (culturally and/or language wise) foreign to a researcher can be of higher fidelity and reliability when competent locals using the local language conduct the discussions. A greater degree of standardisation can compensate researchers for relinquishing direct control over the discussions. Enabling groups to produce manifest results, such as summaries of outcomes in paper form, can advance the production of data less subject to misinterpretation by (foreign) researchers. Nevertheless, doing so may lead to missing details.

However, FGDs are highly effective for building initial rapport because participants feel safe within their groups. Several FGDs were conducted per topic to gain a variety of views from different segments of a population; which allowed for more generic results from a procedural, successive and explorative approach (GÖLL et al. 2005: 9-21), and for contact with a diversity of people. As the researchers' insights evolve and progress over time, the aim of research may change and adjust to the realities onsite, even as rapport is built. FGDs should be held with changing groups until no new data are generated by further discussions, and until theoretical saturation is reached within the scope that the approach allows.

#### **4.3.4. MOFA/Expert FGDs and Surveys**

FGDs and surveys were held with the extension officers of the local MOFA to gain more information on field-internal and external expertise and to generate further quantitative data. These methods served as a means to compare these forms of expertise with the system-internal perceptions of the farmers. The questions and topics covered, therefore, intentionally overlapped with those presented in the farmer FGDs and interviews. The extension officers were asked to define local, qualitative and quantitative criteria for poverty assessment and to estimate the quantitative significance of their definitions. Special focus was directed towards the allocation of land given that the discussions with farmers revealed access to land as a major challenge in making a living. They were further questioned to:

- Evaluate the quality, quantity and trends of hazards, threats and environmental change;
- Evaluate the effects of threats and changes in the environment on coping abilities;
- Assess the influence of markets, especially of selected value chains, on livelihoods;
- Supply information on their experience with farmers and their perceptions of them; and

- Discuss the problems that arise from daily work routines and from the practical implementation of current interventions by the ministry.

Two expert group discussions, in combination with surveys, were carried out in each of the districts where the research took place. For each event, all the extension officers of a given district were successfully recruited for the study. These surveys are thus complete censuses.

### **4.3.5. Household Head Survey**

The household head (HHH) survey served two purposes: to obtain quantitative, individual and aggregated data, and to test the previously generated hypotheses. The survey covered a variety of topics already discussed in the research beforehand. Major topics were:

- Gender relations;
- Livelihood assets, strategies, land use and outcomes;
- Tomato, chili, rice and shea nut value chains;
- General problems in farming and natural hazards;
- Foreign aid and external intervention accessibility;
- Livelihood trends;
- Household decision making;
- Institutional effects on poverty alleviation;
- Hypotheses/opinions on developmental issues in the community.

Only household heads were invited to participate in the survey because they could more easily provide information on an entire household, and thus, a large proportion of the examined population. ‘Heads’ are defined as the male or female member of a household, recognised as being the dominant decision-maker by the other household members. The head of household is also defined as the person who bears economic and social responsibility for most or the entirety of the household. ‘Household’ pertains to the people who live together in the same house or compound, and who cater to one another’s sustenance and living requirements. The degree of relationship – i.e. whether they are directly related (definitions partly adopted from GHANA STATISTICAL SERVICE 2012: X) – is of no consequence. Participant households were selected by geographically random sampling. The locations of the first interviews were established by blind throwing of an arrow onto a map of the village. After each interview, the geographic directions to be followed (north/south and east/west) were decided by a coin toss to determine which household was to be interviewed next. If that household had already been interviewed, the random selection procedure was repeated. In addition, those already interviewed in the individual, in-depth and farm budget interviews were again asked to participate in the survey.

The number of participants in the survey was decided via a method characterised by a compromise between efficiency and representativeness. In 2010, Bui (where the survey was



conducted) had a population of 3299 inhabitants, accounting for 5.8 inhabitants per household (data obtained from the Ghana Statistical Service). The village population grew by about 20 percent from 2000 to 2010 (GHANA STATISTICAL SERVICE 2012: 104; LAUBE 2007: 113). At the time of the study (2012), therefore, the population was estimated to be 3431, equal to about 592 households, each with one head, assuming that household sizes have remained the same as in 2010 (i.e. 5.8 inhabitants/household). With n=177 household heads in the survey, a confidence level of 95 percent at a range of about  $\pm 6.2$  percent was reached in the analysis, assuming a normal distribution of variables (SACHS & HEDDERICH 2006: 263). Lack of time meant that the survey was only conducted in one of the villages visited, in Biu.

Further limitations but also advantages arise from the characteristics of survey participants. Though showing a severe bias according to age, the greater seniority of survey participants in comparison to general demographic structures had the advantage of being able to cover larger timeframes when they were asked for trends occurring throughout their lifetime. Overall it was difficult to find female headed households, as men generally dominate decision making in these economic units (see Figure 5). Data was disaggregated according to sex, to see where substantial differences arise in terms of perception.

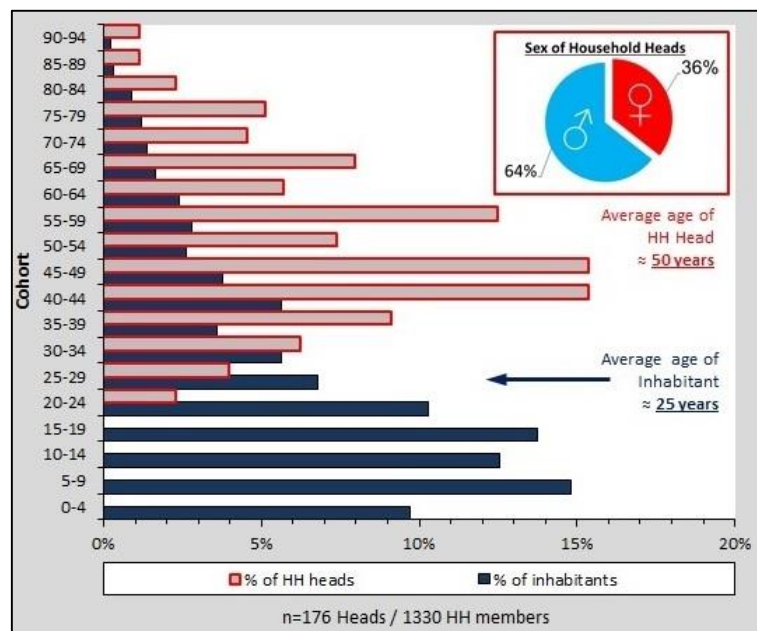


Figure 5: Age and sex of survey participants (own figure, 2014, own survey, 2013, n=177).

#### 4.3.6. Secondary Data Collection and Archive Survey

To understand the effects and importance of different markets and their attached value chains on livelihoods, this study collected countrywide, regional and, where available, local secondary quantitative data on economics and poverty-related phenomena; statistics on production volume of crops; data on the natural environment and climate and environmental change; and data

on households and their land use. Data were obtained from the literature, publicly available statistical reports and intra-organisational records. The secondary data includes:

- Global and regional numeric data on markets, production volumes and general economic data;
- Country-/region-wide farm gate prices;
- Organisational/institutional records, contracts and correspondence;
- Regional and local environmental remote-sensing/GIS data;
- Estimations of shares of gains within value chains, including farm gate prices; and
- Estimations of inputs needed for production and their monetary costs.

Of special interest were the diaries of Catholic priests in Navrongo dating back to 1905 which were revealed by an archive survey. These priests were among the first Europeans to settle in the area. The diary entries were analysed for information on natural hazards, sowing and harvesting times, food shortages and famines and major social happenings. The data provided insights into major land use patterns, and seasonal climatic fluctuations long before data were officially recorded in the area. This contributes to an understanding of long-term livelihood dynamics, especially with regard to changing ecological conditions, and further helped to triangulate results in a broader historical perspective.

#### ***4.4. Triangulation***

To triangulate data it is useful to classify data according to micro, meso and macro scales (ERZBERGER 1998: 80-102). Then, ‘through a continuous alternation of quantitative and qualitative analyses of both individual behaviour and objective structures – facilitated by bridge hypotheses or similar constructs’ congruent or complementary and divergent results can be identified (DE HAAN 2012: 352), to thereby minimise threats to validity. The point at which singular individuals and their actions can be separated from the social systems and institutions in which collective actors perform, define borders between micro and macro scales. Numbers can describe macro to meso scales, express people’s perceptions and illuminate the micro scale. Because scales are interwoven, information gathered is sorted according to its contribution to the explanation of an either individual or collective phenomenon. Data explaining the actions of individual actors must explicitly identify these as a result of their actions. Data that do not directly refer to individuals prevents direct validation at that level. The same goes for meso and macro scales. Thereby, the following forms of data can be differentiated:

- ‘Aggregated quantitative data’ does not directly refer to individuals because it is aggregated. It offers structural information at the macro scale but not at the micro scale; conclusions cannot be drawn on individuals from information of larger groups. Such data often refer to figures, classic macro data, GDP figures, population statistics, imports, exports, and general trends.

- ‘Quantitative individual data’ are quantitative data with direct reference to individuals, providing information at the macro and micro scales. Examples are surveys or panels, and data from health insurance programmes. This data summarise individual actions and thereby generate insights on larger, evolving structures through numbers.
- ‘Qualitative individual data’ are micro data that cover actors’ individual coping strategies, ways of interpretation, interactions, strategies and constructions of reality. Outcomes are text or protocols that originate from interviews and observations.
- ‘Qualitative structural and institutional data’ provide information on institutions and larger social systems as the outcome of the totality of individual actions. Such data can come from individuals as carriers of information about larger contexts (e.g. ‘experts’) and can provide information on larger scales. FGDs are an example. Such data provides insight into the transitions between scales and between individual and structure (thus, the meso level) (ERZBERGER 1998: 103-106).

The combination of these types of data allows the establishment of connections between scales or levels of analysis. Data may establish connections to a micro level via quantitative individual data, expert interviews or FGDs. Each scale enriches the explanations derived from another, and connections between structure and individual actions can be formulated (Figure 6).

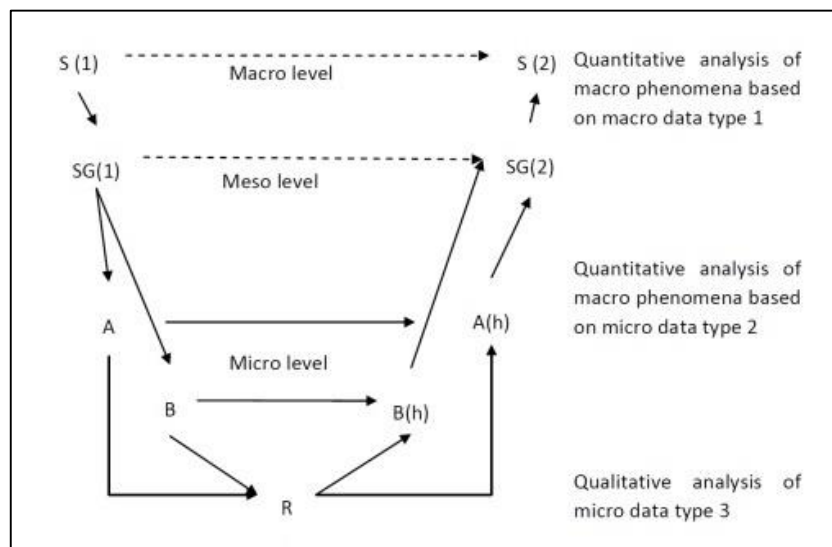


Figure 6: Model of sociological explanation (based on ERZBERGER 1998: 120).

Relations between a social situation and a collective explanandum at the macro level (S1 to S2) are needed to bridge hypotheses. Such bridging enables the production of initial thoughts on the micro level, where individuals put things into practice (A to Ah and B to Bh). The same goes for the meso scale, which embeds these individuals (SG1 to SG2). Bridge hypotheses are generated through the reconstruction (R) of reasons for certain behaviour at the scale of individual actors, that is, the micro level. Larger socio-cultural patterns of interpretation need to be understood through individual perceptions and actions. The macro level serves as a normative

orientation for the actions of individuals and shows limits and specific options, whereas diverse individual actions at the micro level merge to form the phenomena encountered at the macro level (Ibid.: 103-121).

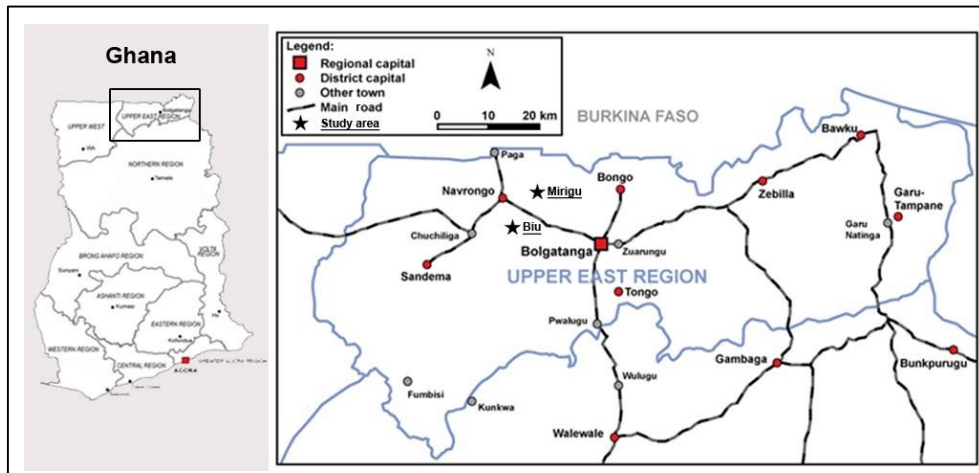
Triangulation in this form enables ‘studying local-global interactions’ (DE HAAN 2012: 351-352) as it merges structural and actor perspectives. It minimises threats to validity because such ‘between-method-triangulation’ can test previously generated hypotheses (MCKENDRICK 2009: 130) and pits the specific strengths and weaknesses of each method against those of others. It comprises other ways of triangulation, such as data, investigator and theory triangulation. These make the re-conceptualisation and continuous, critical evaluation of methods and hypotheses necessary (ERZBERGER 1998: 123-149; FLICK 2007: 519-520; FLICK 2011: 12-17; KELLE 2007; LAMNEK 1995: 252-253, 2005: 158-160), as done in this research (see Section 4.1). When outcomes are divergent, even though no serious mistakes are found in data acquisition or analysis, new approaches to improving theories must be developed. A research approach may have to be modified to once again create complementary results. When triangulation creates a consistent picture there is evidence that an encountered phenomenon is appropriately understood and described. Qualitative explanations verified by quantitative allocations can then arise with results that support the creation of a complex picture proven by numbers (ERZBERGER 1998: 123-149). In this research, the HHH survey provided quantitative individual data that ranged from the micro to meso scale, thereby reinforcing the qualitative individual data gathered through micro scale interviews. Another connection of micro and meso/macro scale was provided by FGDs, as well as by interviews in combination with various forms of mapping and secondary data (Table 4).

<b>Data type</b>	<b>Methods</b>	<b>Scale</b>
No. 1: Aggregated quantitative	Collecting secondary data, maps, value chain data, own mapping	Meso to macro
No. 2: Quantitative individual	Household survey, individual farm budgets, organisational and institutional records	Micro to meso
No. 3: Qualitative individual	In-depth interviews, participant observation, oral history, field notes	Micro
No. 4: Qualitative structural and institutional	FGDs, expert interviews and FGDs, background checks and investigation on key actors, finding and checking on informants, field notes, mapping, archive survey	Micro to meso (and macro)

Table 4: Data types collected according to method and scale (own table, 2014).

## 5. Livelihood Systems under Investigation

This chapter examines the livelihood systems of two communities – Bui and Mirigu – located in Ghana’s Upper East Region (UER). Both communities reside in close proximity to the Burkina Faso border and are part of the former Kassena Nankana District (KND), which was recently bifurcated into an eastern (KNE) and a western (KNW) part. Mirigu falls in the western district, and Bui in the eastern. Both communities lie in close proximity to the former district capital, Navrongo (see Map 1).



Map 1: The study areas, Bui and Mirigu (own map, 2014).

The UER falls within the Sudan Savanna region, characterized by semi-arid climatic conditions and having two prevailing seasons, a wet and a dry season (LAUBE 2007: 45). The region is situated in the ‘Gurma Upland Plains’, which fade into the ‘Oti’ and ‘Salaga Low Lands’ lying to the south. The landscape fades into the savanna plains of the Upper West Region lying west of the villages, while the ‘Atakora Mountain Chain’ is found in the east (SCHULTZE 1955: Beilage 1). Overall, the region’s topography is characterized by relatively low, gently rolling relief. Mean elevation is 197 m above sea level (MDEMU 2008: 11). Mirigu – being further east – is situated at 197 metres, which is a slightly higher altitude than Bui, at about 179 metres above sea level. While vast floodplains exist west of Bui, Mirigu has only minor ones and is characterised by a higher topographic variability.

### 5.1. General and Spatial Principles of Livelihood Upkeep

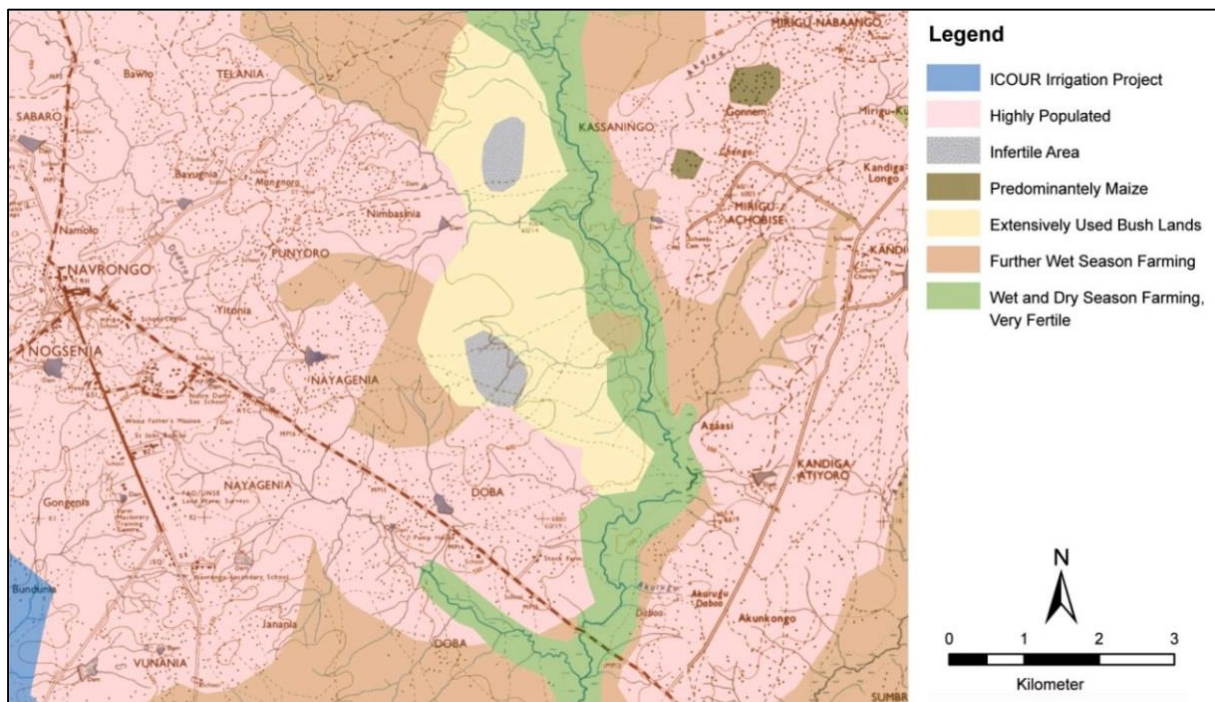
Settlement structures are at the centre of all basic livelihood activity in Bui and Mirigu. Many thousands of years ago, the first settlements were established on hills (WIDGREN 2010: 329, 337). Traditionally, land usage forms semi-permanent, seasonal and concentric, circular ring patterns, which differ in their intensity of usage according to population density (BARRAL 1968: 44; CALLO-CONCHA et al. 2012: 14; HAHN 2000: 142-143; HUNTER 1967a: 104, 106, 1967b: 41; LAUBE 2007: 152; RUTHENBERG 1971: 58-62, 111-112). People have traditionally practiced (manure-) intensive, rainfed agriculture in immediate proximity to their houses and have

cultivated additional bush farms further afield. The main livelihood securing activity – agriculture in Biu and Mirigu – depends on the time of year. During the wet season, from about May to October, locals are busy on their ‘compound farms’, meaning that they work on plots which immediately surround their housing. During the other half of the year, during the dry season, locals practice irrigated farming along intermittent streams, as in Mirigu, or sourcing water from the local irrigation project, as in Biu. Tremendous use is made of trees. Agroforestry, especially in bush areas is an essential part of the land use systems and agrarian landscapes. ‘Kulturbauparks’ (KRINGS 1991) surround settlements with their attached fields. These are cast concentric rings of different parklands, of carefully selected and useful trees. These differ in composition of species defined by the intensity of their usage which in turn depends on proximity to settlements (Ibid. 128; LENTZ & STURM 2004: 408). These parklands are possibly the oldest, still persistent signs of labour intensive agriculture in the region (WIDGREN 2010: 334). Today’s landscape is anthropogenic, centring on agriculture and agroforestry.

The vast majority of people, almost 80 percent in Biu and Mirigu, work as farmers (data obtained from Ghana Statistical Service, 2013). According to this study’s survey data, an average household in Biu will make use of less than three different sources of livelihood income. By far most popular is *‘farming and selling of own crops’* and *‘animals’* in combination with *‘casual labour for others’*. Casual labour is especially important for female-headed households. In Biu 54 percent of all households, but 62 percent of female-headed ones depend on casual labour for a part of their income. Most locals also rear livestock, though the sale of animals is seldom. Many occasionally even have to beg others for support in order to survive. Handcrafts and hunting are less popular. Only a few people work in the manufacturing sector and even less trade or do other activities to secure their livelihoods. Remittances from migrants serve as important incomes for over 35 percent of households. This share is again significantly higher among female-headed households – by an additional 20 percent. Of smaller importance as income sources, though more popular among female-headed households, are trade in everyday commodities and trade with the crops of others. Even less significant are incomes generated through regular remittances from other villagers, aside fishing or handcrafts. Less than 10 percent of surveyed households make a living by more exploitative forms of land use, hunting, and charcoal or firewood production. Significantly fewer have some form of formal employment, or live by selling water, renting out machinery or off a pension (own survey, 2013, n=177).

Similarly in Mirigu, people are generally self-employed farmers. Almost all households derive their income from the exploitation of their immediate natural environment. However, a greater share of people is engaged in non-agricultural activities such as handcrafts. Seasonal and permanent migration to the south of Ghana is said to be far more popular in Mirigu than in Biu and so more households are likely to depend on remittances from migrants. According to FGD

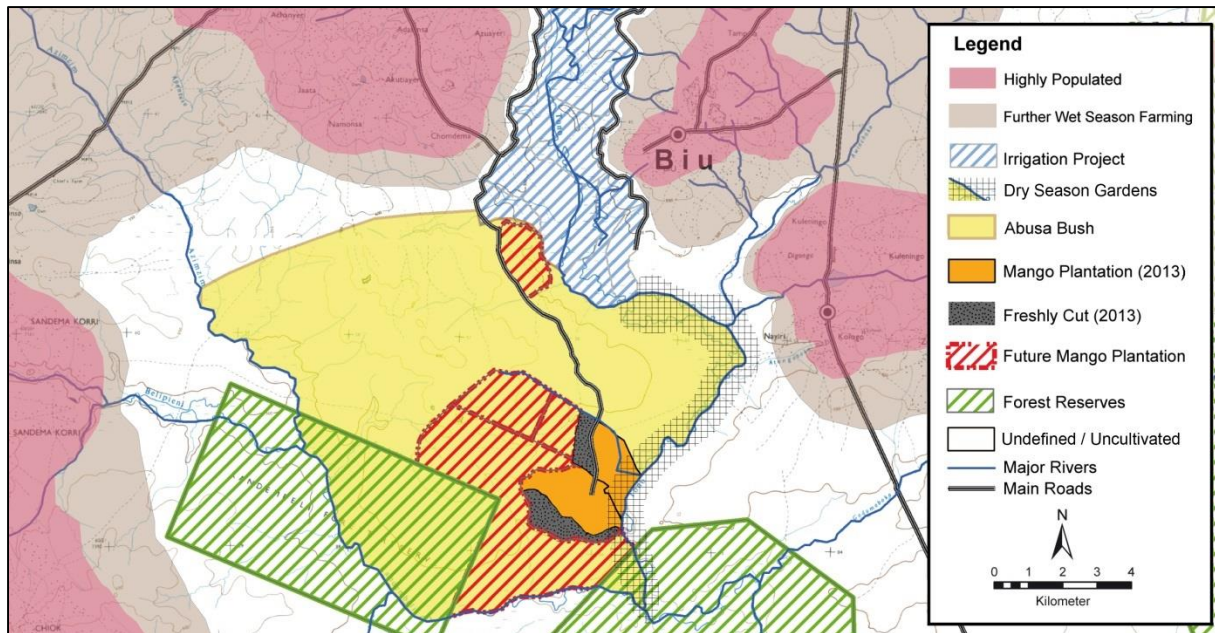
participants, this difference results from the relation of the population to its land reserves. Mirigu has a higher population density than Biu. Aside from the intensely populated and cultivated compound areas within its settlements, Mirigu has only another 500 ha of *'less crowded bush areas'* or *'extensively used bush lands'* remaining between it and its neighbouring communities, parts of which are said to be uncultivable. Of higher fertility is a stretch of alluvial flood plains along the Atankwidi River, where wet and dry season farming is practiced (see Map 2).



Map 2: Illustration of major land reserves and usages in Mirigu (own map, 2013, own FGDs and activity mappings, 2012/'13).

Biu has significantly more land reserves than Mirigu. Its *'Abusa Bush'* spreads over a total of about 6400 ha, parts of which are biodiversity hot spots because they are protected forest reserves and give refuge to wild animals such as monkeys, snakes or antelopes. The agricultural potential of Biu's bush area available to locals is decreasing however, because of large mango plantations mostly owned by local politicians and established with the help of the government's Export Development and Agricultural Investment Fund (EDAIF). The future of a total of 3800 ha of bush is immediately at stake, while farming or agroforestry in the proximity of the plantation will soon no longer be possible, because of heavy agro-chemical usage on the mango plantations. Farmers will become increasingly reliant on agriculture within their village; respectively on dry season agriculture at the nearby irrigation project (see Map 3).<sup>6</sup>

<sup>6</sup> Interview with the plantation manager, 10.11.2013, Navrongo, Ghana.



Map 3: Illustration of major land reserves and usages in Biu (own map, 2013, own FGDs, activity mappings and further GIS mappings, 2012/'13).

Most rainfed agricultural production takes place in highly populated areas. In Biu, the average farming household will work on about 6 acres of land in the village, as compared to less than 4 acres in Mirigu. Over 90 percent of households in Biu and a similar share in Mirigu are immediately dependent on these compound farms. Thus wet season agriculture represents the basis of people's livelihood. It is practised quite similarly throughout the area: usage of compound lands is extensive, as chemical fertilisers or other agro-inputs are seldom applied in these areas, not to speak of mechanical land preparation. Cultivation depends on manuring, composting and communal work. Communal work is especially important, because crops grown in these compound areas require quite a high amount of labour, especially during the beginning of the wet season. Attaining communal work requires investment in social capital, yet it's not free of further financial burdens. Strong alcoholic drinks, drummers and food have to be arranged for neighbours willing to help with land preparation (see Photo 1).

In April, after the first rains have softened the soils and initial land preparation has taken place, manure is collected and applied on compound fields. Different varieties of millet are most often planted. (Bambaran) beans are manured with compost. Furthermore, groundnuts, maize, rice and shea are grown and harvested. Small areas are planted with kenaf, okra or hibiscus. Aside from shea, which is harvested from May to September, crops are harvested over the period July to December (see Figure 7).





Photo 1: Communal land preparation during the wet season in Bui (own photo, 2013).

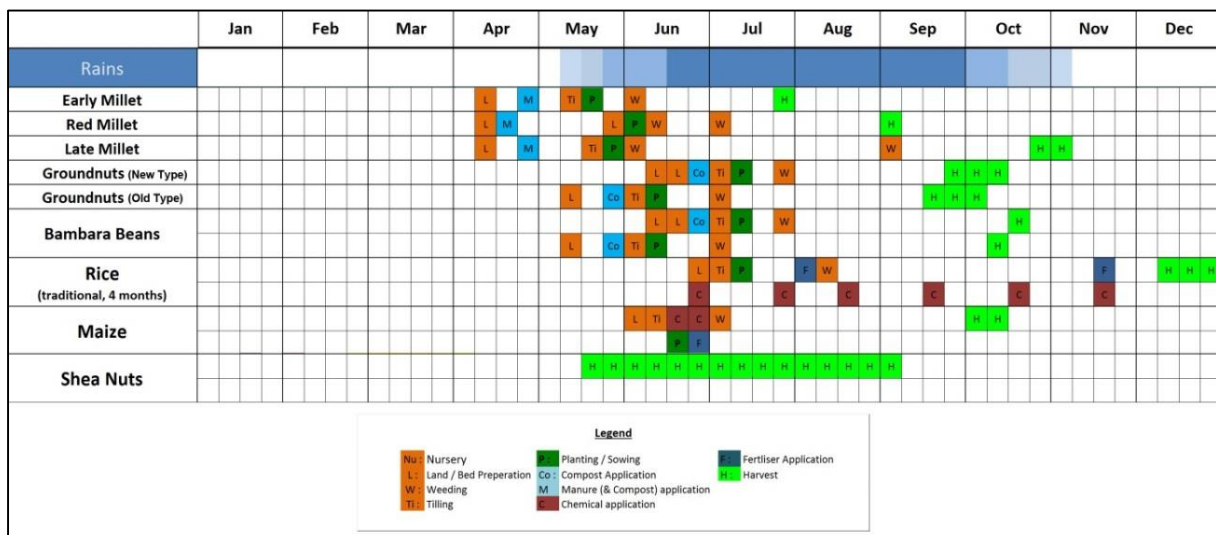


Figure 7: Cropping calendar for major rainfed crops in Bui and Mirigu (own figure, 2013, own FGDs, 2012/'13).

Rainfed production in the compound areas of Mirigu and Bui is manifold. Millet is the most popular crop, and about 90 percent of households in Bui produce different varieties of the crop around their houses. Equally important is the gathering of shea, an indigenous tree whose fruits come with nutritious pulp and oil seeds from which shea butter can be produced. At least 77 percent of households in Bui collect shea nuts from their lands. Groundnuts are grown on larger tracks of compound land by about 36 to 46 percent of households. Crops such as cow pea and bambaran beans are grown in both Bui and Mirigu, but only on an insignificant scale. Most people cultivate okra, kenaf and hibiscus around their houses (over 80 percent of all households in Bui), but equally on insignificant acreage. Maize is produced on compound lands by about 57 percent of households in Bui, and possibly by more in Mirigu. Rice is grown in both Bui and Mirigu. A

little over 50 percent of households in Biu grow rice, and roughly 34 percent of plots are used for this purpose during the wet season. Mirigu's farmers estimate the share of rice producers among their village's inhabitants to be less than 25 percent, and expected a smaller share of plots to be used. The rice varieties grown to suit local environments also differ. People in Biu produce newer introduced varieties of rice, which are high yielding and fast growing, while in Mirigu popular, traditional rice varieties, suitable for uplands, are grown. These crops hardly cover over 10 percent of the land available, and plots are heavily intercropped. For example, in Biu, more than 92 percent of farmers in the village intercrop with an average of 3.25 different crop varieties per plot. Most popular is the intercropping of early and late millet, okra, kenaf and hibiscus. Another combination includes cow pea, bambara/'black' beans and groundnuts. Seldom combined with others is red millet, maize or rice. Crops like kenaf, okra or hibiscus are mainly used to demarcate plots. As a result, plots are not only fragmented but are quite mixed and patchy. Fragmentation is highest in Mirigu, due to higher population pressure, and is said to be comparable to the centre of Biu (see Map 4).

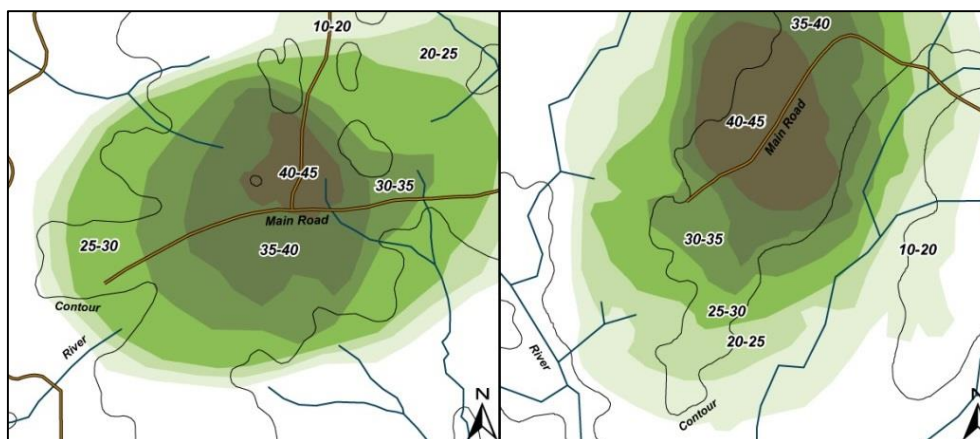


Map 4: Wet season, compound land use with 'head' compound and dependents in Biu's centre (own map, 2013, own interviews, 2013, satellite image © 2016 Google and DigitalGlobe).

The plots in compound areas are patchy and fragmented because the land use interacts with settlement structures. These determine field forms and their extents, due to the prevailing compound farming system; a result of demographic developments. High population pressure led to a dispersed settlement structure, since each farming household needs sufficient lands in order to maintain agricultural productivity and outcomes on relatively fragile and infertile soils (HASELBERGER 1964: 52). Locals therefore intensify usage of compound farms by manuring and intercropping, supposedly in a relatively environmentally sustainable manner (ADAMS 2004: 133; see also WIDGREN 2010: 324). The size of compound fields, their productivity and long-term usability is primarily defined by the availability of manure and consequently the number of livestock owned. Livestock are kept in kraals surrounded by concentric compound structures in

order to protect them and to allow for hoarding their refuse. A concentric ring structure then evolves through a nutrient or manure gradient in soils, because manure is spread in immediate proximity to compounds and thins out towards the outskirts of plots. Due to insufficient manure, hence an overall lack of soil nutrients, high distances between housing structures are needed to sustain agricultural production outcomes, which leads to dispersion. This is evident in most parts of northern Ghana (EGUAVOEN 2008: 73, 95, 113, 257; HUNTER 1967a, 1967b: 339) and has evolved to the degree that the expression ‘village’ no longer tallies ‘with the local settlement pattern’ (LAUBE 2007: 105).

Own mappings of both Biu and Mirigu and own calculation made with these, indicate that compound farms are really highly concentrated. Somewhat circular clusters can be found at higher altitudes, on the ridges of large tracts of land spreading finger like between the valleys of the local, dendritic river drainage system (own mappings and calculations, 2014). Dendritic river systems are said to be relatively old in geomorphological terms, since they have been integrated into larger drainages through ongoing stream capture over the millennia (AHNERT 2009: 214). Therefore, the basic determinants of landscapes and settlements may not have changed much over the last couple of thousands of years. Like their ancestors, people nowadays live on and cultivate higher lying areas and consciously avoid low lying areas, well aware that settling in valleys is dangerous to housing structures and surrounding crops.<sup>7</sup> Consequently, by 1966 the average compound farm in Biu stood at an altitude of about 173 m above sea level, keeping an average of more than 360 m from the next riverbed (calculations based on GHANA GOVERNMENT SURVEY DEPARTMENT 1966). Village structures in both Biu and Mirigu are clustered on hill ridges. Since 1966 structures have further concentrated, especially in those areas where density was already high due to generational succession and population growth (see Map 5).



Map 5: Growth in compound densities (per km<sup>2</sup>) from 1967 to 2008 in Biu (left) and Mirigu (right)(own map, 2014, own FGDs, 2012/'13, data obtained from satellite images © 2016 Google and Digital Globe, GHANA GOVERNMENT SURVEY DEPARTMENT 1966).

<sup>7</sup> Interview with one of the Chiefs of Biu, 06.11.2012, Biu, Ghana.

Today, about 55 to 60 compound farms per km<sup>2</sup> stand in the centre of Biu and 70 to 75 in Mirigu. Gradients of densities in both villages run most distinctively from the hilltops towards valley bottoms, while gradually fading along higher lying plateaus. In the outskirts of both villages the density is about 20 to 40 compounds/km<sup>2</sup> (see also Map 8 and Map 9). On average, the distance between compound farms is less than 180 meters, while in the centres of settlements this distance can easily shrink by over two thirds. Village structures that were de-centrally concentrated have become more centralised. This has consequences for the long-term usage of these areas. Due to spatial concentration and crowding, especially in the centres of villages, fields become limited by their neighbours' land use. With a growing population, fields fragment further by means of generational succession making it increasingly difficult to uphold traditional land use systems: once circular fields become fragments, slices, strips and patches. Thus, the traditional basis of livelihoods, located around compounds, is limited and will continue to shrink with population growth. Intensification may be essential.

Due to fragmentation and the overuse of compound lands, still-available virgin bush lands are cultivated. The average household from Biu will cultivate about 2 acres of bush land, whereas farmers of Mirigu assume to cultivate even less. Bush areas offer higher soil fertility, because they are less overused, and greater freedom of choice in plot location and size. However, the extensive bush lands are hard to make use of. The labour or rather the money needed to clear them is huge and as a result, only 57 percent of the interviewees in Biu have minor fields in the bush lands, while in Mirigu that share is far smaller. Land use in bush lands is quite similar in both Mirigu and Biu. More specialised production takes place and intercropping is rare. In Biu, less than 40 percent of households intercrop on the bush land. Where they do it is with an average of 2.2 varieties per plot. Almost half of the bush area under cultivation in Biu is used for rice production, while in Mirigu maize is mainly grown. Other crops are generally less prominent. Of significance is the relatively high percentage of people that use the bush to collect shea. About 65 percent of Biu's household gather shea nuts in the bush land, where more trees are found than in their settlements. In fact, people travel up to 15 km to collect shea nuts. Considering the extensively used bush and park lands, and concentrated use in close proximity to settlements, the area of human influence is enormous. As the potential of these places is limited and decreasing, intensive use is also made of irrigable areas during the dry season.

At present, two major forms of irrigation are practiced: furrow and shallow groundwater irrigation (SGI). Furrow irrigation is practiced in Biu at its nearby 'Tono' irrigation scheme, managed by the Irrigation Company of the Upper Region (ICOUR). Under this scheme's command area, agriculture in the dry season requires comparatively little human labour, since sublateral canals simply have to be opened to water fields. The second form, SGI, is practiced in Mirigu along the Atankwidi River. SGI is possible on most river beds having sufficiently high

water tables during the dry season. Here, farmers will dig into the river beds or construct wells in close proximity in order to access groundwater, and then mostly irrigate by bucket. Laborious gardens are established in Mirigu on former wet season farms, near river beds. Biu's villagers will mostly go for plots under the local irrigation project, and seldom use bush areas south of the project where excess water flows all year round. In Biu, irrigated farming is pursued by about 83 percent of all households. Without access to irrigation less than a quarter are still able to produce during dry seasons. As the labour needs imposed by watering are vast, the overall share of people in Mirigu being able to produce during the dry seasons via SGI, is likely to be even smaller. Any SGI farming is greatly constrained by access to groundwater, thus a suitable area, aside great physical strength. The amount of labour required limits absolute accessibility of SGI, especially when sufficient health, strength or daringness to climb into improvised, up to 8 metre deep wells is not there. As the local Ministry of Food and Agriculture (MOFA) director states<sup>8</sup>, only 10 to 20 percent of all households are able to do dry season farming in a place like Mirigu. However, in places where water tables are higher, like Paga, larger shares of the population (up to 60 percent) can participate in gardening. SGI also narrows farmers' scope of opportunity, because rice cannot be irrigated by SGI and so vegetables like chili or tomato are produced. Livelihood pathways are thus necessarily of smaller bandwidth and at a higher level of risk with SGI as compared to irrigation schemes. SGI farmers are more vulnerable to a lack of groundwater in the dry season, because they depend on the water table. Thus SGI farmers face different and more elementary risks in production. Irrigation projects, on the other hand, allow for safer, easier and thereby more accessible forms of livelihood outcomes (see Photo 2 to Photo 5).



Photo 2: Sublateral canals at the Tono irrigation scheme near Biu (own photo, 2011)

---

<sup>8</sup> Interview with the KNE MOFA director, 05.02.2013, Paga, Ghana.



Photo 3: Furrow irrigation at the Tono irrigation scheme near Biu (own photo, 2013).

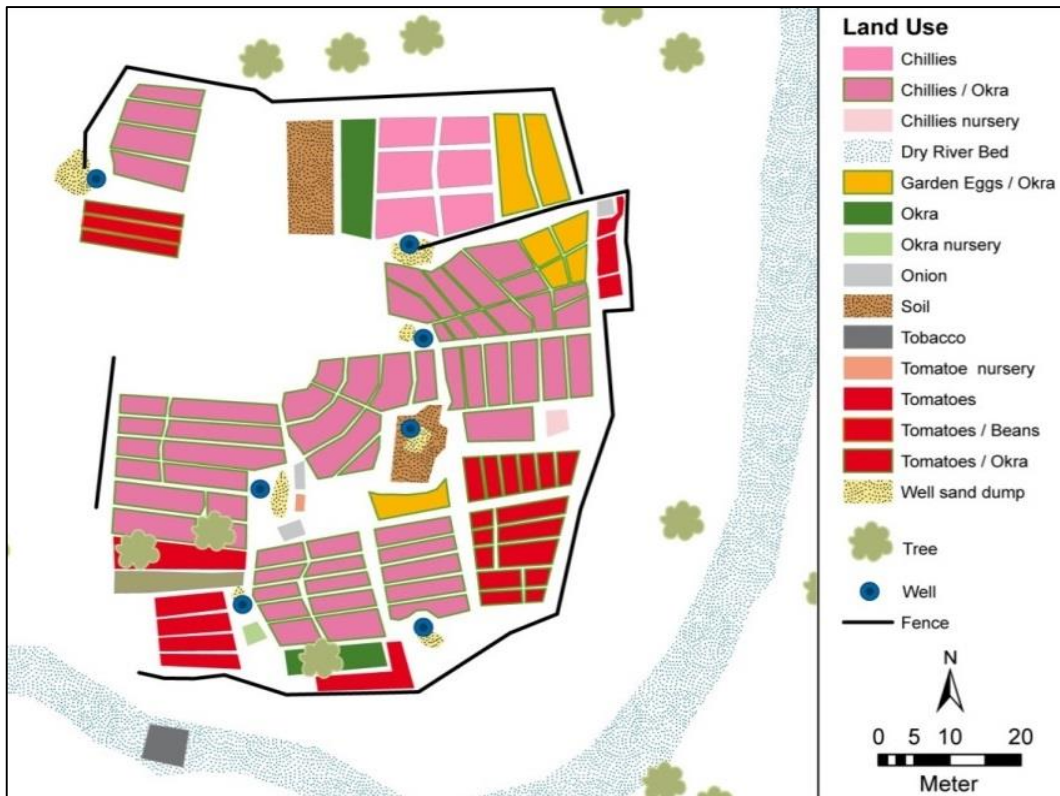


Photo 4: Dry season river dugout near Mirigu (own photo, 2011).

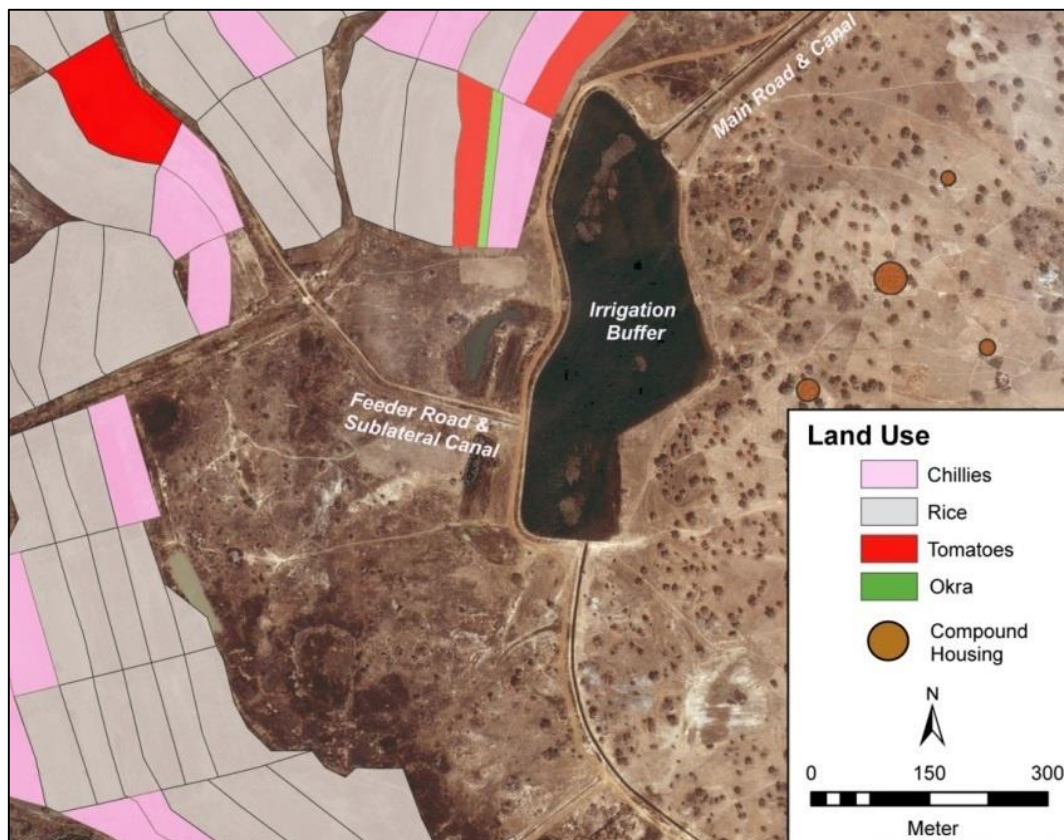


Photo 5: Dry season wells with bucket irrigation in Mirigu (own photo 2013).

During the dry season in Mirigu, chilies, tomatoes and garden eggs (aubergines) are grown on small plots, the outskirts of which are often intercropped with okra. Farmers are fully specialised in vegetable and tomato production (see Map 6). Chili production may also take place in the wet season, when it is limited to local varieties of chili grown close to homes for subsistence. In Biu vegetable and tomato cultivation during the wet season is unknown and instead takes place on dry season plots, which are far larger than Mirigu's, continuous, square and less diversified in their land use, with few to no trees within fields (see Map 7). The average household in Biu uses about 3 acres of irrigated land, whereas in Mirigu the areas used may be significantly smaller. SGI gardeners reported average plot sizes of about a fifth of an acre. Production in Biu's irrigated area is characterised by high-inputs and monocropping, pursued by 83 percent of households, whereas SGI farmers in Mirigu use more manure. Furthermore dry season farming in the project's command area is characterised by rice production, undertaken by 78 percent of households. Most cultivation starts in the later part of the wet season and lasts until the beginning of the next calendar year. Harvests come in from February/March onwards. While the harvest of okra and tomato will be over within a few weeks, chili can be harvested for more than 2.5 months in a row. Rice production in the dry season starts from January onwards, and is ready for harvest by June. Irrigated rice is also grown from May/June to October/November, but only in Biu (see Figure 8).



Map 6: SGI garden of five farmers in Mirigu (own map, 2013).



Map 7: Irrigated fields near Biu (own map, 2013, based on ICOUR data, 2012, satellite image © 2016 Google and DigitalGlobe).



## Livelihood Systems under Investigation

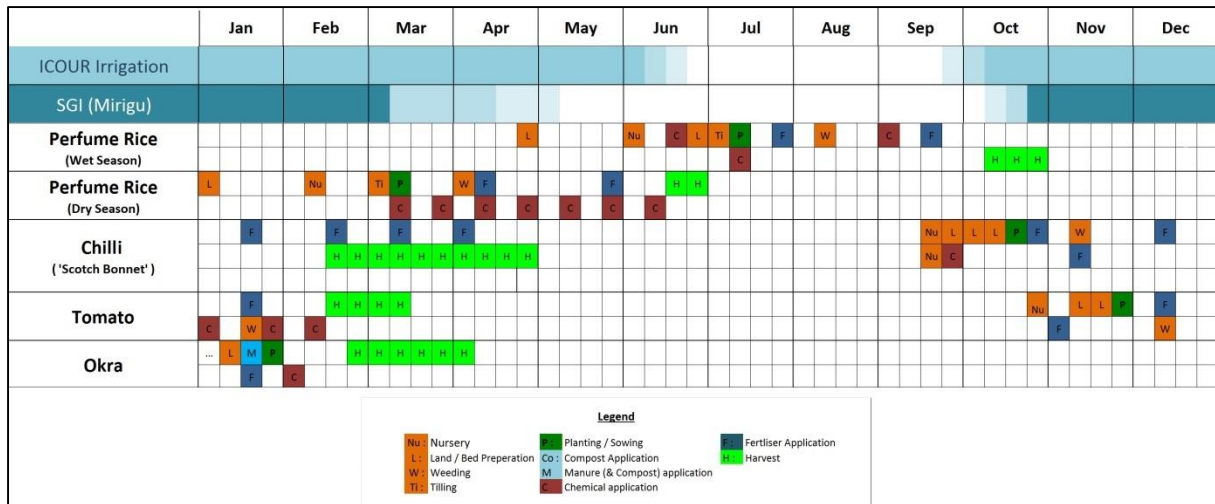


Figure 8: Cropping calendar for major irrigated crops in Bui and Mirigu (own figure, 2013, own FGDs, 2012/'13).

Agricultural production is differentiated as much by gender as it is by geographical and other physical attributes. Almost all females, over 90 percent, in Bui and Mirigu, produce shea nuts and shea butter, whereas men do not engage in this. On the other hand, females tend to avoid vegetable and tomato production and be less engaged in millet, bambaran bean, okra, kenaf and hibiscus production. Maize and groundnut production is more popular among women, though rather dominated by men, and women engage themselves in the production of rice. These patterns are the same for both Bui and Mirigu, however, Mirigu's women are mostly engaged in production of staples like millet, groundnuts and maize instead of rice. Further significant differences can be observed when looking at production taking place via the irrigation project or in SGI areas. In Bui female-headed households are more engaged in rice production during the wet season, and men during the dry season. The reasons for this may include that men are rather busy with staples like millet during the wet season. Production, like that of tomato and chili, is heavily male-dominated, both on Bui's irrigation project as much as in bush areas during the dry season. Mirigu's women emphasised their contribution to gardens, though they acknowledged male domination.

Additional variability in production arises over time. Shea production has become increasingly popular in recent times. Over the past 10 years, most farmers in Bui, especially men, have started to venture into the production of rice on irrigated areas and maize on compound plots, whereby the latter often replaced areas of millet production. Declines are evident in the production of okra, kenaf, hibiscus and bambaran beans. Production of tomato is decreasing, though that of chili by male-headed households is increasing. Overall trends in the production of crops like groundnuts are unclear. Significant gender differences arise when looking at rice and maize production, whereby the prior is increasingly popular among female-headed households during the dry season while maize attracts more male-headed households (see Figure 9). Trends in

Mirigu are similar to those in Biu, especially with maize, though less pronounced in terms of declines in millet and tomato production and increases in rice. As in Biu, many male farmers in Mirigu have started to produce chili in recent years.

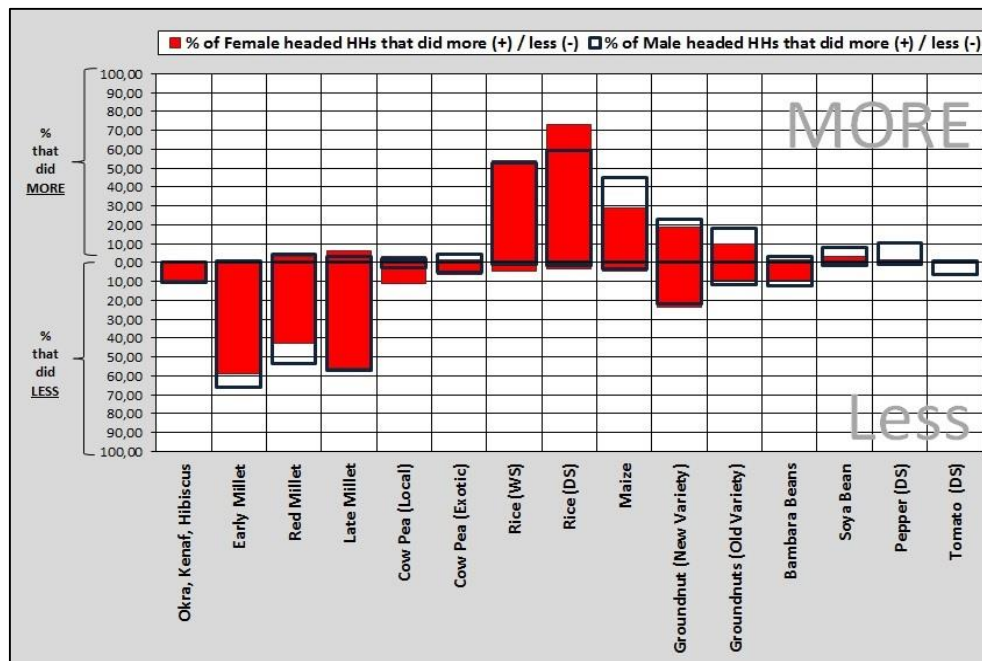


Figure 9: Trends in crops (2003-2013) by gender of respondent in Biu (own figure, 2014, n=177).

The rationale for these trends in agricultural livelihood, as expressed by farmers, is hunger, lack of finance and social capital. These three factors are said to be to be the most crucial determinants of households' well-being and general vulnerability, and thereby of livelihood pathways and rationales behind the production of diverse crops. The general strategy of diversifying production is considered to help deal with risks. While one crop may fail, another may survive thereby allowing the household to survive. So, farmers are conservative in their general approach to making a living. 96.6 percent of all respondents in Biu would 'partly' or 'fully' attest to the idea of risk avoidance by diversification. Therefore, usage of compound land and partly also bush plots is manifold, while irrigated areas are often used for specialised production. Diversification and specialisation are intertwined. Local farmers pursue a multi-purpose strategy. As deduced from FGDs and supported with the secondary data, the rationales employed mostly boil down to a conflict over cultivation of crops for food or for income.

### 5.1.1. Crops for Food or Income

In this section livelihood pathways are examined by an analysis of local people's hypotheses of crops' functions for livelihoods. The most popular locally produced crops are cereals, legumes, shea nuts, vegetables and tomato. These support either direct food or income security, while some fulfil both purposes.

In compound and bush areas, millet is grown because it is deemed to yield well on poor soils and to be able to withstand droughts. Even on degraded soils and when only able to use manure to fertilise the land, millet is said to give good returns, especially late millet, which is why the crop is considered to be essential for food security for up to 11 months of the year. In Mirigu where fields are generally smaller, however, millet harvests are consumed by May at the latest, meaning within only six months. In both Bui and Mirigu, people praise the millet crop for its over proportionally high energy content, its nutritional value, despite low yields, and its usage for the brewing of Pito, a millet beer, which is very popular in the area. Most millet varieties are said to be relatively low in cost and fast in maturing, however, not good for making money, which is why they are considered a staple. The same is said for groundnuts: these are said to be relatively safe to produce, though not necessarily easy in terms of labour requirement. Although considered as cash crops by some, in Mirigu, but also in Bui, groundnuts are grown to be eaten and rarely to be sold. Crops like okra, kenaf and hibiscus are used as side ingredients for own cooking, though in Mirigu people also sell these crops, though with bad returns.

With all factors being equal, crops like millet, sorghum or groundnuts are the quite efficient in terms of yield to input and thus cost, since they require relatively little work – production is dependent on animals owned and labour input. These crops require little fertilisers – NPK or sulphate of ammonia – and other agrochemicals, though they generally have low yields and potential incomes. As they are often cultivated using manure, to the cost of acquiring inorganic fertilisers is removed, and cultivation is more sustainable in agro-ecological terms. Overall, these crops are thereby perceived as cheap and relatively easy to grow, providing good benefits to food security.<sup>9</sup> Compound plots, on which these staples are grown in the wet season, thus represent the traditional, heavily diversified basis for livelihood upkeep that is partly dependent on social capital (communal labour) and manuring to make use of (limited) potential.

Shea nuts generate further food and income-securing activities on compound and bush lands. They have an instant nutritional value as the pulp can be eaten, while the kernels are processed and then sold or used later to produce shea butter. This is the most popular form of cash crop specialisation and also the only product processed locally. Shea butter is used as the primary source of cooking oil, for skin care and also medicinal purposes. Locals state that shea nut and butter do not give good returns, especially the nuts, but provide an income during times of critical food shortages, including at the end of the dry season and beginning of the wet season. The money generated with shea is said to be the major reason for why hunger decreases by May to June, the most difficult period before July and the first harvests of early millet. At this time of year most other sources of income have been used up. Generally, shea is said to empower women

---

<sup>9</sup> Women from Bui talking about the value of traditional staples during FGD, 07.08.2012, Bui, Ghana.

economically and thereby socially, since picking and processing is entirely in the hands of females. Though currently nut processing requires large amounts of firewood, shea processors also have a positive impact on the natural environment, since most of the trees left standing in the villages are shea trees, which women actively protect.

Maize, grown on both compound and bush lands, serves a similar purpose in Bui and Mirigu. It is said to give better returns in terms of yield and pricing than a crop like millet, though still serving as a staple crop. Similarly, it allows people to feed on it for almost half a year. For this reason maize is especially popular in Mirigu, where locals have few alternative crops, e.g. rice, that can serve both financial and food security interests during the wet season.

Rice pays comparatively well and allows households to be food secure for half a year. In the irrigation project's command area, two crops of rice can be grown within each year. When this is the case, it is estimated that five people can eat for almost the whole year off 1 acre of land. Yet, also it is acknowledged that the incomes made with rice are most often exhausted after only six months. Although seemingly short, this is still one of the longest periods when compared to other crops. Rice simply does not yield well outside of the command areas of irrigation projects. Situated at a higher altitude than Bui and having a comparatively greater variability in topography whilst also having fewer flood plains, the likelihood of high rainfall runoffs is high in Mirigu, which lowers attainable rice outcomes. Rice cannot be grown in the dry season using shallow groundwater irrigation (SGI), which for Mirigu's locals is regrettable, since Bui's people consider rice the best crop in terms of production and yield. People often attest that the newer rice varieties do not at all suit their taste and are less nutritious, unlike traditional ones. They are grown because the varieties are popular among consumers in the south of Ghana. In Mirigu, people regret that there are simply too few places suitable for rice production. However, traditional rice varieties in Mirigu, though having lower yields, grow well despite being planted on drought prone lands. Resistant against environmental stresses, the varieties are said to be highly nutritional. Therefore rice is characteristically important for both cash and food in Bui, while it serves as an additional staple crop in Mirigu.

While most traditional staples are low-cost and accessible, the new varieties of rice and maize, which partly serve as cash crops, require finances in order to buy the necessary inputs, among them inorganic fertilisers and agro-chemicals, and to remunerate greater labour input. These varieties require some chemical fertilisers and agro-chemicals, in addition to however much manure is added, in order to yield at all. Maize and rice, unlike millet, also require a great deal of attention. Furthermore, the needed investment during the wet season comes at a time when the last stocks of wet season crops are already used up. Finances are required to purchase the inputs necessary to start production, but accessing financial capital is often problematic.

Dry season vegetables/tomatoes are said to be the most demanding and '*fragile*' crops to produce. According to locals, tomato and chili require high fertiliser application and consume much labour. They are the largest consumers of pesticide and weedicide applications followed by cereals like rice and maize, and then staples like millet or groundnut. Chili, tomato and rice require exclusive access to irrigated/irrigable land, but then have more assured, greater yields and also higher financial incomes. So, although the irrigated areas used for chili and tomato production may be seem relatively small, especially in Mirigu, the monetary value of the inputs required to cultivate and the potential incomes generated are greater than one would expect.

Expensive crops like chili or tomato give the greatest returns on investments. Those who produce them praise these crops for their ability to generate very large incomes over a fairly long period, for example, up to 5 months with chili but less than a month with tomato. These crops help people to finance other investments, such as in housing, motorbikes, mobile phones or their children's school fees. The role of these crops is, however, ambiguous, because one cannot survive by eating cash crops like tomato or chili directly, due to their short shelf-life and rather poor nutritional values. So, as good as these crops are for generating income, they are less useful to feed off directly. Since their calorie content is low to non-existent, food security through these crops is only attained through their sale that facilitates the purchase of other food items. Vegetable/tomato production thereby solely aims at generating an income, and farmers are dependent on fast market access to be able to benefit, unlike with other crops that allow more flexibility.

Thus dry season tomato and chili production is entirely market-orientated and market-dependent, if it is to recover its costs. Those growing tomato or chili are market-orientated, commercial farmers. They are less dependent on subsistence agriculture or willing to take greater risks as compared to those doing rice and maize, and even more so as compared to those content to farm purely rainfed staples. Producers are prepared to encounter great risks. For example, just one day of inattentiveness, possibly due to sickness or any other reason, can spoil a whole harvest due to a lack of water, especially where SGI is practiced. People believe that chili and tomato are very risky crops because successful production is difficult. Environmental stressors like crop diseases or a general lack of fertilisers can limit yields severely, if sufficient and adequate inputs are not at hand. Thus, in all regards, the most profitable forms of agriculture come with the greatest risks (for details on environmental risks and constraints see also Section 5.2). Tomatoes additionally have the problem of being even more perishable than chilies, thus they depend even more on fast and reliable market access. Because such markets are not always available, tomato production is not deemed as profitable as it could be. More traditional crops like shea, millet, groundnuts, and bambaran beans, on the other hand, are most often highly nutritious and have a much longer shelf-life. Shea nuts and butter can, it is said, be stored for years. Furthermore,

groundnut, pearl/early millet, bambaran beans and shea products hold comparatively more calories than meat, eggs or milk. However, their farm gate prices and especially yields are often low. Only products like rice or maize compromise on the value/cost ration, and especially rice and maize have high attainable calories per acre. Judging by their calorific content and according to locals, there is an overall conflict between food-orientated and commercially-orientated approaches to production, with the exceptions being rice, maize, partly groundnuts and also shea (see also STADLMAYR et al. 2010; USDA 2015).

Only a few crops can serve dual purposes, i.e. immediate food and also income, namely rice, maize and partly groundnuts. Other crops are generally produced for either purpose. Chili and tomato are purebred cash crops, although tomato is an exception as its market has severely dropped in recent years. Tomato is still, however, considered a potentially valuable crop, especially in Mirigu. Overall, such cash crops are difficult to produce as they are costly in terms of inputs and labour demanding. The exception in this regard is shea, especially in terms of required investment, because most equipment is already present in households. Overall it is clear that expensive and laborious cash crops are grown during the dry season, often by men, while more easily produced staple crops are grown in the wet season, with more women participating. Thus, wet seasons serve food security and depend on favourable rain patterns, while dry seasons help generate incomes which are then used to attain higher food security and well-being, depending on markets and the ability to irrigate.

Consequently, a poorer and more vulnerable person – among which many are women – is more likely to grow a product that is cheaper and safer, and to put food security before monetary income. Depending on social capital, such a person would produce a pure staple crop. On the other hand, maize and rice, cash and staple crops, must be grown to generate an income. However, financial capital is needed to allow the possibility of generating more financial capital, which may result in increasing inequality. Farmers have to consider trade-offs between subsistence/staple and cash crops, if staples have to be sold to finance cash crop production. The overall ranking of crops with regard to food, income security and ease of production, as defined in the farmer FGDs, is shown in Table 5. Details on possible incomes are given in Section 5.3.5 and more product-specific in Chapter 6. One further issue raised by locals, that of conflict potential, arises from the fact that the production of contemporary cash crops, which are a strive for money, conflicts with traditional forms of land use that aim at generating well-being and social capital through the growing of staples.

Crop	Dry/Wet Season	Biu			Mirigu	
		Food Security	Income Security	'Ease' of Production	Food Security	Income Security
Bambara groundnut	WS	7	8	6	3	–
Chili/'pepper'	DS	9	1	10	–	1
Cow pea	WS	6	6	5	–	–
Groundnuts	WS	3	4	3	2	–
Millet	WS	2	5	4	1	–
Maize	WS	4	3	7	4	3
Okra, kenaf, hibiscus	DS	5	10	2	6	2
Rice	DS/WS	1	2	8	5	4
Shea nut & butter	DS/WS	8	7	1	–	5
Tomato	DS	10	9	9	–	6

Table 5: Ranking of crops by to food and income security and ease of production as far as attained (1= 'best', 10= 'worst', top 5 in grey, top 3 circled/bold, own table, 2014, own FGDs, 2012/'13).

### 5.1.2. Crops for Social Capital and Well-Being

The social capital of households partly depends on their food and income security. Food and income security strengthens solidarity amongst household members, who are then more ready to cater for others from the household in times of crisis, e.g. through sickness or general food shortages.<sup>10</sup> Outcomes attained are thus reciprocal. Agricultural cycles are related with traditional norms and values, which interacting with social capital, facilitate or undermine the optimisation of food and income security. Traditional agricultural practices are perceived as elementary to household well-being and cannot be abandoned easily; the motivation to produce certain crops is not only derived from the idea of maximising food and monetary incomes over time on a given piece of land. Farmers and those concerned with agricultural extension in the area perceive livelihood-securing activities to be *'rather a way of life than business'*<sup>11</sup>. Especially compound land use is seen as more than just a way of making a living through agriculture, for it gives meaning to people's lives. In fact, land use is an elementary part of traditional beliefs (for details on education and religion see Section 5.3.4). Such a lifestyle demands investments in social cohesion to attain well-being and mutual help, which in turn requires obedience to social norms as reflected in agricultural land use.

Millet and groundnut are among the most important crops affiliated to tradition. Millet is an elementary part of local, traditional beliefs. It is said to be the first crop that mankind made use of and is referred to in the people's traditional history of creation. Millet and other crops are needed for ceremonial purposes during festivities throughout the dry season. To be usable for ceremonies, these crops should be self-produced not bought. Additional crops deemed to be 'traditional

<sup>10</sup> Interview with a farmer, 24.03.2013, Mirigu, Ghana.

<sup>11</sup> As was permanently stated in farmer and expert FGDs and interviews.

staples', with these functions, are beans, shea butter, and groundnuts. Furthermore, cow, sheep, goat, chicken and guinea fowls are required all year round to make sacrifices and as gifts.

Festivities can be a severe burden on household food supplies and monetary incomes. During the main period of farming, from April to November, soothsayers are consulted to know what kind of crops should be sown when. Although less frequently practised nowadays, this may require a sacrifice to be made by pouring libation with drinks made from millet. Compound and bush lands are often only released for use by landlords, when such traditional offerings are made. In December Christians celebrate Christmas by coming together to eat and celebrate. Rice and meat is served, as it is at Easter or at birthday celebrations. Towards January, people often sit around fires in the evenings and early mornings, eating groundnuts, telling stories and warming their bodies from the relatively cold weather that prevails at this time. Harvest festivities begin in springtime. To those who believe in tradition, sheep, goats, chicken and fowls must be sacrificed to local gods and spirits. People invite each other to eat and celebrate.

Furthermore, marriages mostly take place from January to May, and celebrations last between a week and a month, depending on the wealth of the groom's family. Society is male-dominated and patrilocal, meaning women generally move to live with their groom's family, where they are supposed to serve the household under their husband's supervision. During marriage preparations, the bride requires entertainment with drumming, songs and dancing. To welcome the bride, people come from across the village, and are served with food and drinks by the groom's family. Large amounts of groundnuts, alcoholic drinks and meat is expected. Births and especially deaths are also celebrated with animal sacrifices and the pouring of libations.

Official funeral celebrations take place between January and April. For about two to three weeks expensive rites are performed for those having died within the last years, sometimes many years ago. Partly because of the costs involved, celebrations may be delayed for quite some time. The scale and expense of the rites depend upon the dead's reputation in society. Generally the expense is a severe burden on finances and food stocks, more so than marriages, which is why many do not perform them. Animal and other sacrifices are made by the elders of a family, whereby they seek blessings from the dead for future marriages. Principally everybody is invited to join. Bambaran beans, millet, shea butter, groundnut and rice are served to those within the family circle, and neighbours and friends are served afterwards. In addition to funeral celebrations, widowhood rites are performed on women who became widows and for these rites, shea and wild herbs are needed (see Figure 10).



## Livelihood Systems under Investigation

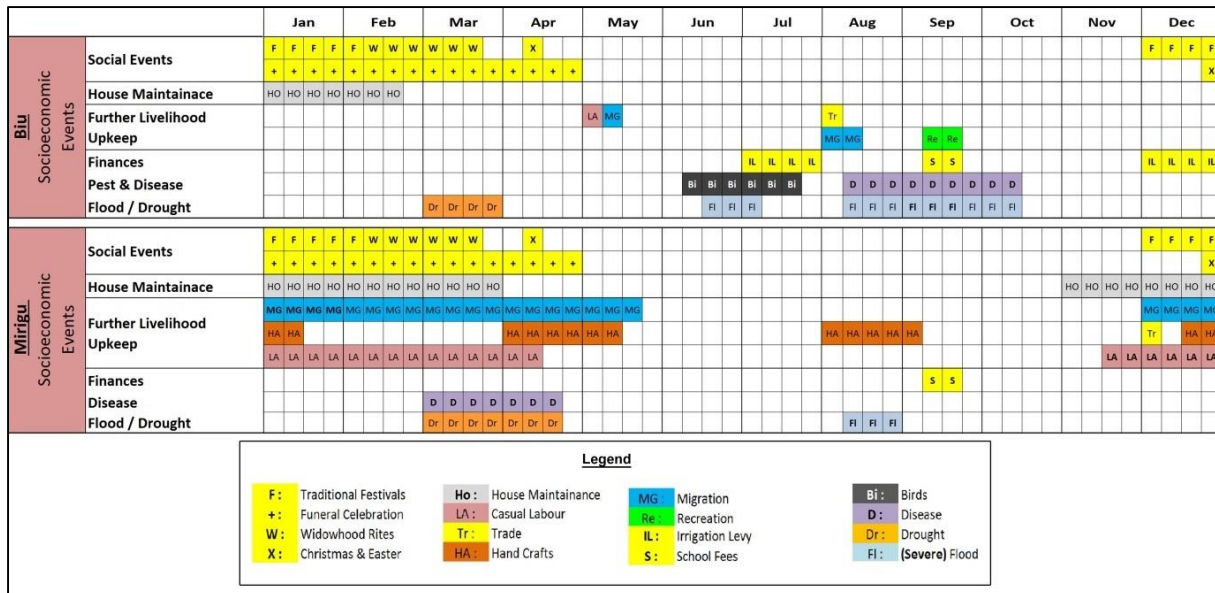


Figure 10: Community events in Biu and Mirigu (own figure, 2014, own FGDs, 2012/’13).

Traditional beliefs touch as heavily upon the annual cycle of festivities as they do upon decision-making and thereby livelihood pathways (see also Section 5.3.4 for quantities). Qualitatively, religious dogmas have an impact on livelihoods and the rationales employ in pathways. Beliefs touch upon land use. In both Biu and Mirigu one local landlord administers the rainfed compound and bush areas as an ‘Earth Priest’. In the eyes of the locals, plots of land, especially on wet season compound fields, are similar to churches, in the sense that they are headed by the highest priest in town, the landlord. He in turn promotes the production of traditional crops. Land uses are therefore indicators of obedience to norms and values, because there is a belief that if people don’t follow customs, by planting certain traditional staple crops, this will anger their gods. People will then blame non-conformists even for their own misfortune. Thus disobedience to land use norms challenges social capital. One of Biu’s chiefs, a highly innovative farmer in the community, explains that a disregard of norms is understood as a break with culture and thereby of community spirit:

*‘That’s just our culture: the millet is there to feed our family! With such culture, you can never say that you want to be part of it, if you then do not do it. No! You do those things to keep our culture! You can’t say that because of the fact that you are now looking for money, you forgot your culture. We have many old people here and for them it is important. [...] So, if they want it, you still have to farm millet!’<sup>12</sup>*

A change in land use, such as the trend from millet to increased maize production, is considered as a breaking of social norms and thus causes conflicts within households. Indeed crops, especially on wet season compound fields, are signboards of a household’s compliance to

<sup>12</sup> Interview with the Kodima chief, October, 2012, Tono Irrigation Scheme, Ghana.

general norms, which in turn is needed to acquire communal labour at the peaks of farming activities (HAHN 2000: 144). People characterise one another by the crops they grow. Because traditional crops are deeply integrated into annual agricultural and life cycles, the elderly people, who form a large share of the traditional believers, connect a change in land use to a loss of traditional values. This brings disagreement between two segments of society: between traditionalists and (Christianised and often better educated) younger people. Many young people in the village have started to refuse to produce traditional staple crops, because they no longer offer sufficient outcomes, especially money, to satisfy their needs. This leads to conflict with traditionalists, who often reside within the same household. The elderly are reluctant to confess that traditional crops have become insufficient to serve people's needs, because by doing so they would indicate that their traditional beliefs are outdated and need abandoning in order to improve livelihoods. The most reported conflict, in both Bui and Mirigu, was about growing rice and maize instead of millet:

*'No matter what my father will say or how much he will insult [me], I will not go for millet again! [...] I told him that it is no good if I break my back [work hard] without getting money, but have made his gods happy. [...] So, I help him with his field [of millet] and am sure that [...] we can attend the celebrations. [...] It is not good enough if we buy [these crops]. They must be grown by us! So, it becomes a problem.'*<sup>13</sup>

Changes in land use are often understood as a change from subsistence, food (millet) production to more commercially-orientated cash crop production. Thus traditional beliefs may conflict with market rationalities, and traditional norms and values may withhold locals from attaining higher incomes and food security (see also Section 5.3.4 on religion). A large part of agricultural activities – major livelihood pathways – are guided by norms and values expressed in annual festivities, and encouraging production of traditional staple or subsistence crops. Much of the harvest of crops grown during the wet season is used during important annual festivities, which fosters social inclusion and upholds cultural values. Traditional staples contribute significantly to social capital, and thereby to well-being.

### **5.1.3. Major Issues Encountered in the Agrarian Cycle**

All investments and incomes by farming households made over the year are closely related and cyclically interwoven. Commonly the outcomes of groundnut, maize or rice will finance dry season production, while the outcomes attained in the dry season will be used to buy inputs for the following wet season. When chili and tomato production during the dry season is not an option, only shea allows the generation of an income to finance wet season inputs.

---

<sup>13</sup> Young, male FGD participant from Bui, 15.09.2012, Bui, Ghana.

It is hard to abstain from the production of traditional staple crops. Those who do might deprive themselves of the social capital required to substitute mechanisation by manual labour during the next wet season. To produce staple crops in the wet season, furthermore, requires money that can be made in the dry season with non-traditional crops. Outcomes are often limited, therefore, due to the circularity of investments. A general lack of assets means that the outcome of one crop not only finances the next, but also determines the start of the next crop's season. Therefore, either suboptimal production circumstances in terms of inputs or delays in production are frequent. Minimising inputs can lead to insufficient yields and affect quality and thereby attainable farm gate prices. Delays at the start of a season, until sufficient means have been gathered, has a similar effect and wider consequences, because it leads to further shifts and shortenings in agricultural cycles over the year and can affect later crops' yield and quality. Thus, aside from climatic calamities, a lack of finances can contribute to an overall delay in farming that again lowers livelihood outcomes. Especially, optimal dry season production is especially difficult due to the often marginal returns of wet season farming.

In Mirigu as much as in Biu, farmers wanting to produce dry season chili or tomato will have to start preparing during the period when their wet season (staple) crops are yet to be harvested. The harvest absorbs tremendous amounts of labour at a time when no finances are at hand. Thus, workers are needed to initiate dry season production, though at this time hardly any are available because people are busy in their own fields and only a few people are able to pay. The likelihood of delays is thus higher in dry season chili or tomato production than for other crops, specifically rice, for which work starts after wet season crops have been harvested. Delays occur in the start of wet season farm activities, specifically in Biu. Farmers tend to shift back the start of their wet season production, because they are still busy with harvesting rice from the previous dry season. In the case of dry season rice production in Biu, harvests fall at a time when migrating birds can easily destroy the crop within hours, thus farmers must maintain a constant presence in their fields, leaving them little time to start wet season activities. Moreover, the likelihood of flooding at harvest time is high and farmers may delay the start of production even further, when waiting for floodwaters to subside. That farmers seemingly give priority to dry season rice production over wet season staples, suggests the contribution of rice to eventual livelihood outcomes is locally important. Farmers most likely concentrate on rice because it gives better returns. This has consequences for the wider farming community, because when the majority of people are busy working on their rice they do not have time to help others in communal, manual labour, which is needed for wet season staple production. Thus a wider section of the population is forced to delay starting activities, which can affect food security.

In Mirigu rice production in the dry season is not an option. Farmers become idle having finished their dry season production early due to water tables being too deep to reach. Harvest of

dry season chili or tomato is therefore mostly completed before work on wet season farms begins. Financial difficulties arise when school fees need to be paid at a time when harvests have hardly been brought in. This frequently leads to pupils dropping out of school when their debts are not settled. In Biu financial constraints can have an even longer lasting impact. Water levies must be paid before one is allowed to use the local irrigation scheme. The consequences of not being able to pay for irrigation levies are harsh: it can lead to a late start in the agricultural cycle, or the loss of rights to plot usage under the scheme. If farmers are not able to pay on time, their fields may be given to others who have that ability. Issues of delays within agrarian cycles and the resulting loss encountered in yields and thereby income and food security, centre on a lack of finances that deprives locals from the ability to purchase agro-inputs. Despite the fact that 46 percent of locals in Biu think that *'the chance of being able to buy enough farm inputs at the right time'* has increased over their lifetime, monetary-based inputs are perceived as *'severely'* or *'extremely problematic'* to attain. Locals perceive the purchase of fertiliser and other inputs for land preparation and use to be more problematic than any basic natural capital endowment or hazard to production that may arise from climatic changes. Only access to land, mostly irrigated, and soil fertility is of higher concern to farmers in Biu (see Figure 11).

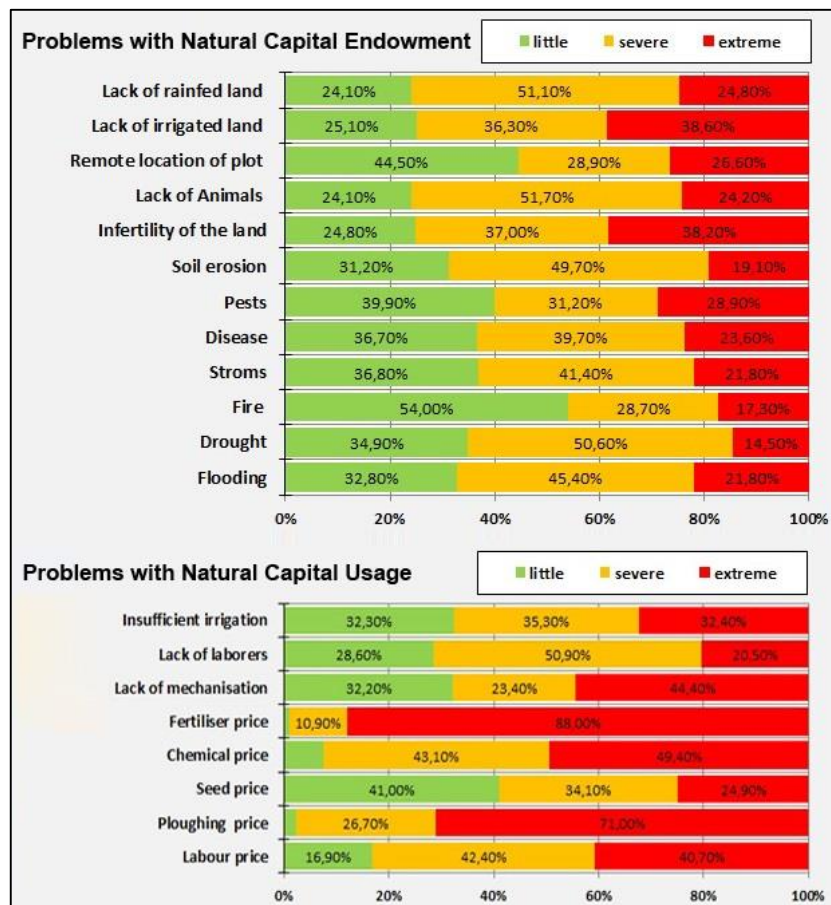


Figure 11: Severity of issues within agrarian cycles/natural capital endowment and usage in Biu (own figure, 2014, own survey, 2013, n=177).

Inequality in usage of land – the most basic asset upon which one can build – amongst locals is severe. In Bui 20 percent of all households have no access to the land under the government irrigation project and about 40 percent of all households are not able to use bush lands. Under the irrigation scheme as well as in the bush, values of the Gini index in land use are at least 0.52, which is very high even by international standards. On the highly populated compound lands inequality is also evident, but lesser and at least everybody has some land to cultivate. So, while there are few large land-owners, especially among local authorities such as the chiefs and their families, the majority of households are actually deprived of equal access to land, especially the most productive and safest areas like irrigated ones. Access to dry season production is particularly exclusive, far more so than wet season farming. In Mirigu inequality is estimated to be far lower, despite it being more crowded.<sup>14</sup> In any case, inequality is always most pronounced in areas where dry season production takes place (see Figure 12).

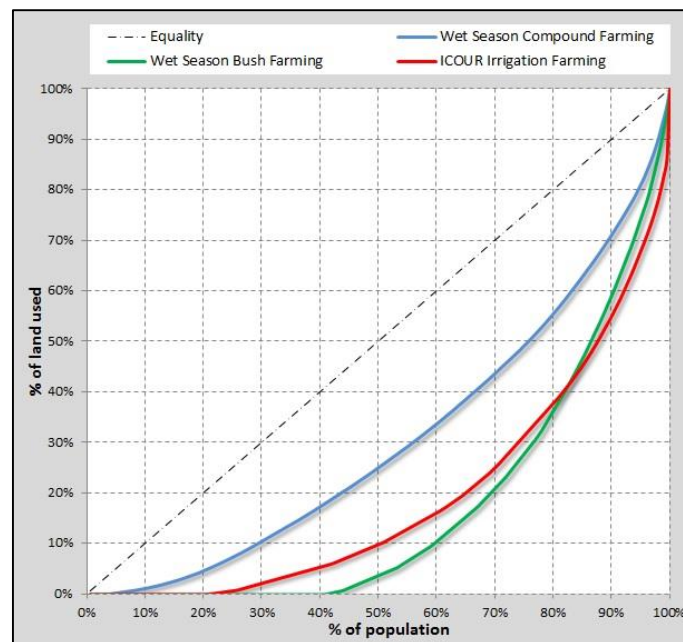


Figure 12: Inequality in land use in Bui (own survey, 2013, n=177).

Inequality seems to be growing: about 40 percent of those interviewed in Bui said that conflicts over land have ‘*severely*’ increased over their lifetime. Further inequalities arise with regard to gender. On average male-headed households in Bui use much more land than female-headed ones, notably about 1.3 acres more (a 3<sup>rd</sup>) on the irrigation project, 1.5 acres more (a 6<sup>th</sup>) on the compound lands and almost 0.8 acres more (almost double) on bush lands. The irrigation project and the land under its command – prime assets – are firmly controlled by men. Women must rely on rainfed bush lands and the gathering of shea:

<sup>14</sup> Own survey, 2013, FGDs and survey among all KNW MOFA officers

*'There are more male than female farmers in general and especially under the irrigation project, because the land belongs to the men and they will give only little to their women. The men will rather let them do other crops at the house, if they give them some [land] at all.'*<sup>15</sup>

Correspondingly, women in Mirigu attest to a severe allocation bias in plot sizes by gender. When considering inequality within each gender group in terms of land use, inequality is generally less severe among women than among men. Women are more equally poor. In Bui, differences in land usage correlate with settlement location. Those in the centre of the village have about a quarter more lands around their homes and 144 percent more land at the irrigation project, as compared to those residing at the borders of the village. Those on the outskirts depend more on bush lands, of which they use about 25% more. Socio-economic differentiation is high and marginalisation processes in the allocation of land worsen the plight of the most vulnerable, especially women. The returns of agricultural developments are allocated on an unequal basis and continue to increase socio-economic differences especially because the safest (and most productive) areas – irrigated/irrigable areas – are seemingly highly exclusive places to do farming and locals are unable to intensify their usage of small (unirrigated) plots.

Despite these issues there is a clear trend towards more input intensive and better paid crops that can serve as both staple and cash crops, and towards the abandonment of crops that can only serve as staples with their comparatively smaller input requirements. Men tend to grow more expensive, cash crops. Consequently this may lead to a further (gendered) divide of the prosperity gap, because not everybody can afford the production of cash crops. Increased differences in attained outcomes are also likely to result from the fact that major changes in natural capital endowment are evident, which seemingly cannot easily be compensated by poor farmers. First and foremost, fertility of the soil is declining severely, while most people are not able to buy fertilisers. Crop failures due to hazards like floods and torrential rains have also generally increased. Thus a majority of locals, unable to purchase fertiliser and with too few animals to provide sufficient manure, and especially those farming marginal land, are likely to experience problems. The natural resource base upon which land usage is based is eroding, mostly for the poor (see Figure 13).

The usage of compound and bush land is increasingly becoming difficult, mainly due to insufficient numbers of livestock, hence manure. An average household in Bui will own little more than two cattle, less than one donkey, almost eight goats and sheep, about 20 chickens and guinea fowls, and also some pigs to generate manure and thereby fertilise plots. Female-headed households own fewer, on average just 1.4 cattle on average and about six goats and sheep, and 13 chickens and guinea fowls. Yet averages may be misleading. In fact, a little less than 50 percent of

---

<sup>15</sup> Interview with a female MOFA extension officer responsible for Bui, 03.02.2013, Navrongo, Ghana.

all households do not own a single cattle or donkey. 10 percent of Bui's inhabitants possess over 55 percent of all large livestock. Similarly though less distinct, 50 percent of all households own just 12 percent of all goats and sheep. Even poultry allocation among households shows severe inequality, whereby half of all households own about 18 to 19 percent of all fowl in Bui (own figure, 2014, n=177). Furthermore, animal holdings are declining (see Figure 14). Correspondingly, farmers in Mirigu claim that animals are now exclusive assets to possess, especially for women. Locals are unanimously convinced of the fact that most animals have been lost to disease outbreaks, because since 1998 public vaccinations stopped as a result of structural adjustments. Farmers no longer have sufficient workforce at hand to collect manure, because their children attend school and thus cannot look after animals nor help gather manure.<sup>16</sup> As a result, animals are allowed to roam freely during the dry season, which is why their manure is hard to gather as compared to former times when they were kept in kraals. Also, children's school fees are costly, which led many households to sell their animals in order to come up with the required expenses. Farmers are forced to work with inorganic fertilisers that they find hard to acquire.

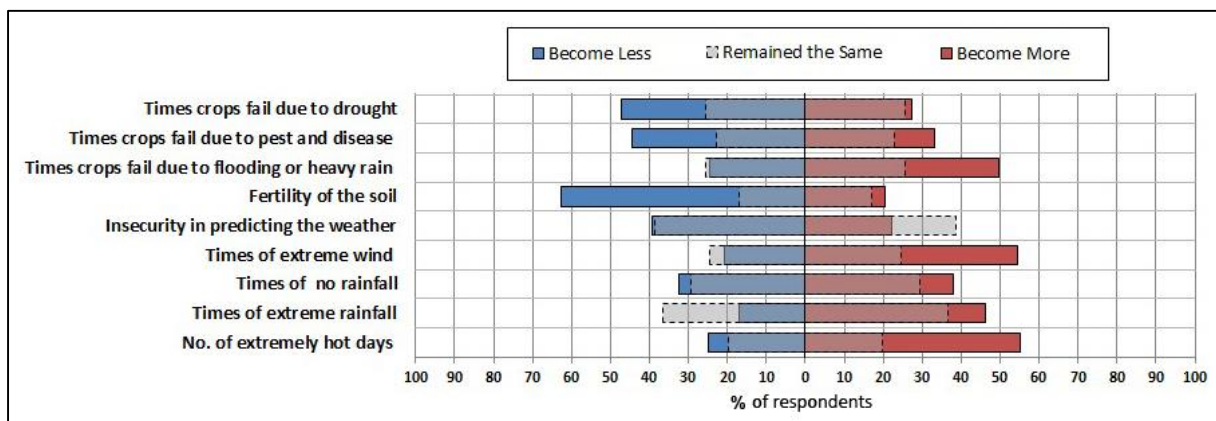


Figure 13: Major trends in natural capital endowment as perceived by household heads in Bui (own figure, 2014, own survey, 2013, n=177).

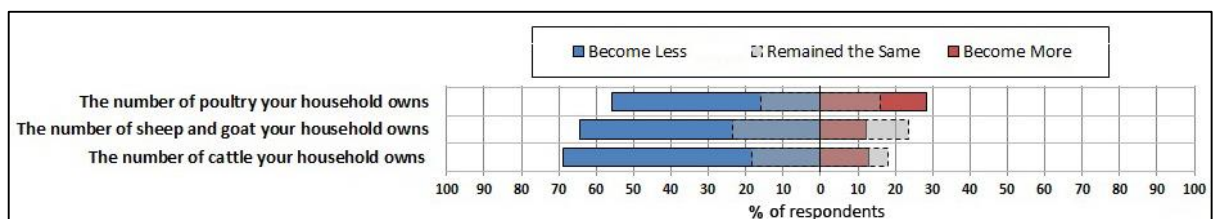


Figure 14: Trends in animal holdings as perceived by household heads in Bui (own figure, 2014, n=177).

Overall most households perceive their livelihood activities within agrarian cycles as based on luck, independent of their own efforts. An overwhelming majority of Bui, 76 percent, is 'fully' convinced of the fact that 'farming is like playing the lottery', in the sense that outcomes are not

<sup>16</sup> Participant of FGD, 11.12.2012, Bui, Ghana.

only highly variable, with a good chance of losing, but that its outcomes are beyond their control. Only 5 percent of locals would disagree with the above statement, while another 19 percent agree 'partly'. As farmers explained, such attitudes are an elementary part of self-perception, since locals value a highly variable natural environment.<sup>17</sup> In Mirigu, perceptions in this regard were even more pronounced, due to the danger of drought caused by a lack of irrigation. The next section, 5.2, examines the environmental assets of locals, because all produced livelihood outcomes are said to be natural capital/resource based. Then, section 5.3 will examine the man-made assets required in the valorisation of natural capital, followed by section 5.4 that derives insights on overall outcomes.

## **5.2. Environmental Assets**

Local environmental assets are perceived as a great source of vulnerability, as people's livelihood strategies, livelihood outcomes are directly dependent on them. People regularly associate this vulnerability to an overall degradation of their natural resource base, related to environmental changes. In this section natural capital is further examined for Bui and Mirigu. The section is divided into four parts, with the first two providing an overview of soil endowments, related sustainable land use, and the livelihood impacts of changes to soil. The third and fourth parts examine climatic properties and changes, again in the context of sustainable land use and livelihood impacts. The section allows further conclusions to be drawn regarding the agricultural pathways – land-based strategies – pursued by locals in terms of basic, strategic orientation, and the limitations imposed upon farmer livelihoods in making use of their natural environment.

### **5.2.1. Soil Properties, Changes and Sustainable Land Use**

Soils in the tropics exhibit very distinct features (NORTCLIFF 2010: 14). Problems arising in tropical agricultural systems differ from those experienced in temperate areas, and will generally be more pronounced when not adequately dealt with (HÜLSEBUSCH 2007: I). The soil potential in sub-Saharan, savannah environments is generally limited, since it is relatively infertile, hard to manage and depletes more easily than in other regions of the world. As a result, farming 'can only be sustainable, if the primary rules of this natural system are respected'. (KILCHER 2007: 35). Monocropping and industrialised/western-style agriculture severely harms fertility and the ecological balance of sub-Saharan soils (Ibid.). Specifically, the soils of the Upper East Region are already classified as relatively bad for agriculture. As compared to other parts of Ghana, they are more acidic, have less organic matter, and have less nitrogen, phosphorus and calcium available for plant growth (MOFA 2011a: 2). Low soil organic matter, which can be provided by manure, and low availability of plant nutrients are 'major

---

<sup>17</sup> Farmer from Mirigu during FGD, 17.09.2012, Mirigu, Ghana.



bottlenecks to agricultural productivity’ in the region (USAID GHANA 2011: 5). Farmers are thus comparatively disadvantaged at the international and nationwide level. Recent data obtained from the Ghanaian Council of Scientific and Industrial Research suggests that soil properties in the areas surrounding Navrongo, thus Bui and Mirigu, are also poor by regional standards<sup>18</sup> and greatly affected by human impact (MOFA 2011b: 22).

Pastures and forests have been largely deforested and fallowing practices have almost vanished, while population grew tremendously over the last century. As a result, fertility and the organic matter content of soils has continued to decrease (LAUBE 2007: 7, 46, 48; LAUBE et al. 2008: 4, 5, 8). Soil losses through erosion have further reduced top soil depth, and thereby nutrient stocks and water holding capacity, which affects crop productivity (AMEGASHIE et al. 2012: 78). Land clearing, total crop harvesting, burning of organic material for land preparation, and insufficient manure application further aggravate the problem. All of these practices adversely affect the physical and chemical properties of soils, and thus lead to declines in crop yields (ANIAH et al. 2013: 28). Therefore, soil fertility, specifically its organic matter content, ‘is one of the main constraints that limits agricultural food production by smallholder farmers in northern Ghana’ (BECX et al. 2012: 495), and may have ‘serious implications on the livelihoods of the people as the land is the major resource from which they eke their living’ (YIRAN et al. 2012: 204). If these trends are not altered, farmers may find themselves ‘in a trap of declining crop yields’ (DALTON et al. 2014: 65). Furthermore, with a low level of organic material in soils, good production and yields are difficult to obtain. Infertile soils with a low content of natural antibiotics, further amplified by the overuse of pesticides or underuse of organic material, tend to an increased occurrence of pests and parasites that take advantage of the resulting plant weakness. Given the population dynamics of pests, already heavily amplified by prevailing climatic conditions (KILCHER 2007: 35), chili or tomato production is greatly endangered. Most traditional crops, like millet, sorghum, groundnut and shea, are less threatened (BOFFA et al. 1996: 120; BRINK & BELAY 2006: 25; MOFA 2011b: 42-43). A general lack of organic material also lowers the quality of crops (FINCK 1982: 171), and specifically chili or tomato (DA SILVA et al. 2008: 8; DAGNOKO et al. 2013: 1111; WILLIAMS et al. 1995: 248).

There are significant deviations in soil quality at the local level, partly as a result of soil endowments and crops grown. Deviations in soil endowment are basically a result of topography. Higher lying upland soils are rather light textured, sandy and therefore well drained (LAUBE 2007: 199). Lowland soils, often flood plains, are heavy and inhibit drainage, but are generally more fertile. In total, three major soil types are most relevant to farmers in Bui and Mirigu<sup>19</sup>. Each

---

<sup>18</sup> As based on data obtained from CSIR, 2013.

<sup>19</sup> As based on digital maps obtained from CERSGIS, University of Accra, 2010.

is used at different times of the year for varying products. Rainfed, wet season/compound and bush farming in both Biu and Mirigu takes place on relatively fragile, poor soils, called Gleyic Lixisols, typical of Savannah zones (see also ADU 1969). In Biu, these soils are also used for dry-season farming in the command area of the irrigation project. Secondly, small spots of Lithic Leptosols soils are found in Biu, also used for wet season farming, though hard to handle. The third type of soil, Eutric Fluvisols, is far more fertile and resilient. This soil is used for dry season chili or tomato production and occasionally for rainfed rice production in Mirigu, as well as for all year rice production under the irrigation project and for some chili or tomato further south.

The first soil type, Gleyic Lixisols, creates major problems for extended cultivation as it is difficult to maintain favourable soil physical conditions. ‘Significant changes in soil chemical and biological properties occur following forest or bush fallow clearing and cropping. Soil organic matter declines sharply during the first few years under cropping and the effect is more pronounced with intensive continuous cropping. [...]. The arbitrary application of exotic, high-input food crop production technologies on these fragile soils therefore often leads to rapid chemical, physical, and biological degradation’ (KANG & TRIPATHI 1992: Chapter 1.7.1). Thus, soil conserving procedures have to be followed, such as the use of terraces, ploughing of contours, mulching and the growing of soil covering plants. Agricultural production on these soils may require the use of fertilisers, especially the use of N and P fertilisers, although the nutrients derived from fertilisers are quickly washed out again. Low pH-levels may have to be adjusted by liming or the application of organic material, e.g. manure. Burning of the vegetation cover is to be avoided as this reduces the amount of organic matter. For the same reason perennial plants are recommended over annual ones. The use of heavy machinery can further endanger the soil structure and lead to quick deterioration. Minimum or zero tillage is recommended as well as agroforestry, and crop rotation. Preservation of the surface soil and organic material is of highest importance (MDEMU 2008: 10; TAKESHIMA et al. 2013: 5; ZECH & HINTERMAIER-ERHARD 2002: 72).

The next most frequently found soil, Lithic Leptosols, is also severely vulnerable to erosion. Slopes can be cultivated with several crops, mainly by terracing with the removal of stones. Agroforestry or a combination of arable crops and trees under strict control holds further promise. These soils are generally problematic in handling, since ‘excessive internal drainage and the shallowness of many Leptosols, can cause drought even in a humid environment’ (IUSS WORKING GROUP WRB 2007: 82-83) and further lack organic material (MARTIN & SAUERBORN 2006: 121). Management is easier with the third type of soil, Eutric Fluvisols. These soils are of good natural fertility and are attractive dwelling-sites on river levees. Microbial activity is stimulated for just a week each year, which is enough to help mineralisation of organic matter and thereby allow a regeneration of soil quality (IUSS WORKING GROUP WRB 2007:

79). This soil is rather easy to handle, but like most other soils, it depends on additional manuring. Manuring is the key to soil fertility and the sustainable use of the natural resource base.

Soil management further depends on the crops grown and their compatibility with natural capital endowments. With regards to the features of the most common wet season crops that are grown on uplands, thus on Gleyic Lixisols and Lithic Leptosols, traditional land use is mostly well adapted to soil conditions because it preserves surface soil and organic material. Some of the crops grown on these lands can help to uphold and improve soil properties, however, groundnuts are less recommendable because they support soil erosion (MDEMU 2008: 10; TAKESHIMA et al. 2013: 5; ZECH & HINTERMAIER-ERHARD 2002: 72). A traditional product like pearl millet for example, is very tolerant of various soil conditions, can grow well in light and acidic soils, and is suitable for soils that suffer from salinity or a low nutrient status. Such millet cultivars also provide excellent protection from soil erosion and even fix plant nutrients such as nitrogen within soils (BRINK & BELAY 2006: 63 and 130-131). Further popular crops that allow for nitrogen-fixation are again traditional staples, groundnuts and beans. All of them are also relatively tolerant to the prevailing soil conditions. (Ibid.: 148, 225, 215, 124). The least challenging traditional staple crop, in terms of soil suitability, is probably sorghum. It grows almost equally well on heavy or light, loamy or sandy soils, as it is generally adapted to poor soils and grows well in areas 'where many other crops would fail' (Ibid.: 171). Equally suited are most forms of agroforestry, specifically shea gathering. The shea tree is native to the region and thereby fully adapted to soil conditions (BYAKAGABA et al. 2011: 16). It also tolerates stony sites and lateritic subsoil (BOFFA et al. 1996: 111; ORWA et al. 2009: 2). Shea plays 'a significant role in soil and water conservation and environmental protection because the trees are able to limit erosion of soils severely (ORWA et al. 2009: 4). Nevertheless the shea tree is vulnerable to extinction, due to timber, firewood and agricultural production (BYAKAGABA et al. 2011: 15).

The impact of exotic crops like maize and rice upon soil is more difficult to manage. Maize requires great supplies of organic matter and nutrients, yet unlike most traditional wet season crops, it heavily drains soil nutrients. Moreover, it causes severe erosion and water losses. Thus upland soils, when used to produce maize, need adequate conservation measures (BRINK & BELAY 2006: 233). Consequently, a trend towards more maize production may lead to a higher environmental impact in terms of soil nutrients and degradation through erosion.

Similarly, rice production is only partly suitable to the soils of the area, especially when grown on uplands but less so when grown on lowlands. Though fairly resistant to a wide range of soil conditions, cultivation of rice is still sensitive to these (MABE et al. 2012: 9). Rice cultivation is most suited (and typical) to alluvial, lowland soils (IUSS WORKING GROUP WRB 2007: 79), because sandy upland soils are less productive than finer-textured lowland soils (BRINK & BELAY 2006: 116). Also, sandy uplands are difficult to puddle, leading to greater infiltration of

water than could otherwise support plant growth, and making their potential for rice cultivation low to moderate. Such soils also contain high levels of free iron, which can cause iron toxicity and thereby lower yields drastically (MOHAPATRA 2014: 30; TAKESHIMA et al. 2013: 5). Only traditional varieties are tolerant to iron toxicity and general soil infertility (LINARES 2002: 16361) and these generally do better on a wider set of soils (BRINK & BELAY 2006: 108). Soil conditions for rice are generally best in wet lowlands (MOORMANN & BREEMEN 1978: 30-31, 33, 110, 113-114; REHM & ESPIG 1976: 22).

Even more constraints are faced in the production of chili or tomato. Upland soils used for their production are mostly suitable only with regards to soil structure. Both tomato and chili prefer a medium textured soil with good drainage and no backwater (BOSLAND & VOTAVA 2012: 100; DA SILVA et al. 2008: 8; MOFA 2010: 1; ZOSCHKE 2008: 39). In lowlands soils are far more compact, and so unsuitable for chili or tomato production during the wet season. This is less of a problem in places like Mirigu where chili or tomato production on such soils is practised for just half of the year, and a reduced drainage may actually be desired since it decreases watering requirements. More problematic for chili or tomato production in the area is the pH of the soil, as well as the organic material content and nutrients (BOSLAND & VOTAVA 2012: 100; DA SILVA et al. 2008: 8; ZOSCHKE 2008: 108). Only the lowland areas used during the dry season are suitable in these regards. Here 'flooding stops acidification and tends to increase pH values' (MOORMANN & BREEMEN 1978: 136), while soils are generally more fertile. On upland soils, however, significant problems arise with regards to organic material, which is very much required for both chilies and tomatoes. Both crops thus require application of manure (DA SILVA et al. 2008: 8; ZOSCHKE 2008: 116). Tomatoes and especially chilies are quite demanding on soils, since they use up a lot of nutrients (ZOSCHKE 2008: 116, 132) which are seemingly hardly ever replaced.

Overall in terms of soils and their usage, it is clear that most traditional staples are well adapted to local conditions and can partly even improve them, while exotic crops and especially chili or tomato are relatively unsustainable in agro-ecological terms and require vast inputs. The environmental stresses encountered in tomato and chili production are significant which is why pests and diseases are generally widespread (ASANTE et al. 2013: 98). Traditional crops are at least fairly resistant because environmental conditions are more suited to their demands, which reduces the level of constraints encountered and allows the production of quality crops (BRINK & BELAY 2006: 63 and 131; CHANDRASHEKAR & SATYANARAYANA 2006: 299; DAGNOKO et al. 2013: 1111). In all regards, exotic crops and especially tomato and chili are far more endangered from suffering under environmental conditions than many traditional staples (MOFA 2011b: 31-39).

The application of manure appears key to a more sustainable farming. It increases yields and thereby improves food security. It augments soil organic matter content, raises pH, improves nutrient exchange and water holding capacity, and permits stable intensified production. When used in combination with inorganic fertiliser, especially nitrogen, it serves to reduce the negative effects of fertiliser, particularly acidification and the increased removal of nutrients other than the one supplied by the fertiliser (WILLIAMS et al. 1995: 248). As indicated previously, the quality of crops, specifically of demanding chili or tomato, could equally be improved. However, these requirements for more sustainable production are often not met and thus severe degradation of soils and accompanying impacts on livelihoods may instead be evident.

### **5.2.2. Livelihood Impacts of Soil Changes**

Farmers in Mirigu and Biu characterize their soils, with reference to Gleyic Lixisols and Lithic Leptosols, as having become infertile and 'dead'. These soils are used for wet season production and for areas under irrigation. As previously mentioned, infertility of land is characterised as a 'severe' to 'extreme' problem by more than 75 percent of Biu's households. Since farmers measure the condition of soils in terms of yield, they primarily attest a decrease in fertility and thereby food security and subsequently income. There is reason to believe that agriculture has a generally high impact on soil condition.

Overall, depletion of rainfed soils is said to be greater in Mirigu than Biu, because the rainfed compound and bush lands are more crowded and locals believe, in a worse state than those of Biu. But, the most severe forms of soils degradation actually take place on Biu's irrigated fields, followed by the areas used for dry season production in Mirigu and then the rainfed areas in Mirigu and Biu. This relates to the crops grown. Exotic crops like most chili or tomato are highly affected by soil depletion, while most staples and generally grains, especially traditional crops, are said to suffer less. In Mirigu soil regenerate through annual flooding, while, according to farmers and the regional Environmental Protection Agency (EPAG), soil depletion is continuous and thereby more intense at Biu's irrigation scheme.<sup>20</sup> Biu's uplands mostly consist of overused fragile Gleyic Lixisols. Farmers and government officials like MOFA and ICOUR representatives claim that these soils, as a result of locals' land use, have acidified and thereby depleted to the point where they no longer produce sufficient quality tomato and chili.

As a result of losses in soil fertility, especially due to a lack of organic material, soil born disease is said to be increasingly widespread, especially in chili or tomato production. The spatial concentration of chili or tomato production at the irrigation scheme, and general infertility of the soil allows disease to spread easily and destroy major parts of the harvest. Occasionally up to half of the yield is said to be lost. As chili or tomato are important cash crops, degradation of soils is

---

<sup>20</sup> Interview with the regional EPAG director, 23.02.2011, Bolgatanga, Ghana.

thus an environmental and livelihood problem, as it effectively lowers attainable food security, and thereby income and livelihood opportunities. Plant diseases affect tomato, chili, rice and shea production (see Figure 15).

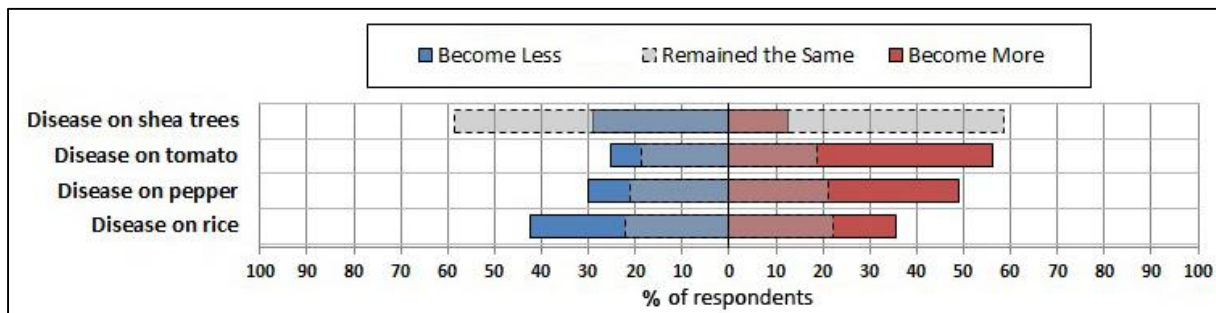


Figure 15: Trends in crop diseases as perceived by household heads in Biu (own figure, 2014, own survey, 2013, n=177).

As a result of soil degradation, farmers in Biu and some in Mirigu point out that they have to increase their use of inorganic fertilizers each season, which is a problem to already financially distressed farmers. Consequently, the *'poor'* claim to not know how to deal with losses in soil quality. Higher fertiliser usage may further promote a degradation of soils. Yet, farmers in both Biu and Mirigu acknowledge that there are certain pieces of land that still do quite well, especially the lowland soil Eutric Fluvisol. Perceived as quite fertile, these areas are prone to seasonal flooding but regenerate relatively fast, and so the effects of soil degradation are far less prominent for irrigated rice in Biu and dry season chili or tomato production in Mirigu. Farmers attest that these soils quickly regenerate as a result of alluvial deposits, and that soil pathogens are destroyed when submerged in water.

The majority of farmers in both Biu and Mirigu believe that soil fertility has decreased because they have over-used inorganic fertilizers on crops such as chili or tomato and have made use of mechanical non-traditional forms of land preparation, while applying less organic fertiliser to soil. Locals characterised these practices as being the antithesis to their traditional forms of land use, which depended entirely on manual, communal labour and manuring. The farmers were eager to underline that their observations on soil degradation are the result of long-term observation. Contemporary forms of land use are considered to break with religious beliefs and traditional norms and values, eventually leading to a loss of divine affection, thereby to soil degradation, natural disasters or generally reduced outcomes in agricultural production. Farmers most frequently state that inorganic fertiliser applications *'have killed the mother soil'* and that applying manure and preparing land manually instead of using mechanical means, such as tractors for ploughing, can only preserve the natural fertility of the ground. Consequently, they indirectly point to cooperation among people, in other words social capital, as a determinant of the

sustainability of outcomes of agricultural production and thereby people's poverty status. The farmers believe healthy and productive soils are a result of manual, communal labour.

Local extension officers and irrigation project management backed the farmers' views on the worsening effects of more industrialised forms of agriculture. All farmers and experts agreed to the fact that traditional forms of agriculture, now undergoing severe changes, had once been sustainable and that traditional, societal norms and values had helped preserve soil quality. Furthermore, for both Biu and Mirigu, extension officers attest that people are turning to more exploitative forms of land use because traditional practices are fading away. As an expert and local from the area puts it:

*'When we were young, tradition used to have a lot of influence on the sustainability of farming, because it was a taboo to use tractor and to use fertilisers and instead we would all work together and work on the land and spread our manure. They said that the gods would be angry if you do otherwise and use the inorganic fertiliser on the land. But with time things have changed [...], which is very, very difficult for our soils.'*<sup>21</sup>

Agricultural practices are relatively unsustainable at the irrigation scheme in Biu and in parts of Mirigu. The irrigation project's command area is characterised by all-year-usage with no fallow period, due to a growing local population that increases the need for permanent use of the project's lands. Monocultures and over-use of agrochemicals including inorganic fertiliser may have worsened tomato quality and destroyed organisms in soils, contributing to the occurrence of pests and diseases.<sup>22</sup> Because irrigation gives assured returns unlike rainfed production, farmers are willing to apply larger amounts of inorganic fertilisers, which is why soil quality at the irrigation scheme is the worst. The fertiliser used is often the cheapest most acid variety, sulphate of ammonia, because farmers lack money to buy the appropriate ones. These further acidify soils and decrease their quality by affecting soil structures. Farmers also have difficulties in applying the right type of fertilizer at the right stage of plant growth, which worsens product quality, unlike with manure, whereby nutrients are supplied according to plant needs.<sup>23</sup> Unlike at the irrigation scheme, wet season farming is heavily diversified in Biu and Mirigu, and possibly more sustainable because of more frequent manure application.

Production of dry season chili or tomato in Mirigu is more sustainable than in Biu due to the greater variety of crops being produced. In Mirigu manure is applied to dry season crops (as well as wet season), whereas fertility on Biu's irrigated lands is most often generated by chemical

---

<sup>21</sup> Interview with the regional GAWU director, 19.02.2010, Bolgatanga, Ghana.

<sup>22</sup> Interview with the regional EPAG director, 23.02.2011, Bolgatanga, Ghana.

<sup>23</sup> Interviews with ICOUR project manager, monitoring and extension units, the MOFA director Paga and his monitoring officer, MOFA extension Navrongo, 2010, 2012, 2013, UER, Ghana.

nourishments. In Bui, 89 percent of all households apply chemical fertilisers to their irrigated fields every season, as much as they use pesticides and fungicides. Only 15 percent of households also apply manure, either once a year or every two years. Farmers never mulch (84 percent) or apply compost (86 percent). Applying manure is said to be more popular in Mirigu, where farmers' acreage is generally smaller, and where people have greater difficulties in acquiring inorganic farm inputs, due to their poverty status. Moreover, accessibility of government support to acquire inorganic fertilisers is said to be easier in Bui than in Mirigu. Thus a lack of government service may help sustain soil conditions in Mirigu.

Yet, farmers state that inorganic fertilisers, pesticides and weedicides are a prerequisite for the production of new, high-yielding crop varieties, especially chili or tomato during the dry season. Farmers in both Bui and Mirigu frequently emphasise that without manure they cannot uphold or revamp soil quality, as traditionally done. Since farmers have fewer animals than in former times, they cannot turn to these as a buffer in times of need and are thus more dependent on the outcome of wet season production. Further degradation of soils is caused by farmers not changing the plot they are working on or the crops grown. Farmers at the irrigation project in Bui never rotate their crops (98 percent) and never give their fields a fallow period to regenerate (89 percent). The poor, especially on the irrigation project, do not have the possibility to acquire different lands, which is increasingly problematic in the context of population growth:

*'We can never shift to another place to give the land a break! If you would not use that field, when will you then use it again? Another one with money will overtake it! [...] So if you leave your place, where should you then go? Whose place are you going to take? [...] I cannot pay exorbitant prices for another plot! [...] It keeps on getting worse, but there is no option!'<sup>24</sup>*

According to MOFA extension officers responsible for both Mirigu and Bui, soil erosion is a factor leading to a worsening of soil quality in terms of agricultural production, especially when hardpans occur due to unsuitable, mechanical land preparation. Lands are said to be too fragile to be ploughed by machinery, the number one reason for hardpans and a loss of organic top soil and erosion, which must then be compensated by costly inorganic fertilisers or preferably through manuring, to avoid drastic cuts in yields.<sup>25</sup> However, many farmers in Bui and Mirigu use bullock ploughs to cultivate their lands. About 45 percent of households in Bui plough with bullocks, while tractors are used by little more than a third. In Mirigu manual labour is most often practised for land preparation. Whatever the case farmers fail, claim MOFA officers, to plough along contour lines in order to decrease erosion. Furthermore, many farmers, in both Bui and Mirigu, frequently burn crop residues to clear their field for the next season, which further reduces the

---

<sup>24</sup> Participant of FGD, 20.04.2013, Bui, Ghana.

<sup>25</sup> Interview with a MOFA extension officer, 14.02.2013, Paga, Ghana.



share of organic material in soils. They do so partly because there is not enough labour force at hand, since children are in school and because communal labour has become less popular.

Not surprisingly, farmers and government extension officers frequently point out that a major step to improve soils could be made if only farmers were able to apply more organic material, i.e. manure to soils. In Bui, about 98 percent of households claim that the quality of crops could be better if only they could add more manure or other organic material to soils. MOFA extension officers are convinced that manuring could decrease the incidence of soil degradation and disease and therefore limits the amount of farming chemicals that have to be used, which would lead to an overall lower impact on the natural resource base. They underline that manure can hardly be overused, unlike inorganic fertilisers, and though less efficient, could improve the water holding capacity of soils making them less prone to drought. With regard to crops disease, farmers in the FGDs pointed at possible improvements of soils through the application of manure, making them less prone to malady. Thus, overall, the issues faced by local farming households are aggravated by partly unsustainable forms of land use on top of an already poor soil condition and climate endowment, which in combination impose further limitations and risks and thereby limit livelihood outcomes.

Government officials also acknowledge, however, that due to a lack of objective soil tests they are factually oblivious to the real state of soils. Soil management, by testing soil properties, but also liming, the large-scale application of manure or any other programme to deal with soil changes do not take place in Bui or Mirigu. These are simply not possible because of a lack of government funds and personnel. The irrigation project's management currently only begin to deal with the above issues by advising the use of leguminous crops such as soya beans or groundnuts and by recommending farmers to use more manure in order to improve soil quality. Specifically the planting of leguminous crops like groundnuts or soya beans is said to be a viable strategy to improve yields while allowing the production of crops. Furthermore, government officials recommend but cannot force farmers to have fallow periods. The management officers acknowledge that this strategy is unrealistic because irrigated lands are so rare and yet so popular that conflicts among irrigation users have become common. However, the management of both ICOUR and MOFA is well aware of the deteriorating effects of worsening soil quality and has been requesting, for a *'long time'*, the support of other government agencies such as the Soil Research Institute. Due to a lack of government finances, the officers remain unaware of the objective situation of soils at the scheme, as well as for mass outbreaks of plant disease. According to high-ranking officials, unsustainability of government activity may relate to agricultural policies followed at the regional level, often the result of structural adjustments which included withdrawal of government support for agriculture (as much as for livestock), most evidently in Bui:

*'Until about 10 years ago we were bringing in chicken droppings to mix with the soil and improve its quality, especially in the uplands where tomato is grown. But, that system is gone because now we are trying to be a profitable company and the government wants us to encourage the use of inorganic fertiliser, because they see it as modern.'*<sup>26</sup>

Agricultural development, according to one regional MOFA director, is nowadays heavily donor-dominated by institutions such as the World Bank, the IMF or foreign development agencies. Their policies focus almost entirely on westernising and industrialising agriculture, mainly through use of inorganic fertilizers, mechanisation and often unsustainable agricultural products. At the same time there is currently no project in Biu or Mirigu concerned with advancing more eco-friendly forms of agricultural production. Interventions do not consider traditional land use systems that were sustainable in terms of their impact on the natural resource base, and instead go for high-input cash crops that need inorganic fertilisers, worsening soils in the longer term:

*'Our course of action here depends entirely on government policies that are often a result of negotiations with our donors from abroad. So, if government policy is not aiming at sustainability, there is not much we can do about it. Looking at how to produce compost and manure on a large scale and at a lower cost, fostering contour ploughing, representative testing of our soils and helping us with disease outbreaks, at least finding out where they stem from, would make sense, but policies mostly only aim at subsidizing inorganic fertiliser.'*<sup>27</sup>

Local extension and irrigation management officers point out that an acre of land requires about 4 to 5 tonnes of manure per year, which is more than what accrues in the average farming household. Therefore reductions in soil quality alter according to socio-economic standing, for the number of animals owned and thereby the manure owners have at hand is related to the wealth of a household. Financially secure farmers have the ability to pay higher prices for quality land, while those with little financial backing often farm marginal, mostly infertile lands. Soil degradation therefore affects those with reduced financial abilities.

Socio-economic standing also determines farmers' environmental impacts. Commercial cash crop production is said to be based on short-term interests and thus exploitative in terms of its impact on natural resources. Aside from their ability to apply large amounts of fertilisers and agro-chemicals for input-demanding exotic crops, large-scale farmers are highly mobile in terms of the areas they farm. Some intentionally search for virgin lands because these offer greater yields, more assured outcomes and better quality crops, due to the greater fertility of the soil.

---

<sup>26</sup> Interview with the ICOUR Managing Director, 20.04.2010, Navrongo, Ghana.

<sup>27</sup> Interview with the KNE MOFA director, 05.02.2013, Paga, Ghana.

When lands are exhausted and no longer suitable for crop production, the rich are able to move to other areas while the poor are stuck with their plots. Thus richer farmers contribute to the destruction of the environment in a larger way than the poor. Those with financial backing are able to acquire virgin lands, which pays well in the short run, because they can afford land reclamation. Socio-economic differentiation also impacts soil erosion, since those who are financially better off can pay higher prices for contour ploughing. Hired tractor operators tend to work fast, rather than consider environmental impacts, and hardly anybody can afford to insist a tractor operator to consider conserving measures while carrying out his work. Overall, it is the relatively advantaged households in society can afford to produce commercially orientated crops and thus contribute to induced environmental impacts.

The better-resourced groups in society are also better able to cultivate chili or tomato because they can afford the relatively expensive inputs. These better-off farmers are likely to use more inputs inorganic fertiliser, allowing them to reduce use of organic manure. However, because the poor are less likely to be able to afford inorganic fertilisers, they are also more likely to use more manure and thus uphold soil fertility. For the poor, 'digging in green manure crops and collected leaves, composting, etc.' might be back breaking work but the returns are no longer only marginal (BLENCH 1999: 11). Such practices seem increasingly essential to allow farmers to make a decent living, and should not be too quickly dismissed (as done by LAUBE 2007: 49).

### ***5.2.3. Climatic Properties, Changes and Sustainable Land Use***

The climate in Ghana's north is variable throughout the year. During the dry season hot and dry tropical air masses prevail, and following these, tropical, maritime and thus wet air masses lead to heavy rainfall in the wet season. Rains normally start in April or May and end in September or October. As a result of this distinct seasonality, the Navrongo/Biu-Mirigu area is characterised by having the highest climatic extremes with regards to annual rainfall, temperature and variations between seasons in Ghana (MACMILLAN 2007: 16-17; MDEMU 2008: 8). The hottest months are March or April (sometimes 40-45°C), the coolest August (26°C). Mean annual temperatures are around 28-29°C, while the absolute minimum (15-18°C) occur in December. Since 1961, average annual rainfall in Navrongo was only 899 mm p.a. (data obtained from the Ghana Meteorological Service, MDEMU 2008: 8, 10-11). Climate is especially harsh in the area thereby allowing an effective growing period of just 150/160 days (MOFA 2011a: 3). Though highly erratic in spatial and temporal terms (CDKN 2014: 18), most of the annual rains fall between July and September, leading to drought in some areas and floods in others (see Figure 16). Especially as a result of rainfall peaks, flooding occurs regularly. This is most evident in Biu's vast flood plains, at the irrigation project, but also in Mirigu, most often in September and

occasionally in August and October.<sup>28</sup> So, floods are of further significance for crop survival, suitability and thus livelihood outcomes.<sup>29</sup> In fact, publications and government documentation on the matter suggest a causal chain of extreme rainfall events, which lead to more flooding and cause an increased vulnerability of households, specifically for farmers' crops and also their housing structures (ARMAH et al. 2010; NADMO 2009, 2010, 2011, 2012, 2013; TSCHAKERT et al. 2010: 491).

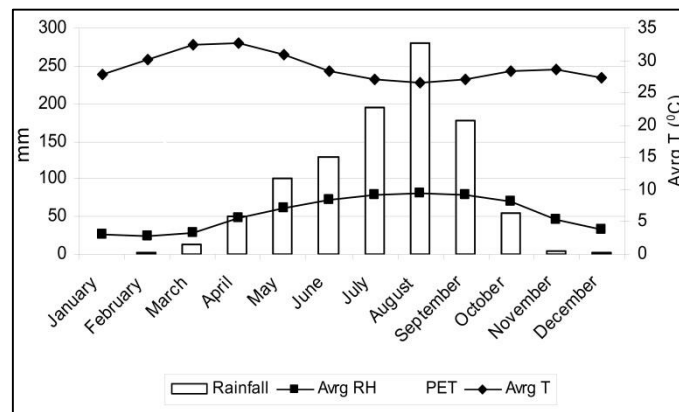


Figure 16: Long-term (1980-2005) average rainfall (mm), relative humidity (RH); potential evapotranspiration (PET) and temperature (T) for Navrongo (MDEMU 2008: 9).

Basic limitations on farmer livelihoods are imposed by general climatic conditions. Crop tolerance to flooding and drought are met only by some of the crops popular in the area. In terms of crop suitability to climatic endowments, millet is the most appropriate crop to grow. Millet cultivars actually have one of the lowest water requirements of all known cereals. Also temperatures of the area are optimal for the plant's growth (BRINK & BELAY 2006: 63, 124, 131). Furthermore, all forms of millets are very much tolerant to drought (WEBSTER & WILSON 1998: 43). Drought-tolerance is actually one of the major reasons for why millet is produced in the area (BRINK & BELAY 2006: 63; KONRAD & SAUERBORN 2013: 280; NGELEZA et al. 2011: 4; WEBSTER & WILSON 1998: 263). Somewhat similar are traditional staples like groundnuts and bambaran beans. Both crops are well adapted to production in the dryer tropics and are equally drought tolerant (BRINK & BELAY 2006: 215; WEBSTER & WILSON 1998: 269). Also very much suited to the climatic pattern is shea (CHALFIN 2004: 47; ORWA et al. 2009: 2) (IPGRI & INIA 2006: 4). The growth of shea is independent of direct rainfall, since rainfall has little effect on yield (BOFFA et al. 1996: 115). However, a good (ground-) water supply, such as that found along seasonal watercourses, is elementary for the trees' survival (BYAKAGABA et al. 2011: 15). Shea tree populations have been subject to increased pressure from drought (BOFFA et al. 1996: 111, 120).

<sup>28</sup> Based on data obtained from ICOUR, 2013.

<sup>29</sup> Participant of FGD, 15.03.2013, Biu, Ghana.

Many of these seemingly suitable, traditional staple crops, like millet cultivars, are being replaced by maize. Maize is suitable in terms of its rainfall, temperature and sunshine duration requirements, yet when temperatures rise too high, a reduction in yields is likely. Maize is far less tolerant to drought than millet (BRINK & BELAY 2006: 233). Despite being able to take 'considerable heat and drought' (WEBSTER & WILSON 1998: 261), maize still reacts more sensitively and is also intolerant to waterlogging/flooding (BRINK & BELAY 2006: 233). Thus, a trend towards growing more maize instead of traditional staples must be considered as a trend towards a more risky form of livelihood upkeep.

This is even more so when looking at other exotic cash crops, such as tomato or chili. For these, requirements are even more difficult to meet. In the case of tomato, temperatures as well as rainfall are problematic through most of the year, though ample sunshine partly favours their production. Optimal temperatures for the germination of seeds and greatest growth efficiency only prevail from June to late January. Throughout the year, temperatures are too high for best results in plant development after germination. From February to May, occasionally even June, temperatures are frequently so high that tomatoes grown during these times acquire an unfavourable yellow-orange colour. Moreover, in late March and early April, fruit abortion may regularly occur due to the same reason (data obtained from the Ghana Metrological Service, 2013, DA SILVA et al. 2008: 6). Excessive flower (blossom) drop reduces yields drastically (MOFA 2010: 1). Additionally, rainfall limits the times suitable for tomato production (BROUWER & HEIBLOEM 1986: Chapter 4). Ample water is available throughout half the year, but since wet leaves promote diseases (DA SILVA et al. 2008: 11), the crop is actually unsuitable for wet seasons. Incidence of pests and diseases and fruit rotting increase with high humidity through rainfall (MANZANO & MIZOGUCHI 2013: 12). Too much water supply alone can cause cracking of the fruits (PEET & WILLITS 1995: 67). As a result tomato production is limited to four months, during the dry season, from November to February.

The climatic demands of chilies are quite similar to those of tomatoes (BOSLAND & VOTAVA 2012: 100). Yet chili is more sensitive to temperature, especially low temperatures. Best temperatures for germination prevail only from June to the end of January (BOSLAND & VOTAVA 2012: 100; ZOSCHKE 2008: 93). Good enough temperatures for pollination and resulting fruits is given all year (ZOSCHKE 2008: 111). It is the same with temperatures for fruit setting (BOSLAND & VOTAVA 2012: 100). Only from March to April temperatures are likely to be too high. However, if temperatures become too high during cultivation, as happens frequently in April and sometimes May, plants may drop their flowers and leaves, and fast rotting spots can occur on fruits. Too much direct sunlight can also easily burn flowers, leaves and fruits (data obtained from the Ghana Metrological Service, 2013, ZOSCHKE 2008: 117, 125 and 131-132). February to May, when most chili is produced, is thus suboptimal for the crops.

Furthermore, as with tomatoes, chilies require constant watering, but too much as well as too little should be avoided. When too dry while flowering and fruiting, abnormal aborting of flowers and fruits can occur within a single day. However, when kept too wet, roots can easily rot (ZOSCHKE 2008: 39 and 115). Uncontrolled watering, however, does not have as grave effects on fruits as with tomatoes, as chili actually requires a little more rainfall than tomato (MIDA 2012: 3). Thus, cultivating chilies during the dry season, when temperatures are often too high for optimal results, is not recommended. Waterlogging even for short periods, such as occurs during the wet season, can cause leaf shedding and thereby destroy production entirely (FAO 2014). Moreover, many pests and disease found on tomatoes, which occur during the wet season, are equally a threat to chilies (ZOSCHKE 2008: 129).

Controlled irrigation is always essential for chili or tomato. Drought and moisture stress is generally 'one of the most significant environmental stresses causing huge loss' and vegetables are by far 'more sensitive to drought as compared to many other crops' (KUMAR et al. 2012: 1). However, chilies have the ability to adapt and produce quality crops in a wider range of environments (BOSLAND & VOTAVA 2012: 99), and are thus less seasonally and environmentally confined than tomatoes. Chilies are more robust than tomatoes with regards to pest and disease (DAGNOKO et al. 2013: 1110) and less impacted by drought, since the critical periods for water supply are shorter than with tomatoes. Moreover, the most popular genotype of chili being planted ('*Capsicum Chinense*') is said to be partly drought tolerant (KUMAR et al. 2012: 5 and 7).

Rice differs (MABE et al. 2012: 9). With regards to temperatures, rice demands are most often met in the area (VERGARA 1992: 15, 23). Only from December to February, during the dry season on irrigated plots, can low temperatures at night be a 'big constraint to rice production' (MOHAPATRA 2014: 30), especially when sensitive growth periods fall in the first months of the year when it is relatively cold. Rice production is defined by the availability of water and its retention, which is a greater factor for yields than temperatures. The advantages of growing rice in an aquatic milieu, compared to pluvial milieus, are several. Firstly, most rice varieties are hardly drought tolerant and so, cannot be grown during the dry season outside of irrigation project command areas, because water demand is too great. Secondly, successful land preparation is far easier with a constant water supply. Thirdly, weed control is improved through flooding, because it destroys unwanted plants (MOORMANN & BREEMEN 1978: 30-33). Constantly irrigated lowland rice thus has the greatest yields and can be done all year round, followed by rainfed cultivation on banded fields, and lastly upland/dryland rice on unbanded fields. The latter two are only possible in the wet season (BRINK & BELAY 2006: 115; CHANDLER 1979: 18-20; ICOUR 2013: 13; MOFA 2011a: 11; data obtained from the MOFA, 2013, MOFA RADU

BOLGATANGA 2013: 1; MOORMANN & BREEMEN 1978: 32-33; REHM & ESPIG 1976: 21; WEBSTER & WILSON 1998: 260).

Drought is still the number one problem for rice cultivation outside of (low lying) irrigation projects, under rainfed (wet season) conditions. The rice crop depends mostly on water in the upper part of the soil, which loses its moisture through evaporation. More than 20 consecutive days of drought usually damages the crop severely. Generally, rice is one of the least drought-resistant food crops, though that varies heavily according to variety, as does yield (MOORMANN & BREEMEN 1978: 30 and 32-33). Only traditional varieties of rice are known for their climatic hardiness, yet newer ones have greater yields (LINARES 2002: 16365). For example, newer varieties like 'Jasmine 85', which about 95 percent of farmers at the irrigation project now produce, are not at all drought tolerant but quite high yielding when grown under irrigation (RAGASA et al. 2013: 26; TAKESHIMA et al. 2013: 3, 7). Traditional varieties under rainfed conditions are better at tolerating water fluctuations, even drought (LINARES 2002: 16361), so farmers preferably grow these outside of irrigation project command areas. Flooding from too much rain is not a problem for rice as it's a semiaquatic plant and thereby partly adapted to flooding. Some varieties can easily withstand submergence for more than a week (MOORMANN & BREEMEN 1978: 155), especially older varieties (BRINK & BELAY 2006: 107). Only 'rapidly rising floodwater is a hazard to rice cultivation, whenever it occurs' (MOORMANN & BREEMEN 1978: 156).

Thus most traditional crops, in all regards, are well suited to contemporary climatic conditions and regular calamities specifically frequent droughts and floods. The producers of rice and maize, by contrast, are at greater risk of suffering from losses. Most endangered is chili or tomato production, since it most likely takes place under unfavourable climatic conditions that cause yield and quality declines. The chances of encountering unfavourable climatic conditions may increase with a change in climate.

Generally, the region is characterised by highly alternating annual amounts of rainfall on top of seasonal variation and thereby incidents of floods and droughts. Over the past 200 years, there have been distinct phases in West Africa's rainfall patterns. Below normal rainfall occurred from 1820 to 1840, above average from 1870 to 1895, followed by below average from 1895 to 1920. Since then, for the past 100 years, patterns have become more variable. Until the end of the 1940s, two or three years of below-average rainfall were normally followed by several years of average or higher precipitation. Since the 1950s the length of the periods within which long and continuous deviation from the average amounts occur have prolonged to between 5 and 10 years. Ample rainfall was received in the 1950s, and strong drought was experienced during the 1970s and 1980s (STRAHLER & STRAHLER 2002: 610-612). After that followed a period of relatively increased precipitation, leading some to promote the idea of a 'Greening of the Sahel' in

the 1990s and early 2000s, in contrast to the foregoing assumption of continuous desertification (TSCHAKERT et al. 2010: 476). Thus over a large time scale the duration and character of phases of either rainfall or drought have become more pronounced.

Downpours have become more erratic in spatial and temporal terms, and there is also evidence that the start of the rainy season has shifted to the later part of the year and will continue to shift (CDKN 2014: 18). Local studies reveal shifts, since the early 1960s, from April to May, and an increased occurrence of dry spells during the rainy season. Rainy seasons and thereby growing periods may be shortening (ANTWI-AGYEI et al. 2012: 326; LAUBE et al. 2011: 759). In the future a further shift in the onset of the rainy season may take place, from the 140<sup>th</sup> day of the year in 2000, to the 171<sup>st</sup> day in the year 2040 (LAUX et al. 2008: 130). Average temperatures in West Africa are likely to rise by 3°C to 6°C until the end of the 21<sup>st</sup> century (CDKN 2014: 18). Some studies further underline the increased risk of more pronounced, extreme climatic events, like droughts and destructive floods (BOKO et al. 2007; TSCHAKERT et al. 2010). As incidents of flooding are on the rise, they are often understood as a sign of climate change (ARMAH et al. 2010; TSCHAKERT et al. 2010: 491).

Changes in climate endanger crops primarily due to their agro-ecological compatibility to general, static climatic patterns, as characterised before, and the abiotic and biotic stresses thereby encountered by them. Stresses generally increase as higher temperatures and more unreliable rainfall may 'lead to a larger diversity of pests and diseases' (FETENE et al. 2011: 4) and can further 'exacerbate the spread of crop diseases and [negatively] alter the pest-plant relationship' (MOHAPATRA 2013: 40). Due to their adaptability to droughts, the yield of traditional staples like millet is least affected by climate-induced fluctuations (USAID GHANA 2011: 153). Shea is better equipped, not only because it yields independently of direct rainfall but also because higher minimum temperatures coupled with early flower onset can contribute to higher yields (BOFFA et al. 1996: 115). Crops like rice 'lie at the other extreme exhibiting much wider variation in productivity year to year' (USAID GHANA 2011: 153). Rice yields are affected adversely by increasingly unfavourable changes in climatic factors, which is why 'farmers need to adapt effectively to climate change' (MABE et al. 2012: 9). Similarly, attaining sufficient yield and quality in chili or tomato production also becomes difficult, because temperatures are already often too high.

The impacts of climatic change and associated hazards on crops and thereby farmer livelihoods remains vague, since 'specifically for Ghana, [...] little agreement exists on future precipitation amounts or seasonality; some GCMs [Global Circulation Models] project increased precipitation in the northern three regions and others project decreases' (USAID GHANA 2011: 2). Consequently, authors are less convinced of changes in the occurrences of extreme events such as heavy rainfall. It is also unclear if the recovery of rainfalls, that had initially decreased over the



20<sup>th</sup> century, may be due to natural climate variability or anthropogenic climate change (CDKN 2014: 11, 18). However, it is certain that the area is likely to suffer from rises in temperature and droughts (CDKN 2014: 18; USAID GHANA 2011: 2). More droughts would come with greater risk, and the Upper East Region is most sensitive in this regard. Subsistence farmers in the region are heavily dependent on their rain-fed agriculture and crops require sufficient rainfall for growth (ANTWI-AGYEI et al. 2012: 329, 333). Coupled with the already poor state of soils, decreases in rainfall may well worsen food insecurity in the region (ANTWI-AGYEI et al. 2012: 329 and 333).

### **Local Climatic Change**

Both locals and scholars believe that changes to rainfall seasonality, as indicators of climatic change, began in the 1950s and 1960s. However, elderly people emphasise that there has always been great variation. An assessment to allow a comparison of subjective impressions and objective facts is difficult, because climatic data has only been collected since 1961, whilst there are not many people still alive to report on previous times. Thus a detailed understanding of the changes in local climatic seasonality is limited by a lack of attainable data. Data on longer timeframes can be derived indirectly, for example, from the documentation of the sowing times of millet and of incidents of severe flooding and drought, as captured in local missionary's diaries. Missionaries were highly observant in noting down when their followers did not attend church! This happened when they were busy preparing their lands and sowing their crops, namely millet, after the first rains had set in. Missionaries frequently noted, in their official diaries, the occurrences of famines and food shortages among other socio-economic phenomena. Their records therefore help to gain an impression of overall trends in climatic changes.

Observations of local rainfall patterns over the 20th century – through an analysis of the local church diary (covering 1905 to 1950) in combination with farmer FGDs (covering 1951 to 2013) – make evident that phases of higher occurrence of floods, and possibly higher precipitation, have generally staggered with periods of drought in the Biu-Mirigu area. In more recent times, according to experts/MOFA officials and farmer FGDs, flooding is said to have become more frequent. An overall trend towards more flooding seems evident, accompanied by a decreased occurrence of famines and food shortages (see Figure 17).

The occurrence of floods, relative to droughts, may have increased, especially since the later part of the 1980s. Equally, according to meteorological data collected since the 1960s, below average rainfall occurred often in the late 1970s and early 1980s, and partly in the early 1990s, which turned to above average precipitation around the year 2000. When looking at trends in total and average amounts of rainfall, variations are occasionally quite heavy. Yet overall, according to five-year-trends in total amounts, rainfalls these have neither decreased nor increased significantly, at least from 1961 until 2007 in Navrongo.

Farmers and ICOUR and MOFA officials estimate that the overall amounts of rainfall have not changed much. In Biu though, an almost equally large number of people say that the absolute amount of rainfall has either become less, has remained the same, or has increased. This inconsistency in perspectives on trends reflects the patterns found in meteorological data. Annual variation may be great, but minor fluctuations visible in longer-term rainfall patterns contradicts the trend towards more precipitation as concluded by looking at patterns of flood and drought (see Figure 18 below and compare to previous Figure 17). Similarly, locals are somewhat divided over perceived changes in climatic patterns. 46 percent of Biu’s households believe that episodes of torrential rainfall have increased over their lifetime, while another 55 percent believe that the number of extremely hot days per year has increased. Analysis of available temperature data (1967-2004) did not reveal any significant trends over.<sup>30</sup> Perceptions contradict one another, and are perhaps more a matter of farmers’ interpretations than fact.

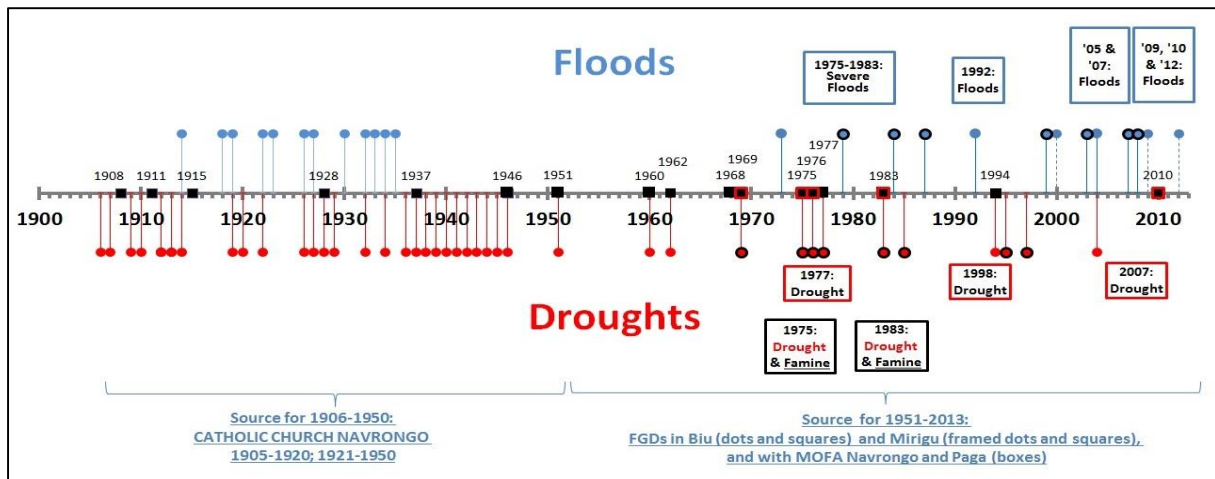


Figure 17: Timeline of floods, droughts and famines/food shortages (black boxes, with year) in the Biu-Navrongo-Mirigu area (own figure, 2014, own survey, 2012/'13, sources as mentioned).

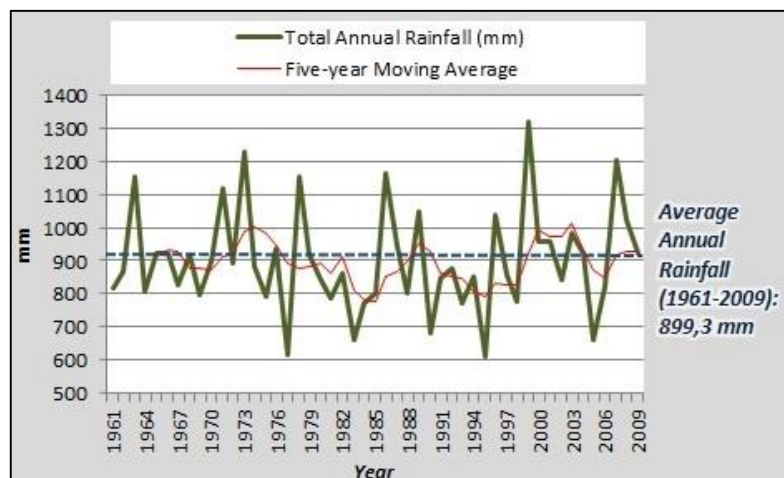


Figure 18: Annual (green) and 5-year moving average rainfall (red) in Navrongo from 1961 to 2009 (own figure, 2014, based on data obtained from Ghana Metrological Service, 2013).

<sup>30</sup> As based on data obtained from the Ghana Metrological Service, 2013.

Another indicator of climate change is the delay in the timing of seasonal rain onset. By analysis of rainfall patterns, LAUX et al studied the timing of the onset of the rainy season in the region. They define the start of the wet season as a minimum of 25 mm of rainfall within five days, coinciding with a minimum of 0.1 mm of rainfall on the starting day and at least another two days within the five-day period, and coinciding with no dry period longer than a week within the following 30 days. They used a fuzzy logic approach to enable modelling, as their criteria did not return sufficient onset dates (LAUX et al. 2008: 331-332).

When applying their criteria at the local level, using data from Navrongo meteorological station – the closest to Biu and Mirigu – no clear trend in the seasonality of rain patterns for the timeframe 1961 to 2007 is visible. More data is required. The only one conclusion that can be made is that the onset of the rainy season has shifted towards the beginning of the year, not towards the end. The data from Navrongo suggests a delay in seasonality occurred during the late 1970s and early 1980s, but since then rains have started to set in early. Local level realities, therefore, may greatly contradict regional and nationwide assessments on climate change. This may point at severe changes in seasonality, and it also gives reason to believe in the uncertainty of contemporary GCMs (see Figure 19).

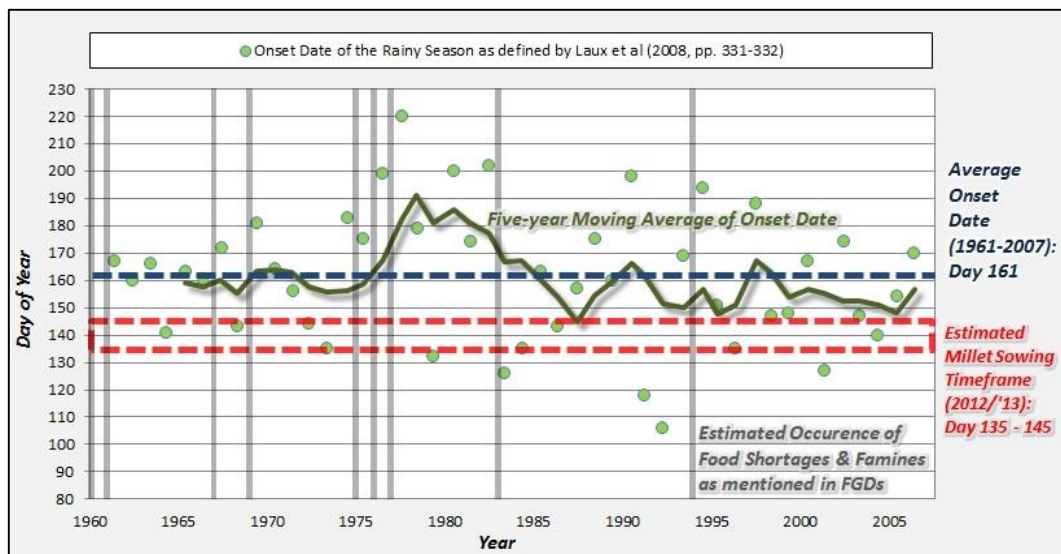


Figure 19: Onset of wet-seasons in the Navrongo area, sowing time of millet and incidents of food shortages (own figure, 2014, based on FGDs and as calculated based on data obtained from the Ghana Metrological Service, 2013, and criteria used as defined by LAUX et al. 2008: 331-332)

In contrast to scientific criteria used, locals define the onset of the rainy season by the planting date of millet, the first agricultural product to be planted within the rainy season. The onset is nowadays said to take place earlier than scientific criteria would suggest. While the average onset date derived for the timeframe looked at was the 161<sup>st</sup> day of the year, millet is said by local farmers to be sown somewhere between the 135<sup>th</sup> to 145<sup>th</sup> day of the year. Farmers point out that in exceptional cases they may wait until June, around the 183<sup>rd</sup> day of the year. The

incoherence of the scientific results and subjective impressions of farmers affirms that neither scientific nor subjective findings may be clear when looking at the local level. Farmers in both Biu and Mirigu are eager to attest that the start of rainy season farming activities has shifted to the later part of the year, by about one or two months, from April to May or occasionally even June or July, depending on the year looked at. Yet, farmers never attest a delay in the end of the rainy season. So the rainy season as a whole may be becoming shorter while the same annual amount of rainfall occurs, as suggested by officials. As a constant amount of rain falls within a shorter time period, locals perceive delayed onsets as droughts and increased amounts of precipitation with the remaining rainy season as flooding. It is apparent that local seasonal shifts occur accompanied by a concentration of rainfall and floods.

According to an analysis of church records there were great variations in rainfall patterns in the first half of the 20th century. The perception of elderly people that rainfall patterns have not changed over their lifetime and that high variations are normal occurrences, may be correct because elders refer to a longer timeframe of observation than younger people. 1905 to 1915 witnessed many incidents of late starting rainy seasons and consequently losses in agriculture accompanied by famines. Up to the early 1920s was characterised by relatively early onsets and probably a higher food security. The trend changed again in the late 1920s, followed by early onsets again throughout the 1930s. Until the end of the 1940s, the start of the rainy season may well have become delayed again. So, when comparing the timing of sowing back then with what is said to prevail today, it becomes evident that a severe shift towards the end of the year may really have occurred (see Figure 20).

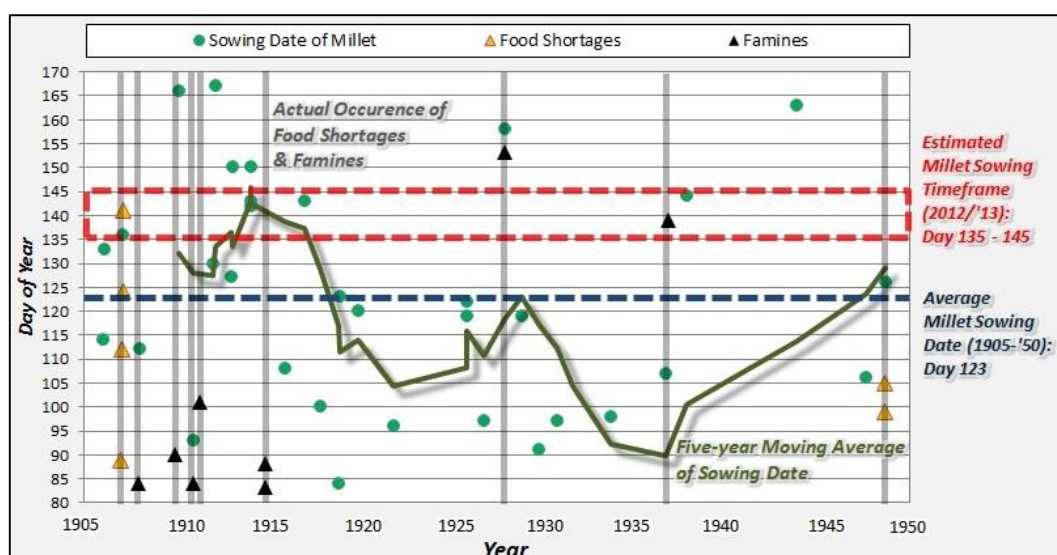


Figure 20: Sowing times of millet from 1905 to 1950 and in 2012/13, and incidents of food shortages and famines in the Navrongo area (own figure, 2014, based on own FGDs and as calculated based on CATHOLIC CHURCH NAVRONGO 1905-1920, 1921-1950).

#### 5.2.4. Livelihood Impacts of Climatic Change

Negative trends in future food security, especially for those without irrigation, are likely because farmers already point out that one major reason for lower yields is the delay in wet season production. Farmers and experts point out that a delay in the onset of the rainy season leads to an overall shorter growing season, increased incidents of drought at the beginning of the season, and thus increasingly limited outcomes of production. Therefore, years of food shortages and famines, as mentioned during FGDs, are often associated with late rainy season onsets, especially when coupled with an overall low amount of rainfall as was the case in the 1970s and 1980s. It can be deducted that there may be a strong, historic connection at the local level between increasing delayed onsets of rains, droughts, and the occurrence of food shortages. Flooding is never associated with food security, neither in historic church diaries nor by locals themselves. With regard to Biu and Mirigu and the former KND, it is unlikely that flooding really affects crops and thereby food security much. Drought is considered a far smaller problem than flooding in Biu, because people have access to easily irrigated lands, which explains why the incidents of food shortages and famines may be declining, assuming that the positive impact of the irrigation project spans beyond village borders because of all-year food availability in the region. Increased total precipitation may even have improved agricultural outcomes for non-irrigated areas.

Flooding is a hazard for locals, yet unlike drought it is often confined and therefore of smaller overall significance. It endangers only production in the lower-lying areas, i.e. the plains lying west of both Biu and Mirigu. The most *'frequently flooded'* areas are found close to the river and especially at Biu's irrigation project, where rice is produced. Most housing and thereby wet season staple production is far away, though in recent times floods have affected such areas, e.g. the 2010 flood. Torrential rains rather than floods threaten housing structures (for details see Section 5.3.2). In the case of agricultural production, flooding decreases the area available for crop production, for example by limiting access to bush lands (see Figure 21, Map 8 and Map 9).

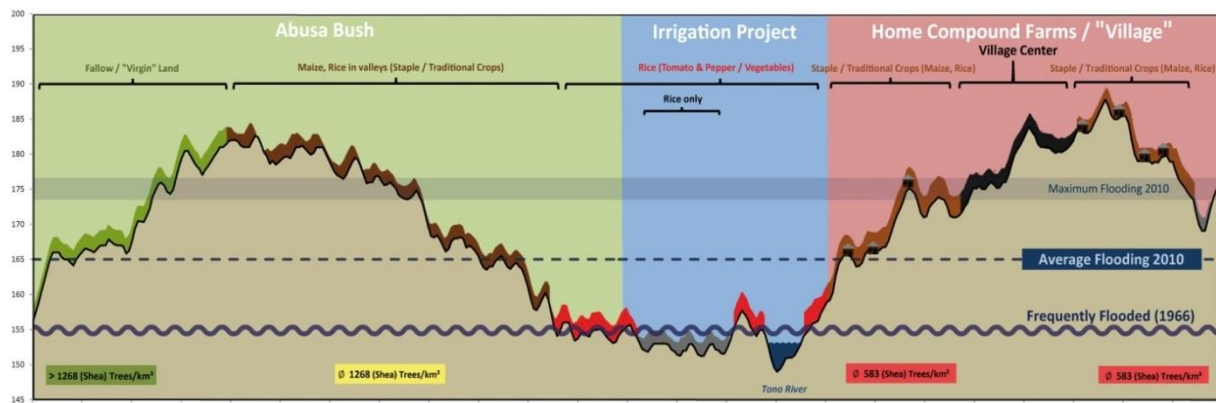
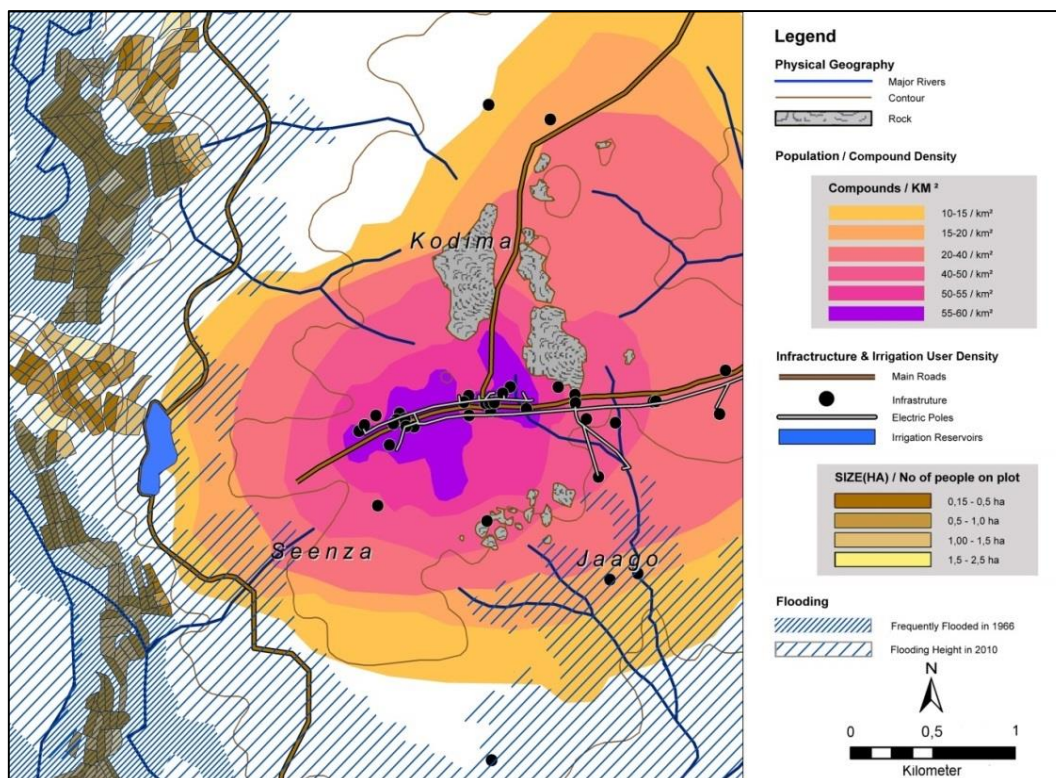
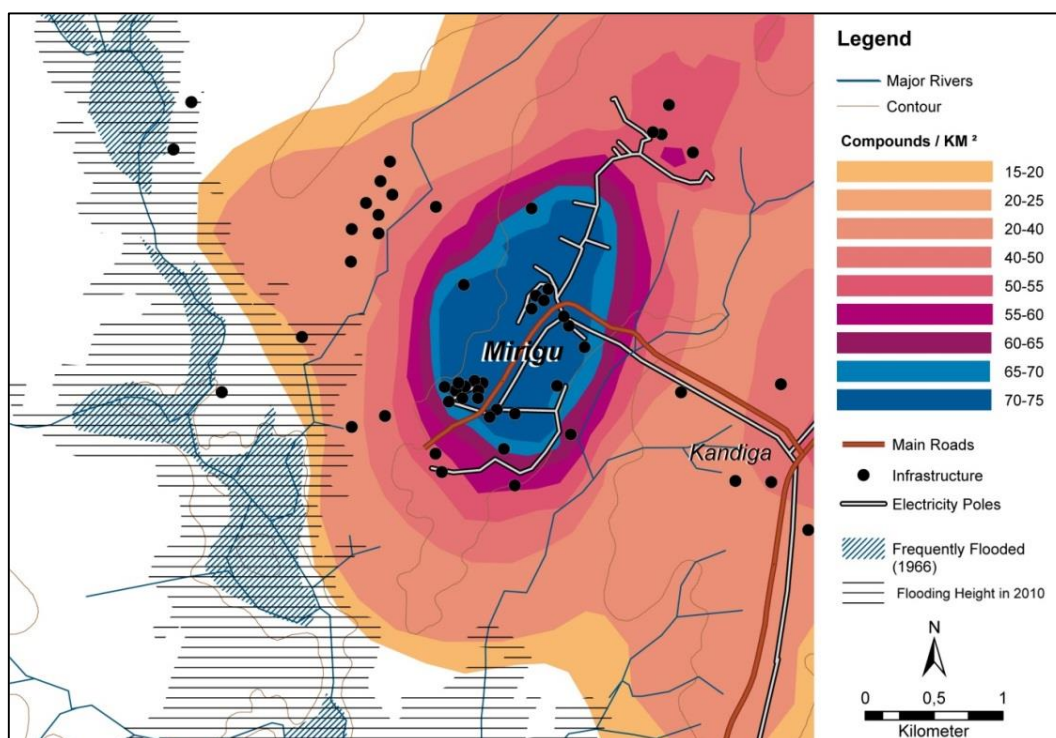


Figure 21: Vertically exaggerated land use profile of Biu from south-west to north-east (own figure, 2014, distances in meters, own FGDs, 2012/'13 and data from GLOWA Volta Project).



Map 8: Biu's sections, its 'centre' (purple), irrigation user density and infrastructure with exposition to flooding in 1966/2010 (own map, 2014, based data obtained from ICOUR, 2012, satellite images © 2016 Google and DigitalGlobe, GHANA GOVERNMENT SURVEY DEPARTMENT 1966).



Map 9: Mirigu's 'centre' (purple to blue) and infrastructure with exposition to flooding in 1966/2010 (own map, 2014, based on satellite images © 2016 Google and DigitalGlobe, GHANA GOVERNMENT SURVEY DEPARTMENT 1966).

From the middle of August onwards, due to the dangers of crossing the local river, farmers in Bui stick to their compound wet season production and irrigated areas. Likewise, farmers in Mirigu mostly farm only on their crowded compounds. Those hit by floods are mostly the poorest, as a result of inequality in land allocation. Spatial marginalisation is most evident among inhabitants of Bui in flooded irrigated lands, because here many work on less than half a hectare, while the well-drained and relatively deserted uplands are safer to farm. These irrigated uplands were once used by large-scale tomato farmers, which have in recent years gone into the production of rice. Their fields are less likely to be hit by flooding and if, like in 2010, will recover much faster than lower areas. The likelihood of flooding events is thus dependent on socio-economic structures and specifically on land allocation (see before, Map 8). The ability of the irrigation system to deal with flooding is also relevant. Its capacity to discharge flooding has greatly decreased since construction, mostly due to siltation. Floods have thereby become more likely for those spatially marginalised in lowland areas. In Mirigu the poor are said to have rather small, infertile lands more exposed to threats from the natural environment, especially floods. Since smallholders are often concentrated on relatively small lands, in both Bui and Mirigu, they lose almost everything when hit by disaster unlike richer households who have several plots in multiple areas and have thereby diversified their risk. It is especially those who lack land and who are generally worse off that are forced to live and work in areas affected by flooding. Being hit by flooding, but also by drought, is dependent on the location of housing and fields which is often a result of the finances and gifts that one can give to other land owners, which constrains the options of the vulnerable:

*'A beggar has no choice! Anytime we go to beg others for their lands, those who own it, give us, the beggars, the valleys – where it easily gets flooded – or sometimes those places that are quickly dry. Those who own the land will want to keep the best for themselves.'*<sup>31</sup>

Thus, socio-economic differentiation leads to changes in the risk imposed upon locals by the natural environment, especially flooding. It severely alters the risk people face in the production of different crops, as much as their achievable outcomes. Furthermore, in recent years farmers in both Bui and Mirigu have tended to shift their farming activities closer to areas more exposed to flooding. The reasons include the location of the irrigation project in Bui, the overcrowding of all compound areas, and the increasing popularity of dry season production. More people are nowadays producing chili or tomato during the dry season in the lowland areas south of Bui's irrigation project and along riverbank lands in Mirigu. Farmers are more likely to use these places during the wet season, when flooding occurs, because they have already invested

---

<sup>31</sup> Participant of FGD, 25.09.2012, Mirigu, Ghana.

in clearing the area. Those who are severely affected by flooding, which is mostly those spatially marginalised and those who work on relatively small plots, will try to sell their animals to cover up for the losses made during the wet season. Farmers are then dependent on friends and family in order to cope with adverse effects.

The institutional setup that could alleviate the effects of hazards, for example the National Disaster Management Organization (NADMO), is described as extremely problematic – as highly inefficient and underfunded – by farmers as well as government officials. Farmers perceive disaster relief aid as being allocated unfairly. Government and farmer interviewees further add these institutions suffer from quality, quantity, elite capture and nepotism based on blood relations or political grounds. Aid coming in through non-government development organisations (NGOs) is distributed independently of government planning and has its own ways and foci of distribution. Lacking coordination with government agencies, as local government officials claim, they are equally distorted by social allocation mechanisms at the village level. Thus, when affected households require help from friends, support is largely dependent on social capital. For example, according to the survey, more than 60 percent of households who suffered destruction of their housing or crops have received help via friends and family, while only 25 percent were supported by the government agency NADMO. Less than 4 percent were helped by other means, while a little more than 11 percent got no assistance at all. Support by friends and family mostly consists of provision of labour, money, food or building material. Attaining social capital and being able to use it beyond the immediate support provided by biological relatives, is crucial in times of severe crisis, since this is the primary source of help when natural disasters occur. In this regard, the upholding of relationships by females with their places of origin can be used to attain help, if these areas are not equally affected by disaster. For households having many female members, this broader social safety net helps in coping with the effects of disasters.

Farmers may find it hard to adjust to changing rainfall patterns because traditional indicators used to determine the onset of rains are becoming more unreliable. For example, trees that would flower shortly before the start of the rains supposedly no longer do so. Disharmony of indicators and factual climatic seasonality challenges household decision-making in making use of the natural environment. Traditional indicators can hardly be substituted by education, due to an overall low level of school attendees and literates (see Section 5.3.4). More advice from public institutions like MOFA's extension services is thus necessary to prevent climatically induced yield losses. However, as with help in the aftermath of disasters, such support is not available to most farmers.

The start of rainy season farming activities with regards to staple crops on traditionally managed compound and bush lands was once largely institutionalized. Aside from allocating lands, the local landlord – who by tradition is also religious authorities – would announce the best



dates to sow after having consulted the gods. However, the loss of landlord's powers is reflected in the fact that people instead tend to concentrate on government managed irrigation lands and non-traditional crops like chili or tomato or maize that do not hold any cultural value. Non-traditional crops are less subject to traditional norms and values, and thereby to announcements made by the landlord. With these traditional values fading, the onset of rainy season farming activities is more individualized and therefore diversified among households. As a result, farming is becoming less and less a communal effort. These tendencies foster a social divide among community members, because poor people are heavily dependent on the help of others through communal labour, thus human capital, to be able to deal with the most strenuous steps of agricultural production such as land preparation during the wet season. When people no longer work in seasonal unison, it becomes harder to coordinate household and community members for collective efforts, leading to mismatches of rainfall seasonality and farm work.

Individualisation tendencies are further fostered by the fact that livelihood outcomes from wet season production have shrunk. As local priests and Ghana Agricultural Workers' Union (GAWU) officials point out, for those farmers without access to irrigation projects, solidarity within society may be declining because people are becoming more concerned with their own survival. The extended family system and resultant social security net that once helped households to cope with the effects of hazards like flooding has nowadays partly vanished. Oftentimes it is reduced to self-help among those living in the same household.

Due to individualisation, growing insecurity in the prediction of rainfall patterns, and a lack of coordination among farmers, people may have to sow their crops several times, which in turn demands more available seed at the beginning of the season. Thus, greater stocks of seed have to be kept in order to be able to sow several times, which in turn reduces household food grain stocks. Occasionally farmers will have to sow seed up to three times. Therefore, people will be more reluctant to eat what they have left from the previous season, and start reducing their consumption of grain/seed from April onwards. This is a contributing factor towards hunger during these times. As burdens increase, individualisation tendencies may be fostered in pursuit of survival. Furthermore, farmers attempt to limit risk by cultivating smaller areas at the start of the season and then increasing production when they are sure of rains. This can reduce the success of intercropping systems, because if the first crop to be sown is delayed, it becomes too late for other crops to be sown on that plot. Plants sown again have smaller yields as they grow in the shadow of drought survivors.

Many crop cycles fit into the duration of the rainy season with difficulty because a maximum of 150 to 160 days is the normal timeframe for the growth of crops (MOFA 2011a: 3). Farmers in Biu and Mirigu state that, because of delays in wet season farming, especially over the past five years, there is now often insufficient time within the season to grow slow maturing,

traditional staple crops such as millet, yet sufficient time to grow other, fast maturing crops like maize. Millet is said to be especially sensitive to late sowing and will not perform well when the season is not met well enough. Traditional products like late millet or old varieties of rice are said to depend on rainy seasons that can be used in their fullest extent. Consequently people feel the need to change to fast growing crops.<sup>32</sup> The local MOFA and irrigation scheme management officers have introduced some such crops. According to their growth period, these crops do better under shortened growth periods. In comparison, traditional crops need over a month longer than a crop like maize and almost double the time it takes faster growing varieties of groundnuts or Millet. One can deduct that effective growth periods may have shrunk by 42 to 63 days, depending on the type of maize variety referred to (see Table 6). A shortened rainy season, under more-or-less constant amounts of total annual rainfall, logically increases the probability of floods and (perceived) droughts which can further decrease the effective growing period, e.g. people must wait for a hazard to pass before continuing their work.

<i>Crop</i>	<i>Growth Period (min. days mentioned)</i>
Late Millet (old variety)	147
Rice (old variety)	105
Maize (old variety)	105
Groundnuts (old variety)	98
Bambara Beans (old variety)	91
Soya Beans	91
Red Millet	91
Rice (new variety)	91
Maize (new variety)	84
Groundnuts (new variety)	77
Pearl/Early Millet	70

Table 6: Growth periods of major rainfed crops (own table, 2014, own FGDs, 2012/'13).

Shortening of the time period available for crop growth contributes to the trend towards planting of faster-growing crops. However, the suitability of new varieties and also those crops grown in the dry season is questionable. Firstly, the newer varieties of most crops are said to be less nutritious than the older ones. Secondly, the MOFA states that a lot of new crops (or varieties of these) have never been tested in local environments but are still distributed to farmers. Thirdly, as stated by MOFA officials, research on these crops tends to concentrate on high and fast yielding (input intensive) varieties, but does not account for the circumstances within which certain crops are actually cultivated, and thus newer varieties may be incompatible to the realities of locals. For example, farmers abandoned an improved variety of millet introduced by the MOFA because it turned out to be unsuitable for the production of local, alcoholic drinks, as it does not ferment properly. The main issue however, is that all faster growing varieties are require the application of fertilisers and often farm chemicals, which not everybody has sufficient funds to

<sup>32</sup> Participant of FGD, 20.04.2013, Biu, Ghana.

purchase (for details see Section 5.3.5). Consequently, only those who are less financially constrained can deal with a delay in the onset of rains by financing the inputs needed for crops like maize or new rice varieties. Another option locals make use of is increasing agricultural production during the dry season, specifically chili, tomato and rice (in Biu only), which is even more input demanding. Many require time to gather sufficient finances, leading to delays in production and smaller yields:

*'The poor suffer most from the change in rains, because everybody is graduating from all other crops to things like maize, thinking that that is the fastest crop that can also give you good yields when the rains finally come. Others go and do the gardens [dry season vegetables/ chili or tomato] to get something extra. Now, even if you try to do the maize or rice or vegetables and you are poor, then you have no fertilizer. So, it means you have done zero work [not achieved anything] and so it is the rich who are favoured. Only the rich have been able to change over the trend of events.'*<sup>33</sup>

Consequently, the poor are most often confined to their old compound farming system where they produce their safe, traditional, indigenous crops. As they cannot spend much on inputs they cannot get high yields or value out of their produce. Even if they were able to go for improved varieties, they would not want to risk their entire livelihood in doing so and are therefore likely to stick with the crops they are used to. Traditional crops, however, do not pay well, which is why climate change, a shift in the rainy season, has created economic and thereby social barriers between locals.<sup>34</sup> Therefore, fertilizer subsidies are regarded as helping locals to deal with the effects of rainfall changes, because they allow the poor to be able to grow faster maturing and input-intensive dry season crops. However, as indicated previously, the gains from fertiliser application is severely limited under current circumstances because of the effects on soil quality.

MOFA extension officers also state that the poorest in society are reluctant to go for faster growing varieties of crops because they lack experience with these and are afraid of worsening outcomes. In the most rural areas, people are even unaware of the fact that *'improved'* varieties exist, and even if aware, are unable to access them. The majority of farmers rather recycle seeds from the previous harvests. Only farmers at the irrigation project, in Biu, have better access to improved seeds because of a concentration of extension services. People that are able to acquire advice from the MOFA or ICOUR thereby find it easier to adjust to a shortening of the rainy season. The same goes for better-educated farmers, who are more likely to take advice from extension officers. A lack of education is said to make people reluctant to change their production

---

<sup>33</sup> Participant of FGD, 29.01.2013, Mirigu, Ghana.

<sup>34</sup> Interview with the KNE MOFA director, 05.02.2013, Paga, Ghana.

pattern, because new crops require knowledge on how to cultivate, since the practices required for a successful harvest can differ substantially from those needed for traditional crops.

### **5.3. *Man-Made Assets***

This section examines the endowment, access and usage of man-made livelihood assets, namely physical, human, financial and social assets. Physical assets are mainly in the form of infrastructure, which helps the population to counter natural conditions. Possible beneficiaries of these are quantified through a look at demographics. Local educational levels and trends in health issues are examined to enumerate and describe human capital and its qualities. Finally, the section takes a look at locals' finances and human interactions framed by social relations.

#### **5.3.1. *Basic Infrastructure and Services***

Road connections going north via the district capitals Navrongo and Paga, across the border to Burkina Faso, are of key economic significance for both study communities in terms of physical assets. These roads are well established; probably the most frequently used routes in the country for international travel and commerce. Ouagadougou, the Burkinabe capital, can be reached in about six hours. Asphalted roads also go south, to connect Navrongo with Bolgatanga, the regional capital. Further southwards a road connection is available though it is occasionally interrupted by heavy rainfall or armed robbery. When conditions are adequate, the capital Accra located in the very south of Ghana – where the main buyers of local agricultural products reside – can be reached within 12 to 13 hours of travel. 'Minor', gravel roads, often impassable once rains have set in, connect villages. Within villages diverse 'feeder roads', most of which are actually trails or dirt tracks, allow the transport of goods.

The district capital Navrongo has the largest market in the area, held three times a week. Smaller markets are found in almost every settlement throughout the area. Navrongo is characterised by a concentration of socio-economically important infrastructure: primary and secondary schools (public and private), a teacher training college as well as a university for development studies. Though there are various schools and small clinics in smaller villages, such as in the two study communities, concentration of services also accounts for most social infrastructure, such as public and private hospitals, health centres, a health research centre, a maternity home and an orphanage.

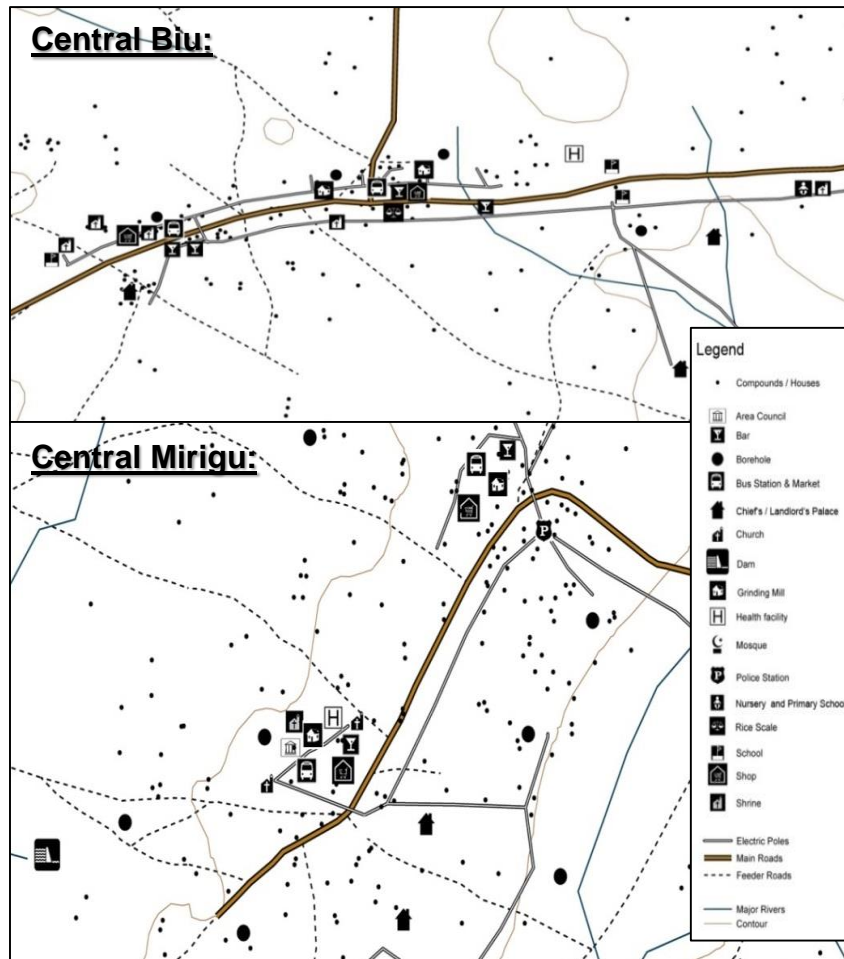
Navrongo can be reached relatively easily from Biu and Mirigu, though vast differences exist with regards to the time this can take. Eastwards Mirigu is connected to the district capital via several improved feeder roads, yet the Atankwidi River cuts these off for half the year during the rainy season. Despite the fact that a large metal bridge was erected to circumvent this problem, for the past seven or so years the bridge stands incomplete such that only pedestrians, if willing and able, can use it. When travelling by vehicle during the wet season, a vast detour must thus be

taken southwards in order to reach Navrongo. Better is the connection from Biu to Navrongo. Not only has Biu two minor roads that allow all-year transport to Navrongo, the irrigation project is also equipped with concrete roads. Thus the village is connected to major market towns and service centres at the regional and national level.

Besides roads, mobility is also limited by vehicle. Market based production is often dependent on traders willing to travel to communities. By far the most common form of transport is slow donkey carts: almost 54 percent of Biu's households have access to a donkey cart, while bicycles are equally common. By donkey cart it takes almost an entire day to travel from places like Biu or Mirigu to and back from Navrongo, whereas it takes half as long by bicycle. Otherwise, faster transport is mostly rented from individual providers, since less than 14 percent of all households have access to motorbikes and less than 2 percent have access to a car or can use a truck for transport. Even fewer are able to take taxis (0.6 percent). More popular is transport by rented, motorised tricycles, which are accessible for about 17 percent of households. Thus, the level of motorisation is fairly low, especially for females.

Mobile telephones and thereby internet connectivity – for those with can afford it – is available across most of both villages. Clean water supply is relatively unproblematic, as there are about nine manually driven boreholes in Biu and about 19 in Mirigu.

In both Biu and Mirigu infrastructure is concentrated along an east-western axis, along main roads situated on hill ridges with two rather distinct poles of higher infrastructural densities, forming a dual concentric village structure. Centres revolve around local stations, where most public interaction takes place and smaller buses, taxis and motorised tricycles stand by for transport, surrounded by small shops, bars, small-time traders and locals selling some of their agricultural products or readymade food. Shops serve as sources of a small variety of everyday commodities and partly also for agricultural inputs. Electric grinding mills can be used for the processing of crops. Similar to infrastructural services, most higher value housing including that of the local authorities, such as chiefs and the landlord, are concentrated at village centres. The land value is high along the main roads because this is where electricity is supplied – where it is safe from flooding. However, blackouts are frequent and most households cannot afford electricity (see also Map 10).



Map 10: Major infrastructure and houses in central Biu and Mirigu (own map, 2015, roads and rivers partly based on data obtained from CERSGIS, University of Accra, 2010).

With regards to educational and health facilities, Biu and Mirigu are each equipped with a small clinic and several schools. Furthermore, a variety of churches exist alongside traditional shrines – holy places – of which there are several in both communities. Mirigu, unlike Biu, is home to a mosque, a police station and the local area council. Biu, on the other hand, has a warehouse to store and weigh rice, large rice silos and mills at the irrigation scheme (see Photo 6 and Photo 7). So, Biu is better equipped than Mirigu in physical capital at the community level. Not only does Biu have access to an irrigation system, its villagers can also take advantage of further infrastructural services, equipment/machinery and agricultural inputs provided by ICOUR. Yet within Biu not everybody is able to access these things. 70 percent of interviewees in Biu describe as an ‘*extreme*’ problem the prices that need to be paid for the renting of ploughs, while another 27 percent characterise these prices as ‘*severe*’. Tractors and power tillers/cultivators are accessible only to 38 percent of Biu’s households, and combine harvesters to less than 2 percent. Only bullock ploughs are more common, being accessible to about 46 percent, although female-headed households find it harder to access them. Significant gender differences in accessibility are found with regard to bullock ploughs (-14 percent), tractors (-7 percent), power tillers/cultivators

(-8 percent) and Motor Kings (-7 percent). On top of that, no female-headed households were found that were able to use combine harvesters. Female-headed households claim that low levels of mechanisation are either ‘*severe*’ or even ‘*extreme*’ problems in their farming. The local irrigation management should help farmers to access mechanised farming services, however, most of the machinery available through ICOUR – large shares of which once came from foreign donors – has broken down and is used to provide spare parts that otherwise cannot be obtained (see Photo 8). All of ICOUR’s infrastructure and mechanisation services lack quality and quantity.



Photo 6: ICOUR rice silo near Nasia (own photo, 2011).



Photo 7: ICOUR rice scale and mill near Nasia (own photo, 2011).



Photo 8: Broken and dismantled equipment at the ICOUR workshop (own photo, 2011).

The irrigation project near Biu is probably the most prominent piece of physical capital in terms of infrastructure in either village. Though Mirigu has no access to the system, there is a small irrigation dam to be found in the village, yet it broke down years ago and is no longer used. That is problematic, because irrigation systems can double agricultural growth periods while at the same time providing a more easily accessible basis for livelihood improvement than shallow groundwater irrigation (SGI). For Mirigu's people alternatives to SGI are not available. Moreover, hardly anybody has access to a pumping machine and so people are primarily dependent on human labour. In Biu less than 20 percent of households own such machines, while less than 4 percent have no access to the irrigation system. Therefore, easy, all-year irrigation is only accessible at the irrigation project, which is a major factor in overall livelihood outcomes. In fact, Biu's local irrigation project has drastically improved food security over the past decades, mostly by making those that have access to it independent of climatic calamities like drought. Though droughts have been experienced since irrigation was established, in Biu they are perceived to have been of minor impact, unlike in Mirigu. Actually, before the establishment of the irrigation project, droughts were mostly accompanied by hunger and famine.

It took farmers quite some time to adapt to the practice of irrigated agriculture. For example, in 1994, almost 10 years after the irrigation project had started to run, there was a severe food shortage caused by drought, because agricultural production on irrigated fields was not yet as popular as it is today. People refused to work in irrigated production because it did not suit their cultural practices and because they did not know how best to use it. Thus, establishing and educating people on new agricultural practices, i.e. advancing human capital, has improved food security. Furthermore, one can conclude that it takes more than just infrastructural delivery to combat hunger and general livelihood development; cultural/societal values are also active in shaping attainable livelihood outcomes. Having seen the potential that government irrigation



brings for livelihood improvements in a neighbouring village, farmers in Mirigu almost constantly allude to a lack of irrigation as the reason for their relatively higher poverty and food insecurity. Especially, when comparing today's situation to that of pre-irrigation times, improvements in livelihood outcomes become clear:

*'There was a time before the irrigation project was built [...]. The droughts sometimes used to turn us all into horrible animals, when we did not have food! [...] I pray that it never comes back again! [...] If you were sick, you had to die! [...] You cannot share food which you don't have and it is better to give to those who still have a chance [...]. People acted like horrible, horrible animals. They were scrambling for food! They were fighting over it with their lives! Friends became enemies and families fell apart. We had no soap, no food and sometimes even no water'.<sup>35</sup>*

Yet, the potential of Bui's irrigation project is limited and shrinking due to breakdown of infrastructure. Its efficiency is now said to be around 40 percent, according to the irrigation scheme management, meaning that about 60 percent of all irrigation water is lost due to poor canals. Government dam rehabilitation efforts took place during the dry season of 2007/2008, but rehabilitation of the canals was prematurely stopped because funding was insufficient and ran out before substantial improvements could be made. While the main canals were partly rehabilitated, sub lateral canals have increasingly suffered from water losses, which have by now outweighed prior rehabilitation efforts. Flooding has continued to damage canals and, as much as drought, now causes severe calamities in smallholders' lowland areas (see Photo 9).



Photo 9: Broken sublateral canal serving low lands near Bui (own photo, 2011).

---

<sup>35</sup> Interview with elderly farmer, 26.03.2012, Bui, Ghana.

During the dry season, droughts occur on those plots dependent on broken down canals. In 2014, dry season production had to be suspended because of too little rain during the wet season coupled with increasing losses from poor infrastructure. The further away fields are from the main canals, the less water they are likely to receive:

*'The crowded low lands in the project area actually face two problems: flooding in the wet season and severe difficulty in getting water in the dry season, because the infrastructure is breaking down. So, those who can will rather go to the uplands which are closer to the main canals and therefore easier to irrigate, especially during dry seasons'.*<sup>36</sup>

Smallholders in Bui are already fighting over access to water due to the irrigation project being so run down. The irrigation system demands constant presence at one's irrigated plots to assure one's turn in watering and to make sure others will not divert water to their own fields. Those in the crowded lowlands, elderly people and generally those not able to hire labour are said to be the most affected by this situation. It is, however, a general problem, since 68 percent of Bui's households perceive insufficient water provision at the irrigation scheme to be a 'severe' to 'extreme' problem in farming (see before, Figure 11). The issue of water shortage is further enforced by the fact that rice is nowadays cultivated on well-drained uplands, which were previously used for less water-consuming tomatoes. Uplands, therefore, now require about twice the water they needed before. Degradation of the irrigation system is a somewhat self-energising process, further amplified by land inequality and changes in land use.

Farmers in both Bui and Mirigu are at risk of becoming victims of elite capture, due to a high concentration of lands among a few large landowners. This gives rise to increasingly deepened socio-economic differentiation. Yet, farmers from Mirigu attest that the general lack of access to irrigation has made them more 'equally poor', thus there is said to be less socio-economic differentiation within the community. Marginalised farmers find it hard to improve their livelihoods, a component of which is further defined by poor housing infrastructure.

### **5.3.2. Housing Infrastructure**

A good house is a basic necessity of life and one of the most significant contributors to local poverty, since it is the most expensive item for households and a prerequisite for good health and well-being, in turn needed to make use of the surrounding lands (UN-HABITAT 2010: IV). Housing defines locals' vulnerability and moreover, general well-being. This sub-section elaborates upon the principles of housing, locals' housing endowment, and the effects of housing on livelihoods.

---

<sup>36</sup> Interview with the ICOUR Tono project manager, 23.05.2013, Navrongo, Ghana.

The main principles of local housing are based on traditional architectural concepts.<sup>37</sup> Since medieval times, architectural styles in the very northern, savannah regions of Ghana have been dominated by mud plastering often in combination with adobe and natural materials. As the spherical (mud/adobe) bricks are the basis of buildings, traditional farmsteads are predominantly circular in nature (PRUSSIN 1974: 192). Also, a history of violence has left its marks on traditional architectural styles, because people needed to find protection from slave traders and horse mounted warriors and wild animals (WIDGREN 2010: 329 and 337). Forced labour migration and soldier recruitment in colonial times further increased the need for some sort of protection, which is why traditional farmsteads resemble round, miniature castles (LAUBE 2007: 106), partly built according to military principles. Among these are inward facing doors and windows, walls behind the entrances to rooms that serve as barriers for entering enemies, fortification of entrances and further enforcements at hand to be put up. Walls, forming a kraal in the middle of the compound where cattle can be secured, enclose rooms, storages, granaries and barns. Flat, platform roofs can be used to observe the surroundings.

Surprising considering the relatively weak structural strength of buildings is the under-utilisation of durable stone structures, despite the omnipresence of granites in the region and the apparent need for protection. However, special tools for cutting and trimming would be required, and would be more time-consuming than mud construction. Moreover, building sophisticated, durable, squared-stone constructions without machinery at hand is only possible where (harder) stone is available for dressing another (softer) stone (PRUSSIN 1969: 10). Local traditional architecture reflects social norms and philosophical principles, such as the temporality of life and ancestor worship (HAHN 2000: 138-139). Traditional concepts of architecture do not, therefore, necessarily embrace a need for durability and permanence (PRUSSIN 1969: 10). As characteristic of hoe farming societies, most housing structures are ephemeral, thus semi-permanent, round, mud compound houses, mostly consisting of materials from the natural surroundings (GHANA STATISTICAL SERVICE 2013: 377-378; KRÖGER 2010: 19; RUTHENBERG 1971: 26, 58-62, 111-112; SCHWARZ 1988: 88).

Due to their semi-permanence, traditional compounds are to a large extent sustainable, though perishable. Adapted to local necessities, they are an important part of local culture. Mud constructions are highly adaptive to changes in household size through marriage, birth or death. Materials are cheap, so value flows for construction remain within villages. As most resources used in construction come from the natural environment, structures are recyclable. They leave no

---

<sup>37</sup> Traditional here refers to architectural styles that were documented in the early 20<sup>th</sup> century. It should not imply the notion of historical stagnation or lack of change, but the basic architectural types defined here, are still relevant for the rural parts of West Africa, especially northern Ghana.

construction waste and thereby sustain fertility and health of surrounding fields. Aside from this, the clay material used in buildings has outstanding properties suited to the local environment and offering protection from heat and pathogenic germs. Mud, the primary material used in local construction, is fairly water resistant as it dries to form cement-like coats.

The circular form of buildings increases structural stability, since edges are subject to higher wind speeds and dynamic pressure. Wind stress would otherwise lead to erosion, especially of the weather side (SCHRÖDER 2010: 300, 342, 351). Additional plastering, which consists of manure and a special liquid derived from plants together with shea nut oil, increases water resistance (KUNZE 2003: 22). On the other hand, any sort of adobe or mud building is severely endangered by water, which is why buildings are not built in flooded areas. Wind-driven rains and rainstorms erode the structural strength of buildings since they are wet and weaken walls from top to bottom. Therefore protection against wind-driven rains by use of wind barriers is very helpful in the conservation of outer walls. If bricks are not laid properly, water can frequently penetrate walls even though a building seems well made. Moreover, insufficient compression of clay bricks and their laying, leads to structures being not very stable. Unlike the with additional coating applied to the outside, it is not common to mix plant materials or juices or other materials into the bricks in order to harden them (KUNZE 2003: 22-23). A lack of roofing material leads to increased surface erosion from rain, weakening constructions in little time. Run off hindered by a building can cause further destruction. Soil erosion in the surroundings of facilities additionally has a negative impact on foundations and structures (see MANU et al. 2008: 4-5). Constant maintenance is essential for the strong structure of any clay building. However, houses are often poorly maintained. When following necessities and avoiding water prone areas, and with decent workmanship on foundations, roofing and sufficiently thick walls, adobe and mud buildings have withstood centuries despite extreme rainfall (SCHRÖDER 2010: 237, 247, 275-277, 294).

The major issue with traditional mud housing is that buildings collapse frequently. 82 percent of surveyed households in Biu had houses that had partially or fully collapsed at least once during the past 10 years (own survey, 2013, n=177 households). Similar issues with housing collapses were reported in Mirigu. The vast majority of houses stand outside of potentially flooded areas (see before, Map 8 and Map 9). Thus in both Biu and Mirigu, torrential rain and especially wind driven rains are said to be the most severe threat to traditional mud structures because they soak walls and roofs, which is why immediate land use around farmers' houses is often a key element in protection:

*'The crops that surround our compounds [...] can protect the house from winds and especially wind-driven rains that would otherwise hit the walls directly [...]. Walls of kenaf, okra and millet that surround our compounds, can soak up a lot of water from the ground and so the foundations*

*as well as the walls of our compounds will become harder and easily dry after heavy rains. That way compounds will not collapse so easily.*'<sup>38</sup>

Wind and water stresses, especially wind-driven rains, are dealt with by planting tall crops such as okra, kenaf or millet besides outside walls. Thus the structural strength of traditional housing is partly dependent on a functioning compound farming system surrounding the settlement structures. Since these fields are increasingly fragmented and since traditional, tall growing crops like millet are gradually becoming less popular, such protection is becoming patchy and the dwellings are increasingly more vulnerable to erosion. People have also become more conscious of the benefits of concrete masonry and metal roofing. According to farmer FGDs, any household whose house collapses during the wet season may remain homeless for considerable time, sometimes months, because reconstruction depends on support by family and friends, thus social capital. However, friends and family, if at all, only have time to help during the dry seasons. During the dry season even, people are busy with irrigated dry season production. Thus affected locals and their kin are left to choose between rebuilding their houses and assuring income and food security. The homeless are often forced to spend their nights in a local school or church. As a result, permanent, concrete housing is considered a high priority and has in recent years become a very desirable norm:

*'When your child [...] comes to tell you that he wants to have money in the pocket and to build a block [concrete house], you can't stop the child. When you advise him that he should rather stick to our traditional housing, the child will tell you that you are archaic.'*<sup>39</sup>

Durable housing has become a main livelihood strategy and substantial capital is raised for it, though many cannot really afford to do so. The financial capital required to construct a small shelter room that can withstand heavy rains (as much as flooding), easily equals about the whole annual income attainable by farmers. Zinc roofing, the primary element of durable shelter, is relatively cheap and so more common. However, durable, concrete walling is hardest to finance, even if own labour inputs are provided (see also Table 8). This is not to negate that the construction of traditional compounds does not also require vast inputs. However, the main materials used for traditional construction can be gathered freely and neighbours are easier to convince of support, when compared to helping construct a concrete building. People feel more obliged to help freely in the upholding of cultural identities as reflected in traditional architecture.

Durable housing is understood as a sign of modernity yet also of wealth and prosperity, while mud structures signal an upholding of tradition but also poverty. The allocation of different

---

<sup>38</sup> Interview with a teacher from Biu, 04.05.2013, Biu, Ghana.

<sup>39</sup> Interview with a Farmer from Biu, 12.01.2013, Biu, Ghana.

types of housing must therefore be considered in terms of social inequality and general vulnerability. Many households in Biu and Mirigu can thus be considered fairly vulnerable, since housing structures are most often made of mud/clay. In Biu, a third of all inhabitants live in traditional clay/mud compounds, while about 68 percent of all houses have partial zinc roofing. Only about 3 percent have a fully zinc-roofed clay house, while another 7 per cent live in concrete houses with full metal roofing. This is roughly the same in Mirigu (own survey, 2013, n=177, FGDs, see Photo 10).

Permanent, safe, durable, concrete settlement structures dominate the centre of both Biu and Mirigu. In Biu, about 30 percent of all houses at the ‘*centre*’ are made of concrete, mostly standing along the main road together with most infrastructure of wider socio-economic importance. In the more flood-affected outskirts, less than 4 percent of buildings are made of concrete. So, structures that are generally more vulnerable stand in areas more prone to risk. People at the centre of Biu are simply better off and can pay a higher price for land at the centre of the village, also the case in Mirigu. Being affected by collapsing housing is thus a question of socio-economic differentiation. Vulnerability in terms of housing is high and growing, especially in the outskirts of villages where flooding can become a further problem. Consequently, higher amounts of financial capital are required to help locals improve this basic necessity of life.

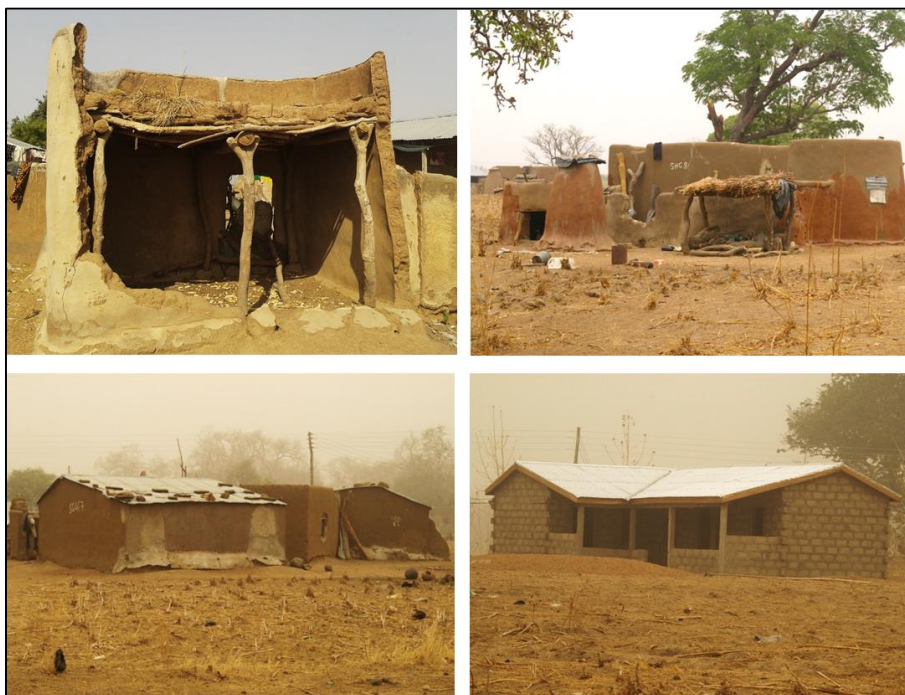


Photo 10: Traditional compound structure cross section (upper left), mud compound (upper right), roofed square compound (lower left), concrete house (lower right) (own photos, 2011 and 2013).

### **5.3.3. Demographics, Health and Labour Force**

The Upper East Region (UER) is a crowded part of Ghana, almost comparable to some of the most crowded regions found in the very south of the country. Generally the most crowded

areas of UER are situated in the east, while less populated areas lie further west. In comparison, the former Kassena Nankana District (KND) is a relatively average district in terms of population density, although this greatly increased over the 20<sup>th</sup> century (data obtained from Ghana Statistical Service, 2013). Population within the whole region has doubled since the 1960s. Yet outmigration has also been a crucial factor in population trends. Growth rates during the 1960s were relatively low, and during the 1970s and early 1980s, the economic crisis made it less attractive for people to leave, which is why far higher growth rates in population occurred from 1970 to 1984 (LAUBE 2007: 113). The period from 1984 to 2000 was characterised by SAPs and ERPs. In combination with persistent outmigration, this era of economic readjustment and downfall in the Upper East led to relatively little population growth, even a shrinking of in the KND. Since 2000 population growth at the regional level has decreased. However, contrary to trends at regional level, the districts in which Biu and Mirigu are situated have attracted greater growth in recent times (see Table 7 for absolute numbers).

	Year	UER	KND (East & West)
<b>Population</b>	1960	468638	93397
	1970	542858	99006
	1984	772744	149680
	2000	920089	149491
	2010	1046545	177400

Table 7: Population change in in the region and district of the study areas (GHANA STATISTICAL SERVICE 2012: 104; LAUBE 2007: 113).

The overall population density in the UER has on average increased by more than 123 percent between 1960 to 2010 (calculation based on GHANA STATISTICAL SERVICE 2012: 22; LAUBE et al. 2008: 7). Taking into consideration data dating back to 1931, an average increase of more than 200 percent may seem realistic (SCHULTZE 1955: Beilage 2). Today, the region has achieved an average density of more than 118 people/km<sup>2</sup> (GHANA STATISTICAL SERVICE 2013: 53). The majority of growth in population density likely took place in the research areas in the early decades of the 20<sup>th</sup> century (SCHULTZE 1955: Beilage 2), and after construction of irrigation projects in the 1980s (LAUBE et al. 2008: 7). Thus population pressure has vastly increased over the last half a century, mostly shaped by political and economic trends with outmigration serving to relieve pressure for distressed locals.

At the local level, total population and population density vary heavily from village to village. Throughout the Upper East Region, population density follows an east-west gradient, thus higher densities are found in Mirigu, while the least populated areas start to commence in Biu and to its south-west. Total population is hard to estimate and compare, because community census borders heavily vary by topographical maps of the area, people’s perception and personal impressions on the ground. Census data proclaims a total of 5085 inhabitants in what is formerly

known as Mirigu (and quarters), and 3299 inhabitants for Bui.<sup>40</sup> More assured are numbers derived from this study's population density mapping, whereby up to 55 to 60 compounds per km<sup>2</sup> are found at the centre of the Bui compared with 70 to 75 at the centre of Mirigu. Thus, with an average of 5.8 inhabitants per compound in the Upper East (GHANA STATISTICAL SERVICE 2012: 22), densities of up to 348 people/km<sup>2</sup> in Bui and 435 people/km<sup>2</sup> in Mirigu are possible (see also Map 8 and Map 9).<sup>41</sup> Notably, the average household would be 44 percent greater if large shares of the local population had not migrated, specifically females. Livelihood outcomes are often insufficient to cater for needs, and migration is a common strategy to address this. A significant share of households, mostly female-headed ones, depends on remittances generated by migrated family members.

The demographics of Bui and Mirigu are both shaped by a young and growing population, with an average age of 25. Cohorts of people below 15 easily make up more than a third of the local population, while older ones, especially those of 20 years and older, make up a relatively small share of the inhabitants. There seems to be a decrease in growth when it comes to the youngest cohort, the 0 to 4 year olds, indicating demographic change in northern Ghana. Data from 2013 backs the assumption of demographic transition, whereby the 0 to 4-year-olds now represent only 9 percent of inhabitants, meaning the cohort may have shrunk by another 3 percent since the last census (own survey, 2013, n=177). Marks in the population pyramid (see Figure 22) point at the cohorts born in the early 1970s and early 1980s, which are those in the age ranges 55 to 60 and 65 to 69-year-old.

These marks were probably left by forced labour and soldier recruitment during the second world war, partly explaining why the 65 to 69-year-olds are relatively underrepresented. Furthermore, famines in the early 1950s, late 1970s and the early 1980s had an equally limiting effect on population growth. Therefore 55 to 69-year-olds make up less than 2 percent of the local population, as do those born in the early 1970s and early 1980s. Furthermore, population grew rapidly when the irrigation project started to run in the 1980s and became more popular in the 1990s. Recent cohorts have become smaller when compared to previous ones. Interviewees often state that they have, in recent years, changed their reproductive patterns in favour of fewer children; partly as a result of improved access to contraceptives, but also with the aim of meeting financial requirements imposed mainly by school expenses. In earlier times, large numbers of children went along with large social capital and they served as social safety nets. Nowadays education serves as a means of securing livelihoods:

---

<sup>40</sup> As based on spatial data obtained from Ghana Statistical Service, 2013.

<sup>41</sup> Own survey and mapping, 2013.



*'We thought that if you had many children, you would be well respected in society. [...] But we have learned that too many children can be a problem [...]. Where are you going to get the money from to send them to school? How will you feed them? Today you can rather be proud if you are able to send your children to school [...]! Big men today are those that have been educated.'*<sup>42</sup>

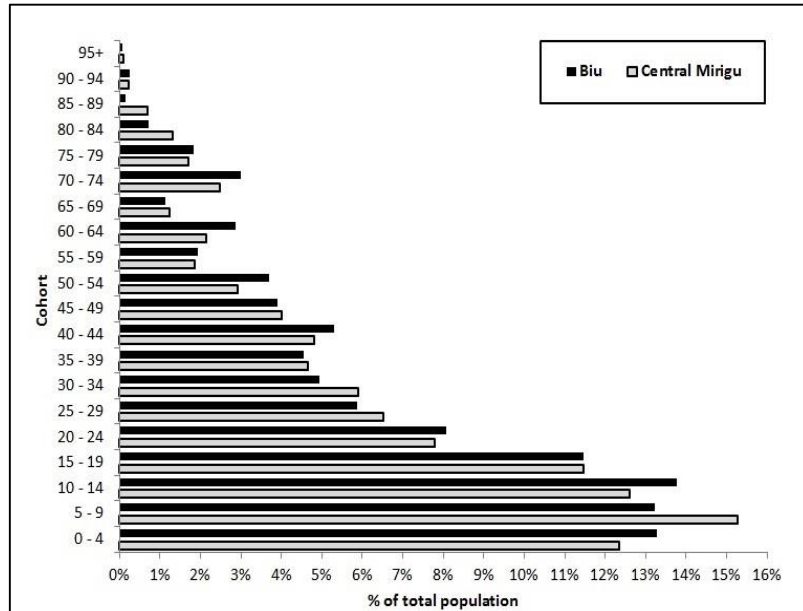


Figure 22: Population pyramid for Biu and Central Mirigu in 2010 (own figure, 2014, data obtained from Ghana Statistical Service, 2013).

In the past quantities of human capital were correlated to qualities of social capital. Yet, people nowadays put emphasis on the education/human capital of each child instead of trying to outweigh future risks by sheer numbers (of children). Population pressure may continue to increase for some years to come, but then it will likely come down due to general trends in norms and values as well as trends in the withdrawal of government support for education. On the other hand, several limiting factors to population growth have nowadays been eradicated. Severe famines and the outbreaks of different human diseases, such as meningitis, measles, smallpox or mumps that severely decreased population growth during the 1940s and 1950s are nowadays uncommon. Population growth is also aided by better health services, e.g. the eradication of measles epidemics, which killed up to a third of children, in 1992 (Figure 23).

Future trends may be shaped by classic demographical changes, similar to industrialised countries, if lowered birth rates coincide with lower mortality rates. This is not to say that people in the region no longer suffer from disease, though deaths have massively reduced due to government health infrastructure, insurance and irrigation. Malaria, guinea worm, elephantiasis, tuberculosis, HIV/AIDS, sexually transmitted infections and disease as well as leprosy are still common. People are prone to suffer easily preventable diseases such as diarrhoea, acute

<sup>42</sup> FGD participant, 18.12.2012, Mirigu, Ghana.

respiratory infections and intestinal worms, while vitamin A deficiency, iodine deficiency disorders, iron deficiency diseases and iron deficiency anaemia have high prevalence. On a region-wide level, 27 percent of children under five are underweight. Recent challenges have included outbreaks of meningitis, cholera, yellow fever and anthrax (see also GHANA HEALTH SERVICE 2012: 17, 50). There are indications that the establishment of irrigation facilities has partly increased incidents of elephantiasis and malaria in a range of 1 to 2 kilometres of these schemes, due to the breeding grounds they provide for mosquitos (SONGSORE 2011: 321). Pressure on health with regards to mosquito-borne disease is thus high in Biu.

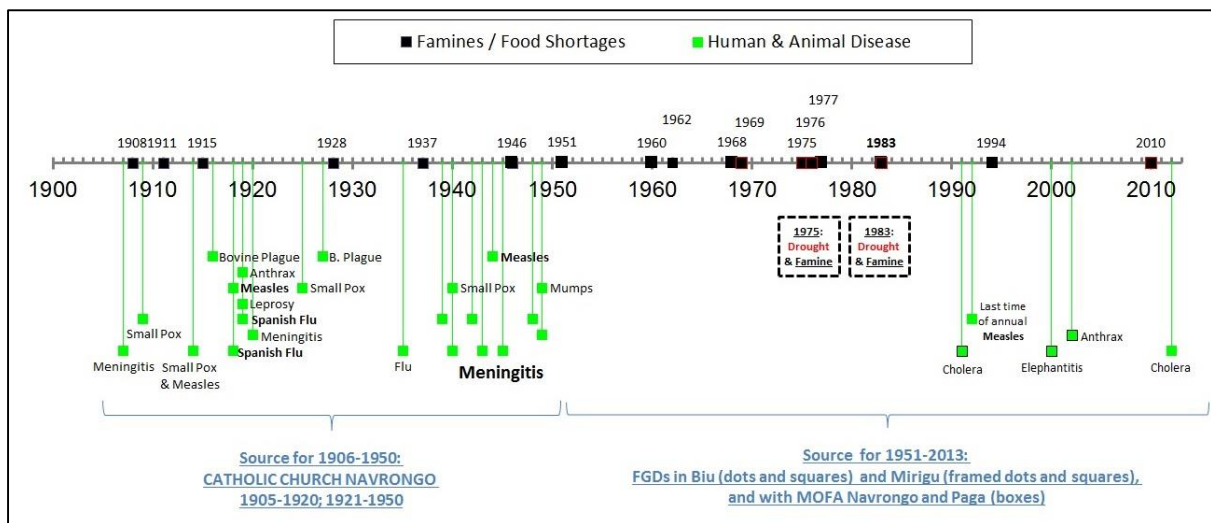


Figure 23: Timeline of famines/food shortages and disease in the Navrongo-Mirigu-Biu area (own figure, 2014, sources as mentioned).

Socially induced diseases are also very prominent. From the early morning onwards, on a daily basis, numerous people in the villages can be found utterly drunk in one of the many bars in the communities. A total of 87 percent of all those questioned believe that alcoholism is a serious issue in their village, especially prevalent among men, and thereby a major threat for local development. Alcohol decreases the level of rationality employed in decision-making. Chronic alcohol misuse can lead to severe neurological and thereby memory disorders. Serious alcoholics are further ‘at increased risk of developing other psychiatric disorders such as anxiety, depression and psychosis, the severity of which is exacerbated by sensory deprivation’ (KOPELMAN et al. 2009: 152). Even worse is that alcohol is perceived to be a major reason for domestic violence, which renders the wives of unsuccessful farmers vulnerable to psychological and physical trauma:

*‘These things happen day in and day out. We women can even prepare food for the man and be kind to him, but if the man wants to sell some of the food stuffs to buy drinks and you the woman, you would not agree to that, that is where the beating then starts. [...] You [...] would want to protect the family and the children but the man doesn't care. He wants to go and drink and so*

*fighting will definitely come! [...] The men are frustrated [...] with farming and so they drink, but the drinking is really the cause of all this violence.*<sup>43</sup>

Externally and internally induced pressure on health is still high. The alcohol addicted cause grave misfortune for their wider family while depriving themselves of their own human capital. Aside from Protestant churches and Muslim mosques preaching unconditional abstinence there are no institutions to help deal with alcoholism. Overall a lack of good health and nutrition leads to low life-spans, and moreover deprives people of making full use of their potentials in livelihood upkeep. Economic activities pursued – livelihood pathways – are mostly if not entirely based on hard labour. Moreover, livelihood upkeep requires the labour power of most household members, which is why even one dropout – due to disease – can threaten livelihood outcomes, especially if it occurs during crucial phases of agricultural production cycles. Already, averagely 4.59 household members cannot work, but depend on others for their survival. In female-headed households the dependency ratio is about 57 percent, while it is about 63 percent in male-headed households. Most dependents are either too old or too young to contribute to household incomes.

Dependence on at least one child (below 16) as a source of labour is common at least in every second, average household. Children are said to be needed for land preparation, for the rearing of animals or to gather water from boreholes. They are thus primarily used to generate immediate household outcomes, as nine of every ten working children pursue his or her work within the household. People are dependent on communal labour, since 71 percent of Biu's households have 'severe' to 'extreme' difficulties in acquiring paid labourers to meet the labour requirements imposed by different crops. Therefore, agricultural intensification that aims at a reduced human labour input is important with concern for dependency ratios and to further boost land use efficiency for a still growing population. To further help deal with constraints, education – parts of which come from faith communities, i.e. Christian or Islamic institutions – is essential.

#### **5.3.4. Education and Religion**

Allowing one's children to be educated is of highest priority to locals and also indicates prestige. People are ready to suffer from hunger and a lack of finances to be able to send their children to school. This is because locals perceive education to be a major factor in determining livelihood incomes, thereby also outcomes and overall potentials. Education can alter traditional household hierarchies, specifically household decision-making processes. Furthermore education is required to help locals deal with the constraints of environmental changes, because certain forms of societal knowledge, such as natural indicators of seasonal change, are ceasing to

---

<sup>43</sup> Female FGD participant from Biu, 09.11.2012, Biu, Ghana.

function, while the primary assets of agrarian livelihoods, such as soils, are becoming degraded and eroded.

There are two public and two private schools at the centre of Biu, one a private nursery and primary school, the others Junior High and two primary schools. In Mirigu there are six schools in total, none of which go beyond Junior High level (see Map 10). Yet formal educational facilities in both Biu and Mirigu lack quality. Public schools, upon which about 83 percent of pupils depend, are characterised by a lack of personnel, huge class sizes, broken chairs and tables. The aged schools are severely overheated in the day-time, while suffering from insufficient roofing whenever it rains (see Photo 11). Private schools better in all regards, but less than 17 percent are able to come up with the required fees. Even public schooling is already constrained by financial resources, because although education is supposedly free in the region, the truth is that people have great difficulties to come up with the required school equipment, like pencils, paper, additional books, and school uniforms. Consequently, almost every second household in Biu has at least one child (below 16) that cannot attend school. School attendance among children growing up in female-headed households is slightly higher than the average, suggesting that females may better cater for children when in charge.

Yet overall educational levels are low. About half of Biu's population received no formal education or only attended nursery level. About another third did not make it beyond primary school. About a tenth managed to attend Junior High school or secondary schools. Colleges were visited by less than 1 percent and even fewer, 0.3 percent, went to university. Among girls educational levels are generally worse. In Biu only about 40 percent of school attendees are female. They are less likely to access education and especially higher levels. Formal education to boost human capital is thus an exclusive asset (see Figure 24).



Photo 11: Public school building in Biu (own photo, 2012).

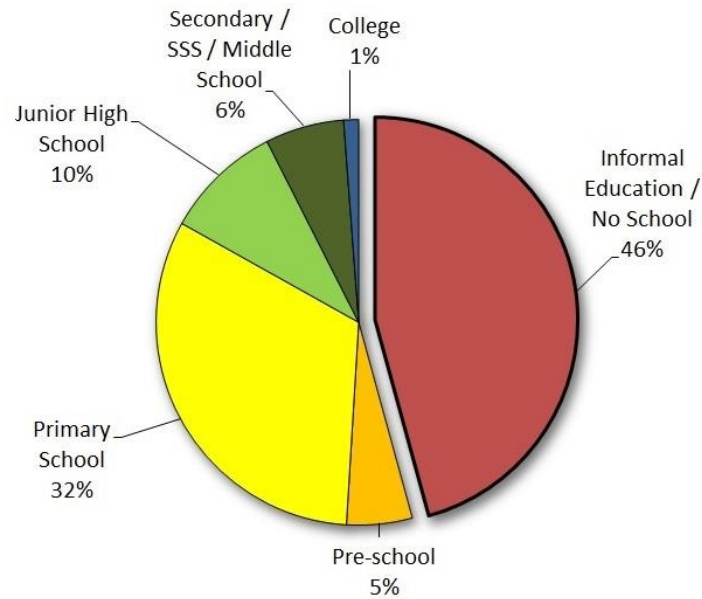


Figure 24: Education levels among Biu's inhabitants (without university attenders, own figure, 2014, own survey, 2013, n=177).

Improvements to the quality and quantity of education seem important. At the most basic level, it ought to be assured that at least public education is really free. At present a lack of uniforms or books can deprive students of school attendance. However, since the share of current school attendees among the under 16 year olds is far greater than the total share of population that has never received formal education, overall education levels are improving. Other sources of education are limited, since the possibilities of media usage are mostly confined to radio and mobile phone. About 80 percent of households own neither: 15 percent have a TV, less than 6 percent read newspapers, 6 percent own a PC, and just 3 percent access the internet.

The vast majority of locals are illiterate. Less than a third of all household members are able read and write. Locals possess greater oral skills, meaning that on average almost all households (98 percent) have somebody among them that can speak another of the many languages spoken in the Upper East Region, such that they could conduct business in that language. About 60 percent are able to do the same in English or another, southern Ghanaian language. French is basically unknown, with less than 1 percent of households having somebody able to speak it. Other languages than the native one, mostly regional ones, are spoken by less than 10 percent. Female household heads are generally able to communicate in a greater variety of languages, since their share among the households able to speak English or a southern Ghanaian language is significantly larger.

Due to such language skills, both men and women are thereby able to engage in a great variety of economic exchanges. Yet with such illiteracy, it is likely that economic exchanges may, at least on the side of farmers, be characterised as having little rationality in decision-making. Locals frequently emphasise that the commercialisation of agricultural production is still a

relatively recent phenomena. For example, most farmers state that barter trade was the most common form of economic exchange until about 30 to 40 years ago, and continues today, even though money has become more common for transactions.<sup>44</sup> During farm budget interviews with locals, it became clear that farmers are often unaware of the fact that their production is, in sheer monetary terms, unprofitable though they might be able to feed themselves somewhat sufficiently for some time after harvests. Without the ability to calculate gains and losses in production, and with a lack of records on the inputs invested, the likelihood of farmers encountering losses without them even noticing are high, as a formerly illiterate woman from Mirigu put it:

*'I would not have thought so, but all this time I was really losing money. When I had learned how to read and write and after my good friend here told me how to do my calculations on the farm, it was like I was stepping into the light. It opened my eyes and then I could see, but I did not like what I saw! [Laughing] It helped me a lot to better strategize the little money I have for my crops and to explain my side to the traders when they come here.'*<sup>45</sup>

The inability of farmers to rationally maximise profit is the most prominent mantra used to describe the mind-set of farmers among most government officials, especially at the MOFA. Experts were trying to emphasise that reasonable business opportunities could not be taken advantage of by farmers because most agricultural production is embedded in a cultural (belief) system that followed logics partly independent of market-based rationalities (see also Section 5.1.2). Though officials also attested to the fact that farmers would be interested in maximising their yields and thereby outcomes, including in monetary terms, they were trying to express that most rural farmers lack planning skills and act on a rather short-term basis instead of applying comprehensive, strategic concepts to their agricultural production. They simply miss evolving crop market potentials and thus continue to live at subsistence levels.

It may be correct to point to the limitations of rationality employed in decision-making, specifically when it comes to increasingly popular cash crops that demand a minimum consideration of costs and achievable incomes. However, this is the perception of a well-educated, westernised government elite, and their argumentation is equally useful to cover up their negligence in fulfilling their responsibilities. The officials are playing a blame-game. Farmers may be maximising their profits using the little resource endowment they have.

Furthermore, concepts of profit do differ. A farmer producing at a heavily diversified subsistence level will primarily talk of a profitable production in terms of feeding his/her household. In this sense, subsistence farmer decision-making may be highly rational in regards to everyday practicalities, even if it fails to account for market. Government officials may devalue

---

<sup>44</sup> Elderly participant of FGD, 10.01.2013, Biu, Ghana.

<sup>45</sup> FGD participant, 26.04.2013, Mirigu, Ghana.

and thus ignore the realities of farmers. Moreover, with an average ratio of about 2500 farmers to one MOFA extension officer, the likelihood of getting suitable advice with problems on one's farm is vastly limited, aside from the fact that extension services are said to severely lack in quality. Government officials may be overestimating the possibilities that exist in farmers' production systems while downplaying their own inefficacies.

Nevertheless, over the past three years about half of all farming households in Biu have received general training in better farming through the MOFA or ICOUR. Less than 40 percent have received practical help or advice with a concrete problem on their farm. Though these numbers are relatively high when compared to the extension-farmer ratio, it is equally so that among those not having received any support, 50 to 60 percent do not even know that these forms of help exist! Thus, about a quarter of all households are cut-off from any sort of possibility to enhance their level of '*rationality*' employed in agriculture, as defined by government officials.

Farmers in both Biu and Mirigu frequently emphasised that their general lack of education, especially with regard to literacy levels, deprives them of attaining information on government and NGO trainings, subsidies or other support. Those willing to improve their level of education are unable to do so, as thresholds are set too high on the side of development agencies. The uneducated are dependent on trustworthy and willing literates to acquire support or to gain an understanding of business arrangements to be made with these or others. Within the study communities, literates are invested with a lot of power and consequently attain higher livelihood outcomes, greater wealth. Equally at the household level, it is nowadays those educated few, possibly even children, who are consulted as to how to make better use of lands. Thus education can invert traditional hierarchies, specifically within households where educated individuals can serve as knowledge monopoly holders and selective disseminators of it. Indeed, major forms of attaining knowledge are based on social capital, since over two-thirds of respondents state they receive advice with problems on the farm from family or friends. Societal knowledge, often derived from tradition, is of great importance. 81 percent of households '*fully*' or '*partly*' agree that '*it makes sense to plant certain crops, because our forefathers also did them*' while only 19 percent reject this idea. So, decision-making is shaped by societal factors, specifically religion.

The greatest share of people is actively religious, since in Biu only 3 percent consider themselves as atheists. The vast majority of people are convinced that external, higher powers play a significant role in determining their livelihoods. Among those formally denominated, Protestants form the greatest group of believers (58 percent), out of which the majority follow quite a conservative evangelical belief system, as they attend the Church of Pentecost or the Presbyterian Church. The second biggest religious group is the 'traditional believers' (23 percent, especially males), followed by Roman Catholics (16 percent) and Muslims (0.4 percent). Thus, at a basic level, human capital is heavily shaped by colonial influences in the form of Christianity

and traditional beliefs. In Mirigu, the share of Muslims is higher, as is also expressed by the local mosque within the village centre (see Map 10). The locals, however, are quite flexible in the handling of their belief systems and to a large extent, one gets the impression that religious philosophies are actually based on a mélange of practically applied faiths. This is summarised in an FGD partly concerned with traditional beliefs and their influence on livelihood upkeep:

*'We have no problem with Christianity! It is only that the Christian pastors constantly talk about death. [...] I don't like that too much, but if it is so important, then we may as well do what they tell us, to also make the white man's god happy. So, we will make sure that we have a good afterlife by going to church on Sunday. However, many believe that if you want to make sure that you also have a good life today, then you must also worship our traditional gods. They are the original gods of our land and only they can help to get what you need today.'*<sup>46</sup>

The influence of traditional beliefs is of special importance to farmer livelihoods because no matter one's religion, this governs land uses to a large extent. People care greatly about how others perceive the crops they are growing. Though traditional believers represent only a minority of household members, three-quarters of Biu's respondents say that their land use is at least partly determined by traditional religious intentions, thus deeply embedded, social motives. Indirect influence of traditional norms and values on land use is vast. Traditional believers are mostly elderly people, often considered as household heads and always well respected in household decision-making (see before, Figure 5). More than 53 percent *'fully agree'* that certain crops must be produced in order to *'pacify [...] god(s)'*. Among these are traditional staples like millet and others needed for annual festivities (see also Section 5.1.2). The agricultural system is deeply socialised. Due to a reliance on cooperation, farmers are hardly fully independent producers, but depend on communal or group consent and in a wider sense on common norms of production. Beliefs thereby promote sustainable land use – unlike government agencies – because they define the type of crops to grow and ways of agricultural intensification, such as through manuring instead of inorganic fertiliser usage.

Most traditional crops with religious value, like millet or shea, are crops highly adapted to the local environment, require only manure, and are required for many traditional purposes. These crops simply must be produced. Almost two-thirds of respondents would *'partly'* or *'fully'* attest that disobedience to traditionally-set norms in land use lowers their attainable livelihood outcomes, as they believe that *'bad harvests can be a result of sinful behaviour of the people in the village'*. Notably, about 42 percent of female-headed households reject that idea. Women feel less dependent on these traditional norms regarding land use. They are very active in the

---

<sup>46</sup> FGD participant, 01.05.2013, Biu, Ghana.



preservation of trees to safeguard their shea. Traditional beliefs and thereby land use systems aim at environmental sustainability through trees, because beliefs inhibit their indiscriminate felling. 93 percent of those questioned ‘partly’ of ‘fully’ attest to the idea that ‘*spirits live in trees*’, which is why they ‘*cannot be cut down*’ without prior consultation of spiritual authorities like the landlord. All the presently sustainable forms of land use allow only marginal incomes. People would rather their finances improve than to consider the environment. As reflected in crop trends, environmentally sustainable values have been partly replaced by monetary ones.

### **5.3.5. Finances**

Financial capital is perceived as a major asset in shaping general well-being, vulnerability, food-security, future prospects of children (for education), thereby also human and social capital. Its possession shapes general livelihood outcomes. Overall dependence on agricultural markets is high – 80 percent of all households in Bui and probably similar shares in Mirigu depend upon selling their produce. Irrigation projects support the commercialisation of agriculture, since the share of those dependent on sales among those with no access to the irrigation project in Bui is 30 percent below the average. Those deprived of furrow irrigation, including all of Mirigu’s population, are in all regards most likely to remain subsistence farmers, as they are cut off from the potential benefits of market developments in irrigated crops. Financial capital is of further relevance because times of financial deficits correlate with times of food shortage. Thereby food security is generally worse in a place like Mirigu, when compared to those with access to irrigation, such as in Bui. However, as much as it is desired, financial capital is considered hard to attain.<sup>47</sup> Financial capital is indeed scarce, with more than 90 percent of Bui’s households claiming that they will experience times of ‘*very severe financial problems*’ throughout a year. This goes for savings as much as liquid financial capital.

#### **5.3.5.1. Outlines of Savings**

A general lack of finances is primarily apparent when looking at long-term savings in the form of animals. It is relatively uncommon for locals to have bank accounts, and animals are considered to be the primary form in which savings are made and multiplied. Farmers use them as a bank account and a form of security. They do not sell their animals just to make a profit, rather they use the earnings to pay school fees, dowry or to invest in housing.<sup>48</sup> This implies that saved financial capital is a rare form of capital. There is probably no other that is allocated as unequally. It accounts for small and large animals; however, it is most evident for bigger livestock like cattle

---

<sup>47</sup> Consent statement of participants of FGD in Bui with regard to the relevance of financial capital in making a living, 03.04.2013, Bui, Ghana.

<sup>48</sup> Interview with the KNE MOFA director, 12.02.2013, Paga, Ghana.

and donkeys. When assigning monetary values to the animals owned<sup>49</sup>, the mean average a household in Biu will have saved is 5679 GHC (with a range from 0 to over 47000 GHC). Though the average may seem relatively high, about half of all households have savings of less than 2700 GHC, and a quarter of the total have less than 1000 GHC, There are just a few very rich locals whose wealth biases the mean average severely. In fact, the ‘richest’ 10 percent of all households possess about 43 percent of all savings in Biu, while the lowest 10 percent have close to none savings at all (see Figure 25).

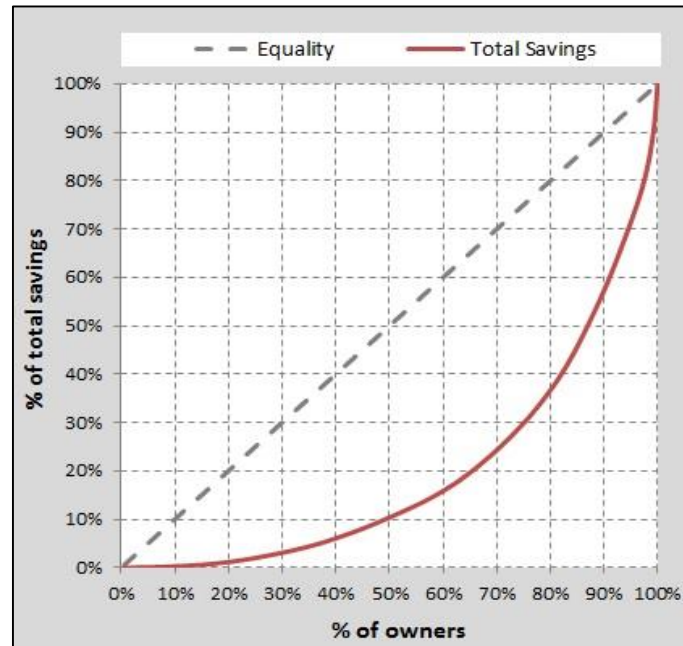


Figure 25: Allocation of savings in Biu (own figure, 2014, as deduced from numbers on animal ownership, numbers from own survey, 2013, n=177, and calculations based on MOFA data).

To put this into practical perspective: even if locals were to invest their entire savings in housing, about 42 percent of Biu’s households would not even be able to construct an emergency shelter to surely withstand growing incidents of torrential rainfall (see Table 8 and also Section 5.3.2). Similarly, liquid financial capital is constrained.

<i>Inputs (incl. sundries)</i>	<i>Costs (GHC)*</i>	<i>Costs (€)**</i>	<i>Costs (%)</i>
Zinc Roofing	200.00	87.00	9 %
Concrete Foundation & Walls	1135.00	494.00	48 %
Woodworks	350.00	152.00	15 %
Labour Costs	660.00	287.00	28 %
<b>Total</b>	<b>2345.00</b>	<b>1020.00</b>	<b>100 %</b>

\* Prices as at 22<sup>nd</sup> December 2012 and provided by a local construction company.

Table 8: Costs of one emergency shelter, a flood- and rain-proof room with 10m<sup>2</sup> of space and a maximum capacity of 6 people (own table, 2014, own expert interview, 2013).

<sup>49</sup> Based on average prices in the 4<sup>th</sup> quarter of 2012 attained from MOFA data, 2013.

### 5.3.5.2. *Outlines of Liquid Financial Capital*

The deprivation of many locals is evident when considering liquid funds used for daily livelihood upkeep that can later be turned into savings such as animals and be used for housing. The poor are hindered from improving the utilisation of their most productive resource, natural capital, because they cannot afford investments. Having to pre-finance farming seasons requires vast investments to later be able to capitalise on these, by selling of the thereby produces crops. Most find it '*extremely*' problematic to attain the inputs needed (see before, Figure 11), which must be regarded as a major obstacle to improved livelihood outcomes. Their acquisition is even more problematic than acquiring rainfed or even irrigated land. This poverty trap, based on a lack of financial capital, has a self-reinforcing effect. Fertilisers often make up the largest share of the costs of production. Other chemicals include herbicides, fungicides and insecticides. While seeds are often produced by locals themselves and mechanical ploughing may be substituted by own labour or hired personnel, such substitution is almost impossible for fertilisers and other farm chemicals. Income polarisation, in a broader sense, is caused by most locals not attaining sufficient inputs at the right time to increase yields and thereby monetary incomes. A popular strategy of those having sufficient money for fertilisers is to buy publicly subsidised ones at a time when few others require them, meaning lower prices are paid and timely inputs can be made to further increase possible incomes. Those struggling with their finances buy fertilisers when their price is high, and thus they miss the subsidies.

The most popular and relatively cheap cash crop in Biu, irrigated rice production, further illustrates the situation. Assuming that farmers make full use of the average 3 acres they cultivate at the irrigation scheme, while providing labour themselves, farmers have to invest a maximum of about 1110 GHC (roughly 485 €) at the beginning of the rice season. Assuming that seed and land preparation is also substituted by own work, thus excluded from the calculation, an investment of 678 GHC (about 296 €)<sup>50</sup> is required. Such low investments are already characterised as '*extremely problematic*' for most locals. Because allocation of land is highly unequal among locals, it is most likely that the majority has fewer funds at hand than Table 9 may suggest. For example, irrigation levies (90 GHC/39 €) are problematic for farmers in Biu, and thus have major effect on the very basis of livelihood outcomes. One of the greatest factors in land allocation is said to be the reallocation of lands from those unable to pay levies to those with funds and proven ability to use irrigated plots intensively, i.e. commercial farmers/local elite.

---

<sup>50</sup> 1€ = 2.29 GHC as at 22<sup>nd</sup> December 2012.

<b>Inputs</b>	<b>Per acre (GHC)</b>	<b>3 acres (GHC)</b>	<b>Share (%)</b>
<i>Irrigation Levy</i>	30.00	90.00	8 %
<i>Land preparation</i>	120.00	360.00	32 %
<i>Seed</i>	24.00	72.00	6 %
<i>Fertilizer: N.P.K.</i>	112.80	338.40	30 %
<i>Fertilizer: Sulphate of Ammonia</i>	48.00	144.00	13 %
<i>Agro-Chemicals</i>	35.40	106.20	10 %
<b>Sum</b>	<b>370.20</b>	<b>1110.60</b>	<b>100 %</b>

Table 9: Primary costs of production for irrigated rice at average intensity and an expected yield of 2 tonnes per acre (own table, 2014, based on data obtained from ICOUR, 2013).

Just paying the irrigation levy is already problematic for many, sometimes resulting in the loss of land at the irrigation scheme. Thus, a lack of just 30 GHC per acre can, at certain times, make a household lose its right to easy dry season irrigation. In Mirigu, constraints imposed by fees charged by the local landlord for dry season cultivation in proximity to the river have a similar effect. Credit and support is thus essential just to maintain one's livelihood, not to speak of improving it.

#### **5.3.5.3. Sources of Credit and Support**

The poor have only a few formal sources of support, specifically credit. Banks are hardly ever an option, but public institutions like ICOUR and the MOFA, as well as USAID, provide support and vertical contractualisation in agricultural production through freely credited inputs, most of which are inorganic fertilisers. The government, through ICOUR and MOFA, is active in distributing fertiliser subsidies to locals, but officially only during the wet season. These subsidies give a general 50 percent discount on fertiliser prices and reach about 42 percent of male-headed, but less than 30 percent of all female-headed households in Biu. These government agencies are content with their 'Block Farming' (BF) programme, which is part of the 'Youth in Agriculture' initiative and provides subsidised fertiliser on credit. Arrangements in the Block Farming project are based on formal contracts and reach about 26 percent of Biu's households, whereby an almost equal share of recipient households are male- and female-headed.

On the other hand, inputs and money coming from friends and family as credit are more widespread, reaching about 40 percent of Biu's households. Depending on the social relationship between lender and borrower, credit interest can range from free to exorbitant. Credit lent within households is usually interest-free. However, in rice production it is common that cheaply attained, subsidised fertilisers are used to 'sponsor' farmers at the onset of the rice season in exchange for a share of the forthcoming rice harvest. This is fixed at the market prices prevailing at the beginning of seasons. Intra-community sponsors thus first bet on rising fertiliser prices, and then rice prices, both of which are highly lucrative. Even without a difference in rice prices, the sponsors can thereby easily obtain a margin of about 40 percent without having to bear as much risk and effort in rice cultivation themselves, while bypassing the issue of land scarcity and being able to monitor their outsourced production in close (spatial and social) proximity.

Equally popular are credits from traders. More than another third, almost 38 percent of all households in Biu and especially females, receive money or inputs, mostly fertilisers and agro-chemicals as a comparatively cheaper seasonal credit from a buyer of their products. Such credits are the most prominent form of direct support to both female- and male-headed households. When farmers are able to produce a good enough quality harvest, such forms of outgrower farming provide mutual benefits. Traders may forward cash for inputs like fertilisers or sprays, which farmers could otherwise not afford, whilst farmers are willing to forward their produce on credit and patiently wait for traders to sell the product.<sup>51</sup> Such a form of contract farming is evident in the production of many crops, especially cash crops. Commonly, inputs, especially fertilisers, are given out on credit or in the form of cash, which is later paid back with interest and in kind.

Credits from traders reach a slightly larger share of people than many other forms of external help, like government fertiliser subsidies or development aid, while showing significantly less bias according to gender. When considering sources of external help that provide inputs prior to (guaranteed) sales, inputs given by traders on credit are more important than USAID and government efforts. Only the government fertiliser subsidy reaches a similar share of people, but only among male-headed households, followed by Block Farming. Overall, about 30 to 40 percent of local households are thus provided with some practical form of external support, inputs on credit, in their business endeavours. Yet, no form of help reaches a majority of locals, despite about 80 to 90 percent of non-recipients, mostly women, knowing about these programmes. Thus, most of these initiatives have in common that they are hard to access. Right of entry is especially difficult for females, so women rather use their social capital to acquire credit and support informally through friends and family. If not provided, they may be hindered in the production of certain crops, mostly high value ones.

#### **5.3.5.4. Crops and Possible Incomes**

Farmers associate major inputs for agricultural production and general access to markets with financial capital, money, and also human capital, labour, according to different crops. Input requirements and thereby financial and labour requirements naturally vary by crop type. At a basic level, access to the production and then market of a crop, a livelihood pathway, is defined by the initial investments in financial and labour terms required for meaningful production, which relates to a long-term, more strategic perspective:

*'If you do not have the money and the time to do a thing like the pepper [chili], then you better not be doing it at all. It will not turn out well for you! You need the fertilisers, the sprays and all that, or it will just die one day! [...] So, you need the money [...] at the right moment. [...] At first, I*

---

<sup>51</sup> Interview with a farmer from Biu, 26.10.2013, Biu, Ghana.

*could not do that and so I was wise not to have tried like some of my friends who are now down [have failed]. So, me, I did the rice first, which is cheaper but will yield and yield and yield! Then I started migrating into the pepper. [...] It is now that the pepper can fetch me plenty!*<sup>52</sup>

With differences in the levels of initial investment needed in crops and with altering gains made possible by investments – whereby, in numeric terms, higher investment is most often rewarded with higher net returns per season – one can characterise the level of economic upgrading of livelihood pathways accordingly. Farmers that work on more sophisticated and more expensive crops may have shifted ‘to more rewarding functional positions or by making products that have more value added invested in them and that can provide better returns’ (GIBBON & PONTE 2005: 87-88). As was already indicated with regards to farmer rationales (see Section 5.1), a basic and practical distinction can be made between crops like tomato and chili, crops like rice or maize and traditional crops like millet and groundnut. The latter gives the smallest yield but requires little initial investment and has a relatively high market value per kilo. Tomato and chili on the other hand promise far greater returns, though they are hardest to finance and manage. The other crops like rice and maize are found between these extremes. Especially maize is attractive, with a promising ratio of initial costs to net returns. What all of these crops share, is that producers are, theoretically at least, able to pay themselves or their employees the usual wage of about 6.00 GHC/man-day, even if farmers were to sell their product at the exact producer price without any net return (common wage in 2012, see ICOUR 2013: 10). That is significantly higher (+25 percent) than the minimum wage of 4.48 GHC/man-day (KPMG 2012: 13). When considering net returns per acre and assuming that nobody is employed for production, double the common wage is easily attainable for farmers themselves (see Figure 26).

Yet in reality the yields of socially and spatially marginalised farmers vary greatly, and when considering production outside of irrigated areas, it is likely that yields may be lower still when calamities like flood or drought occur. Most responsive to such are tomato and chili, followed by rice and maize, and then millet and groundnuts. However, the average numbers used in the above calculations give a useful impression of the input-output-situation (based on yield estimates and farm budgets attained from MOFA Accra, 2013, and MOFA 2011a, 2013a). When not considering irrigation levies, or replacing these with similar fees charged for land use, the calculations are also transferable to Mirigu, though it is important to note that when looking at dry season production, labour requirements will be far higher in the case of Mirigu’s SGI production. So, it will be harder for SGI farmers to acquire sufficient incomes or at least minimum wages. But, one can assume that high incomes are still possible among those having access to quality

---

<sup>52</sup> Based on field notes and interview with a male farmer from Biu, 11.12.2012, Biu, Ghana.

land and finances to make use of the agricultural inputs required. That goes for the production of most grains and tomato or chili, with the exception of traditional crops due to low yields.

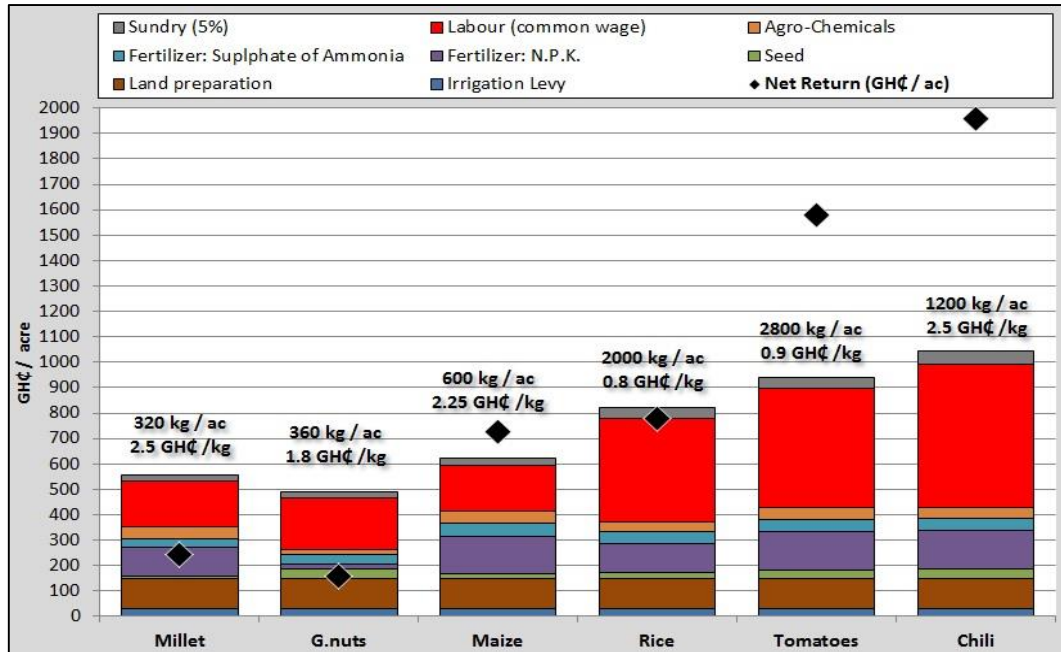


Figure 26: Average costs of selected, irrigated crops, expected yields, prices and net returns per acre in the 4th quarter of 2012 at common wage of 6 GH¢/man-day (own figure 2014, based on ICOUR, MOFA and USAID ADVANCE data, 2013).

When looking at shea products, a typically female-led traditional cash crop, inputs and outcomes differ greatly. Though prices fetched per kilo are the highest among all crops, production of nuts and butter requires larger investment in equipment. In sum, the equipment needed to produce nuts and butter can cost slightly more than an acre of chili (easily more than 1,000 GH¢/). However, when done properly shea processing can allow more than 3 tonnes of nuts or about 750kg of oil to be produced each year (extraction rate of about 25 percent), independent of rains and without necessarily needing to be in possession of lands when nuts are plucked in uninhabited areas, the ‘commons’. Moreover, many women already have most of the equipment at hand as they use it to prepare food. Once the equipment is available, variable costs of production are comparatively insignificant. Most equipment will depreciate at a fairly slow rate, lasting at least a year if not two, and further inputs like firewood and water, milling are relatively cheap to come by and are easily available. The labour input required is in fact the greatest single production cost, which has to do with the amount of time spent in gathering and de-pulping. It is not possible to attain a minimum wage of 4.48 GH¢/man-day, not to speak of 6.00 GH¢. Women in shea production are at best able to pay themselves a wage of about 30 GH¢ per 100 kg of processed nuts, which translates in to a wage that is more than a quarter below the official minimum and almost 47 percent below the usual. When further processing self-produced nuts into

shea butter, overall a higher income can be generated but this caters for about 55 percent of the minimum and about 41 percent of the common wage (see Figure 27).

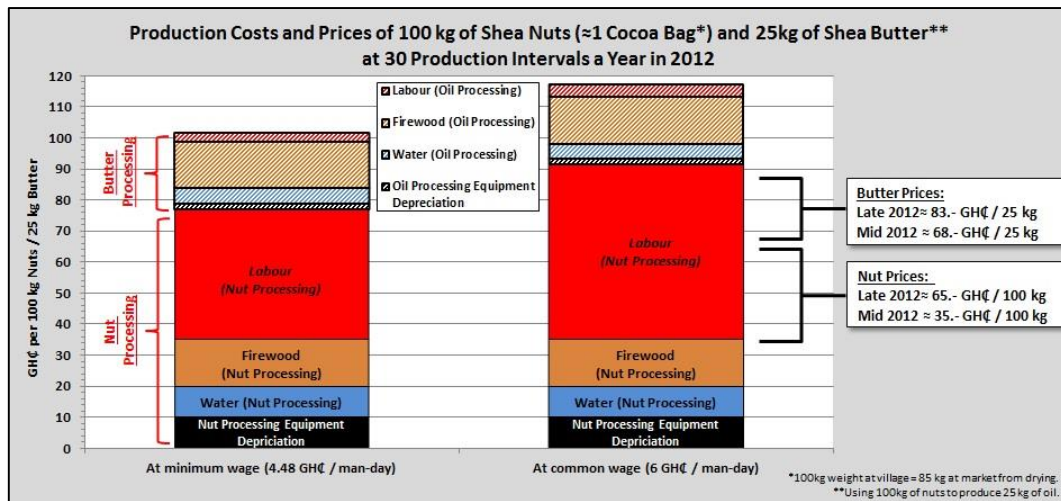


Figure 27: Estimated prices and production costs of 'optimal' shea nuts processing and butter production at minimum and common wage in 2012 (own Figure, 2014, own FGDs, 2013).

Consequently, those who process shea must be desperate for money and turn a blind eye to equipment depreciation. Only then can minimum wages be attained for the processing of nuts and butter from mid-season onwards. Another viable possibility is to specialise in butter production and to buy the required nuts. Then shea butter production becomes partly economically-sound in terms of one's own wages but only at the expense of paying nut processors below the minimum. Shea production is thus good for emergencies but nothing one could build a better living out of.

Price variability is also extreme for other crops. Attainable prices generally differ by location. Farmers state that as a result of differences in product quality, farm gate prices in Mirigu are often higher for tomato or chili as compared to Biu, though lower for rice. This is because quality rice requires irrigation, controllable and high amounts of water, while a lack of irrigation as found in Mirigu requires watering by bucket which favours quality tomato and chili because these cannot be overwatered as is the case with furrow irrigation in Biu. Furthermore, prices of tomato and chili fluctuate wildly – are highly volatile – according to seasonality, while a crop like rice encounters changes in pricing throughout the year though comparatively smaller ones. Consequently, price risk in tomato and chili and therefore in Mirigu, is higher than in rice and therefore in Biu. Tomato and chili farmers must be relatively punctual to profit from market prices. Moreover, due to a lack of cooled storage facilities, specifically tomatoes are most dependent on timely sale.

Similar issues arise when looking at shea nut and butter production. Though prices do not differ by location, according to season prices can alter up to 100 percent for nuts and about 20 percent for butter. Prices of both nuts and butter drop harshly during the harvesting season of nuts. Thus shea production, especially butter production, is profitable only during the off-season,



because prices rise significantly (see Figure 28). Therefore, shea nut and butter producers sell during times of high pricing, as their produce is otherwise almost valueless. However, farmers often miss the most profitable timeframes, because they start production relatively late. Major selling times then coincide with rather low farm gate prices for chili, tomato and rice. Throughout the first half of the year, when unable to produce tomato and chili there are hardly any income sources attainable and so locals face a lack of finances and food as seasonal cash flows are interrupted (see Figure 29).

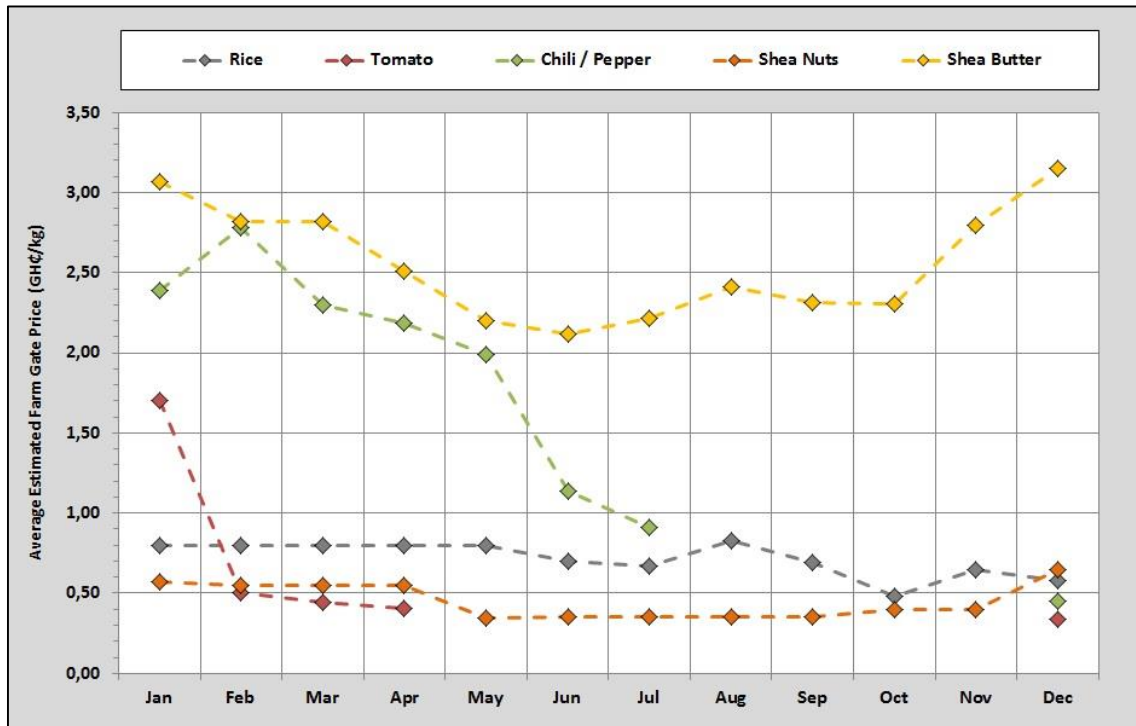


Figure 28: Estimated farm gate prices of rice, tomato, chili and shea in 2012 (own figure, 2014, own FGDs, 2013).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rice (Irrigated)	P	P	P	P	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
Rice (Rainfed / Irrigated)	Shaded	Shaded			P	P	P			Shaded	Shaded	Shaded
Tomato	Shaded	Major	Major	Major	Shaded					P	P	P
Chili / Pepper	Shaded	Major	Major	Major	Shaded	Shaded	Shaded		P	P	P	
Shea	Major							Shaded	Major	Major	Major	Major

Figure 29: Major (coloured) and minor (shaded) selling times of selected crops and their major planting times ('P') (own figure, 2014, own survey, 2013, n=177 and FGDs).

The potential to attain better market prices – by delayed or early selling of produce – is limited by overall household assets and livelihood outcomes. A lack of these favours a late start in production and fast selling at harvest time, which can then again further delay the beginning of the next cropping season. Aside from overall limitations in assets and outcomes, further constraints in

attainable market prices are imposed by the relatively high and continuous investment required in products other than shea. Lands must be prepared for the next season, but since farmers sell their crops at a low price, future investments are blocked. This continues to affect farmers because when they need more time to acquire finances, they delay production, and keep on lagging behind for many crop cycles to come.<sup>53</sup> This vicious circle ensures that harvests cannot coincide with times of high prices.

Although locals appear to be in a poverty trap, overall market trends are said to be positive. Despite the negative effects attributed to globalisation tendencies over the previous decades (see also Chapter 2), farmers attest to positive change. More than 50 percent of Biu’s household heads even claim that globalisation tendencies do not at all or only partly affect their chances of selling their crops. Overall market demand has grown tremendously for both male- and female-headed households. Looking back over their lifetime – on average the past 50 years – over 72 percent are convinced that the number of buyers of their crops and thus the demand for their work has significantly increased. Furthermore, people are of the opinion that popular forms of cash cropping – rice, chili and also shea – are increasingly profitable, possibly with the exception being tomato and below-average improvements in shea markets. Most significant income advances are said to be made in chili and rice (see Figure 30).

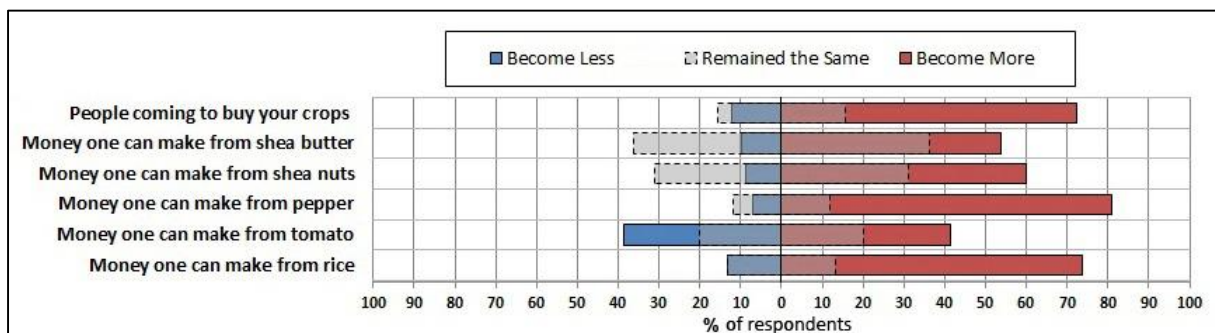


Figure 30: Trends in financial capital and its major sources, as perceived by households in Biu (own figure, 2014, own survey, 2013, n=177).

Similar trends are evident when looking at more recent dynamics. From 2005 to 2012, real farm gate prices at least doubled for the most popular cash crops, despite a high inflation of on average 12.64 percent. Most constant was growth in prices for shea butter, chili and rice, while crops like shea nuts and tomato have instead rather encountered severe ups and downs. The biggest improvements in prices are for chili, followed by shea butter, rice and tomato. Developments in shea nut prices could, on the other hand, have been negative in some phases of the last few years. When only considering the more recent past, these must equally be considered as positive. Nevertheless, increases in shea butter prices outweigh those made in nuts, its

<sup>53</sup> Interview with a farmer from Biu, 23.02.2010, Biu, Ghana.

preliminary product. So, while it is increasingly rewarding, though at a very low level, to produce shea butter, this is only partly true for nuts. Since it seems evident that butter production can only be economically sustainable when nuts are bought at prices that only allow for appalling wages, market dynamics put a severe damper on the livelihood outcomes attainable by the lowest part of the shea value chains, the nut processors, women. At the same time these dynamics favour further segmentation between nut and butter processors in terms of specialisation, overall socio-economic situation and hierarchies between the two. With shea being a typically *'female crop'*, these dynamics suggest that developments in financial capital are possibly polarised among female-headed households (see Figure 31). These are estimated values, it is worth remembering, and can only be understood in terms of their basic direction. Limitations arise because economic exchanges are heavily shaped by horizontal and vertical social interaction and cooperation.

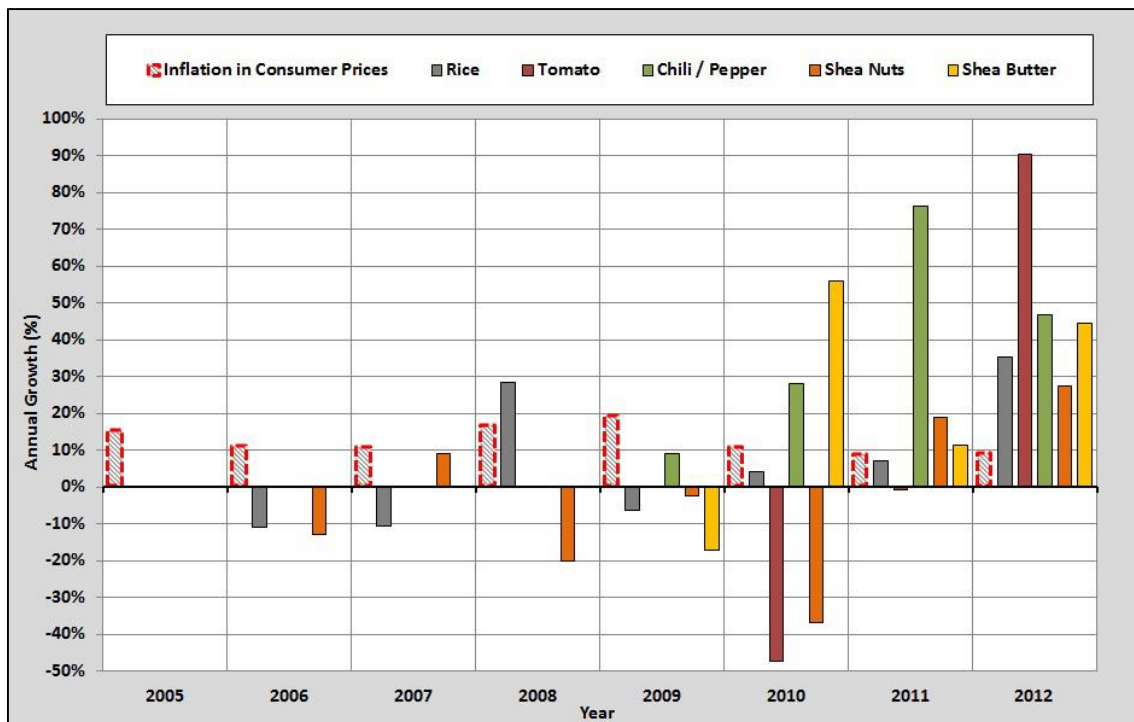


Figure 31: Annual inflation and adjusted growth in farm gate prices of selected crops in Bui and Mirigu (own figure, 2014, own FGDs, 2012/'13, inflation rates based on WORLD BANK 2014).

### 5.3.6. Social Interaction and Cooperation

The social capital that farmers use to advance their livelihoods is assumed to be the basis of social interaction and cooperation. In reference to institutional contexts, interviewees associate social capital with its vertical form, specifically a conflict of local elites with less privileged community members, or of local leaders versus their subordinates. Social capital is thereby strongly associated with financial capital. Needed for land preparation and crucial in times of crisis, social capital is used for decision-making processes in household units as much as it is for decisions that affect the whole community. Thereby, deficits in social capital are associated with a lack of organisation by the most vulnerable parts of society, which leads to further problems in

hierarchical relationships. The following sections first and foremost analyse and describe the importance of social capital and its general allocation within and between households, and then with regards to hierarchies within villages.

#### **5.3.6.1. Horizontal Social Capital**

Social capital in its horizontal form is an asset highly prized by locals. The vulnerable depend on it in times of crisis. Mutual bonding within household units, for example, serves as a social safety net for the aged, since almost no elders receive retirement pay. Social obligations among villagers do not stop at the borders of blood relations. At least every second household will have a minimum of one non-relative living with them. While an average male-headed household tends to cater for another 0.59 people from outside their immediate kin, female-headed ones will averagely accommodate another 0.82 people.

Still, 45 percent of all heads of household, and 52 percent of female heads of households, *'fully'* believe that the extended family system – whereby mutual support is provided beyond immediate, often biological relatives – *'is a thing of the past'* and that the nucleus family nowadays serves as a social security net. Another 35 percent of female-headed and almost 40 percent of male-headed households agree *'partly'*, while only 17 percent reject this idea. Another third of male and female interviewees claim that general cooperation and help among community members has decreased over their lifetimes. Yet almost 45 percent attest no change, while about another third claims that cooperation has increased. FGD participants explain contemporary individualisation tendencies with a reference to rising financial burdens – mainly in terms of rising costs for agricultural inputs and school fees – and describe systems of support as based on the functional logics of mutual exploitation:

*'You will see that we help each other out a lot, because we all depend on getting help to do our farming, to eat. But really, if you look more closely, you will see that it now has limits. [...] We were closer together in previous days because we did [...] not have such high expenses!'*<sup>54</sup>

Somewhat following the logic of social capital multiplication and diversification with the aim to exploit societal connections, more than 65 percent of households are *'fully'* convinced of the idea that *'one must try to become friends with many different people, so that there is always somebody there to help, when a problem occurs'*. In total, another third of households interviewed agree at least *'partly'* to this idea, while only a minority of 6 percent disagree. Thus households actively and intentionally diversify their social assets to widen their security nets. 93 percent of all male and female heads of households *'fully'* agree that concrete benefits should derive for themselves, from having friends or relatives in favourable, social positions. Another 7 percent

---

<sup>54</sup> FGD participant, 09.05.2013, Bui, Ghana.

agree at least *partly*, while less than 1 percent rejects the idea. To do so, people are ready to exploit potential benefits even to the disadvantage of their fellow citizens. If there is an opportunity at hand 74 percent are at least *partly*, if not *fully* convinced that they will make sure to *grab what they can*, even if that causes *problems for others*. That many residents of Bui and Mirigu survived severe famines in the past helps explain this broad prevalence of attitudes. Thus, horizontal social capital can undermine the livelihoods of others and their options.

Horizontal social capital varies by one's position within a household, and is primarily dependent on age and sex. Older men have often managed to attain the most favourable social positions and also basic decision-making processes at household level are in fact biased, if not inverted, by gender and seniority. While the average age of Bui's inhabitants is less than 25, the average age of those recognised by others within households as being the major decision-makers is double this, at 50 years. The share of decision-makers rises according to age cohort, though they represent shrinking shares of the total population (see before, Figure 5). Men are most associated with general household decision-making, even within female-headed households, taking *decisions that affect the whole family*, especially the selling of main assets like animals, and regarding land use, and the selling of crops (see Figure 32). Due to their low social capital base, women are often forced to provide the greatest amounts of labour. Women additionally cater for children, clean and cook, whilst also working on shea, own staple crops, and others' cash crops.<sup>55</sup>

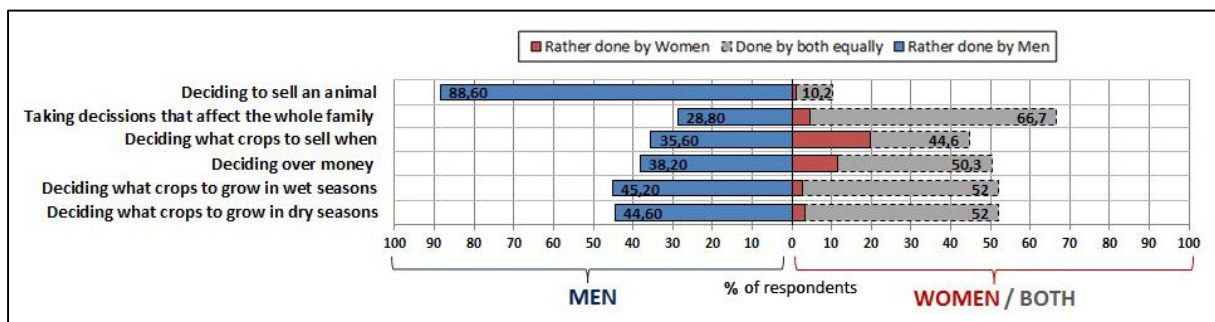


Figure 32: Gender and household decisions in Bui as perceived by household heads (own figure, 2013, own survey, 2013, n=177).

Responsibilities to fulfil religious duties are primarily associated with men. Women are primarily associated with attempts to stabilise and increase social bonding, within and between households. For example, women often take care and speak in the interest of their children. Men, on the other hand, are strongly associated with physical violence and conflicts within households and with others in the village. More than 71 percent associate risky behaviour with men, compared to 23 percent that equally attribute it to women. Just 6 percent associate it with women

<sup>55</sup> Interview with USAID ADVANCE management, 12.04.2013, Bolgatanga, Ghana.

only. In combination with an overwhelming majority of 85 percent associating alcoholism – as much as consumption of marihuana – with men, it is clear that sub-optimal decision-making is likely to result from the unequal allocation of horizontal social capital, used for monopolising power among men.

Gender differences at the household level arise from the fact that society is patrilocal. Women have to involve themselves in yet unknown social fields after marriage, while men continue interaction on common grounds and with the backing of their socially and physically close relatives. While this may lead to spatially wider and more diversified social security nets among females – as has been shown in reference to locals dealing with the adverse effects of flooding and drought – women enter new social fields without many possessions after marriage. In fact, wives are considered to be men's assets, as they are said to be *'property of their husbands'*, an idea to which 64 percent agree *'fully'*, another 25 percent *'partly'* and only 11 percent disagree, almost as much among male-headed as among female-headed households' respondents.

If women do not obey social norms and values, like male domination, they can be branded witches and expelled from the village. The greatest share of people, *'partly'* of *'fully'* believe in the idea that women have the potential to *'become witches that possess negative, magic powers'*. 28 percent believe this to be *'fully'* true, 43 percent at least partly. Just less than a third rejects the idea. Interestingly enough, among female-headed households the share of people *'fully'* backing the idea is quite similar though 10 percent more reject it fully. Women frequently undergo humiliating and inhumane widowhood rites performed alongside annual funeral celebrations, in which they must prove they have not used black magic to cause their husband's death. After having undressed, a gourd will be used to pour boiling hot, herb water onto the widow's head. The degree of her burns determines her share of the responsibility for her husband's death. Women can then be excluded from village festivities, and branded as witches, which leads to a withdrawal of mutual support. They may further be forced to leave the community and migrate to one of the witch villages in the region, if found guilty. 44 percent of all households in Biu are *'partly'* or *'fully'* of the opinion that such *'rites should be performed on women'*. Even 35 percent of female interviewees agreed with it. There is more than sufficient room to argue for a grave and deeply embedded, moreover an internalised, societal oppression of women. This may limit potentially positive outcomes for children, especially those of the most vulnerable households.

Social capital is of further relevance for attaining external support in agriculture. The money or other inputs provided by family or friends, including free support with labour and advice, is essential to finance agricultural production. Social capital for these activities can be generated by cherishing societal norms and values and by complying with inherited forms of land use. Traditional, non-mechanised forms of land use create further social capital, as communal

work can increase bonding, thus horizontal social capital among locals. This may partly grant further access to mutual support, ‘horizontal forms of contractualisation’, and improve agricultural production and livelihood outcomes for both men and women, though it could also limit the individual’s potential in pursuing innovative forms of land use. The poor are especially reliant on communal work. Better-situated households can afford to pay workers, however, most of their work is completed using free labour attained by social capital. When looking at the production of tomato, chili, rice, shea nuts and butter, it is clear that none of these activities are ventures pursued by individual, economic actors. Rather they mostly depend on social interactions because they often require unpaid labour.

Male-headed households receive slightly more voluntary help – people working without direct compensation – than female-headed households. Thus community social structures again favour men. Yet crops considered as typically female and traditional, like shea nuts and butter, are dependent mostly on free labour. On average, almost 64 percent of all workers helping with the production of shea nuts in female-headed households worked without payment of any kind. More so, at least twice as many people help freely in the production of shea butter, when compared to those who charge for help. In male-headed households, people also receive relatively big support in the production of chilies, since almost 57 percent of their helpers work for free. Yet, the level of social capital invested in producers of the crop is two-sided. They are said to lack social capital, since their product does not have any affiliation to traditional land uses. Normative conflicts between subsistence agriculture and more market orientated livelihood pathways are indeed most evident when looking at tomato or chili production. Especially in Mirigu, farmers frequently talk about the fact that people would regard their money made with cash crops like chilies and tomato as being ‘dirty’, mainly because it lacks uses for traditional purposes/cultural affiliation. On the other hand, there is quite some resentment or jealousy present in perceptions of farmers of cash crops like chili:

*‘They’ll say you people have gone to make your dirty monies, your useless monies [...]! [...]They only look at the monetary grounds. They will not consider money as dirty when an armed robber brings it to them. But people will criticise that we’re enjoying dirty money. [...] I thought people will rather say that we should teach them how to farm pepper and so on, but they rather sit at home and then insult. [...] People have a lot of wicked intentions against us because they are not used to the pepper. It is not custom to do it like with the millet.’<sup>56</sup>*

Those products done primarily by women are the most dependent on subsidised work attained through social capital. Female-headed household show a greater dependency on social

---

<sup>56</sup> Interview with a chili and former tomato farmer from Biu, 03.04.2013, Biu, Ghana.

capital. Looking at remittances from migrants, female-headed households are by far more dependent on external donations (+ 19 percent, Ø 37 percent) despite the fact that about the same share of household members has migrated as in male-headed households. Horizontal social capital spans beyond village borders, especially for women, and provides a crucial source of income, especially for those having insufficient lands or agricultural inputs to intensify production. Horizontal social capital is of special significance to women, because they are most dependent on making use of social capital to attain work, vertical social capital, among their colleagues.

Compared to their male counterparts in terms of income sources, female-headed households are more dependent on casual labour (+12 percent, Ø54 percent). They depend on good horizontal social relations to access these. This may indicate that women are more likely to become subordinate workers than prosperous farmers. Their seemingly weaker social capital basis in its horizontal form may deprive them of attaining greater amounts of vertical social capital. Usually men have larger acreages and more money and so they hire the women as laborers.<sup>57</sup> Males are also the primary external representatives of households, and so the management of vertical relationships or bonding ties is firmly theirs. For example, though 53 percent of interviewees claim that going to political leaders for help is as much a man's task as it is a woman's, 42 percent tend to associate it only with men and 5 percent with women. This is especially the case when going to the landlord or chief, going to government agencies or NGOs for support, and when speaking out on community problems in public.

#### **5.3.6.2. Vertical Social Capital**

Several authorities/institutions of relevance for vertical social capital and livelihood advances within Biu and Mirigu were mentioned in FGDs. All are male-headed and it seems that males are not only more likely to become the employers of females and control contact to the most important institutional authorities, they also embody them. Among authorities of primary local significance are chiefs that nowadays represent the lowest level of jurisdiction, a landlord that administers rainfed lands, elders that support community decision-making, the assembly man who is the only '*democratically*' elected authority, farmer organisations, government and development agencies and traders of various crop seeds and inputs. These are examined below, keeping in mind their perceived significance for livelihood sustainability.

#### **Basic Authoritative Structures**

There are three chiefs in Biu, each administering a section of the village – Seenza, Kodima and Jaago – whereby the chief of Seenza is superior to the chief in Jaago and contests over paramouncy with the chief of Kodima. In Mirigu there is only one paramount chief with various

---

<sup>57</sup> Interview with USAID ADVANCE management, 12.04.2013, Bolgatanga, Ghana.



subordinates. The chiefs are generally acknowledged as being there for and *'leading the people'*, but locals are also quick to emphasise that chiefdom is a recent phenomenon, and that the *'real'* or *'traditional'* political head of communities is the paramount landlord (a.k.a. *'Earth Priest'* or *'Tengnyam'*). In pre-colonial days landlords not only administered land, they were equally the only religious and political leaders of communities (TONAH 2008: 116). The colonial administration tried to replace them with more allegiant functionaries, chiefs (BERRY 2008: 46), to establish indirect rule. Since 1883 land administration was formally placed under the jurisdiction of these newly introduced authorities (AMANOR 2008: 63), who then also became political representatives, partly overtaking the roles of landlord. Nevertheless, landlords continued to this day to administer land according to customary laws, though in competition with the newly made chiefs, especially in Biu (TONAH 2008: 128).

Chiefs were, however, able to capitalise on their positions and to commercialise their power through the introduction of compulsory labour, which since colonial days has often created a major disconnect between the chiefs and common folk (SONGSOORE 2011: 88-90). Today, the landlord still administers and thereby partly grants or denies access to all rainfed land, aside from fulfilling his role as a religious authority. But due to the growing powers residing with chiefs, many locals nowadays consider the landlord as *'rather being there for the land'*. In Biu, the landlord has managed to retain a vast level of political authority, because the chief of Seenza is his brother, which is why they can closely coordinate their actions against their common rival, the chief of Kodima. With Kodima's chief arguing for a further separation of powers – to take paramouncy himself – this situation caused violent clashes in the 1990s (LAUBE 2007: 137-139) and, as locals state, has remained a subliminal conflict between leaders and their immediate supporters; nowadays carried out by the strategic allocation of external support such as that provided by development agencies (see Section 6.3 for details).

Government agencies like the MOFA or NADMO are active in agricultural development in the villages. NADMO is responsible for bringing disaster relief to the community whenever necessary. MOFA deals with the advancement of agriculture, most often by providing input subsidies, subsidised fertilisers, advice or training. In the case of Biu, MOFA endeavours are side-lined by ICOUR, responsible for managing the local irrigation scheme. Development organisations (NGOs) frequently patronise both Biu and Mirigu. Currently the most prominent one is USAID, which tries to advance local agriculture in rice. To receive their support, most farmers are organised in Farmer-based Organisations (FBOs), parts of which are members of the local farmers' union, the Tono Irrigation Cooperative Farmers' Union (TICFU). FBOs were initiated by the MOFA (and ICOUR) with the aim to ease subsidy distribution to a large number of farmers and, if given on credit, to spread liability among group members as a form of collateral. FBOs continue to serve as platforms for other such forms of help, like USAID interventions.

Leaders of FBOs and TICFU representatives are often responsible for allocating subsidies and organising sales with large-scale buyers attracted by organisations like USAID. They are thus invested with quite some additional powers that enable them to be actively involved in pro-poor development.

### **Power Levels, Pro-Poor Engagement and Major Issues Faced**

Biu's households were asked the level of power that authorities and institutions have to change their everyday life. All believed that the greatest potential to change their lives lies in the local irrigation system management. 43 percent consider the project manager most important because he allocates land at the project. 33 percent consider Kodima's chief most important, while 31 percent consider NGOs and 30 percent the landlord most important. Just behind these are various government agencies, namely NADMO (28 percent), ICOUR (26 percent) and MOFA extension (22 percent). Of little significance is the local assembly man; the only democratically elected representative. Yet, less than 16 percent believe substantial powers are invested in him. 8 percent consider the elders percent to have powers, and even fewer, 4 percent, think the same of FBO leaders. Significant differences exist between the local chiefs, whereby the chief of Kodima is perceived to exhibit far greater power than the other two chiefs. 33 percent of those questioned believe that Kodima's chief possesses great power, while only 7 percent would associate such power with the chief of Seenza and even less (just 1 percent) with Jaago's chief.

Noteworthy are differences observed in the perceptions of female and male heads of households. Generally, female-headed households tend to perceive all institutions to have greater levels power than they actually do. For example, while almost 29 percent of female-headed households would say that the average political or administrative institution in Biu has '*great power*' to change their lives, only 19 percent of male-headed households would say the same. This supports a point raised in a FGD, that female-headed households feel more dependent on the external support brought forward by local authorities.

Overall, the institutional assistance available for locals is quite variable. The chief of Kandiga in Biu, who is described as especially powerful, is also '*greatly*' engaged in bringing pro-poor help to the village, namely via USAID, according to more than 45 percent of those questioned. Less than 5 percent think the opposite. No other institutions engaged in Biu can boast of similar support. The two other (powerless) chiefs in Biu are, on the contrary, hardly ever associated with bringing in such help; they are often characterised as being '*poor and uneducated, yet fair*'. Their lack of knowledge of the English language, their lack of personal transport and overall assets, as well as their resulting lack in connections to the regional capital, where most foreign aid interventions and government subsidy dispatchers resign, are said to be the decisive factors for why these chiefs are unable to acquire more external help.

Of further significance in terms perceived of pro-poor engagement are – in descending order – NGOs (esp. USAID), NADMO and the ICOUR project manager, ranging from 34.5 to 24 percent in terms of showing ‘great’ pro-poor engagement. Just 12 to 17 percent associates pro-poor engagement with the assembly man, the landlord, MOFA and ICOUR extension services, and less than 8 percent with FBO leaders or village elders. Aside from NGOs and the Kandiga chief, there is a significant polarisation of perceptions. For example, 15 to 23 percent of all those questioned attest no pro-poor engagement at all with regards to the assembly man, the ICOUR project manager, NADMO, the landlord, ICOUR extension officers or FBO leaders. Even more pronounced are differences with regard to MOFA extension services. While roughly half of respondents believe they are engaged in helping the poor, more than 28 percent believe they are not at all engaged. The role of Bui’s primary public institution engaged specifically in agricultural development may thus be ambiguous.

Other private entities with relevance for vertical social capital are traders of crops, some of who reside in the village, others coming from Southern Ghana at harvest time. Of greatest relevance are traders of cash crops like tomato, chili, rice and shea. Overall these range in the midfield in terms of their perceived power and pro-poor engagement. With the exception being those engaged in tomato, traders of most other products, like chili, shea and rice, are perceived to be more engaged in fighting poverty than community or government officials.

Starting with a look at traders, vertical social capital in business relations is important because good personal relationships with (mostly female) traders are a primary determinant of the conditionality under which market access takes place, by financial capital is generated. As a teacher and large part-time farmer from Bui states, social capital is required for profitable, economic transactions:

*‘It all depends on the personal relationship between the farmer and the market women. If you establish a good relationship, they can come to buy yours and will leave others’ [crops]. That is why some are able to get a very good market [...]. Surely, if you have a good relationship you will get a lot of money and they may even help you with other things.’<sup>58</sup>*

Aside from providing finance in contract farming arrangements (see Section 5.3.5), merchants may be deeply embedded in society and show an interest in the personal affairs of their business counterparts, which is highly appreciated among locals. At critical times, merchants are able to provide support, such as by providing food or even housing material that can be costly in northern Ghana.<sup>59</sup> Relationships to traders of agricultural products is thus generally characterised by a certain degree of mutual trust and cooperation. Despite issues with tomatoes, trends in

---

<sup>58</sup> Interview with teacher from Bui, 24.04.2010, Bui, Ghana.

<sup>59</sup> Interview with Anna Antwi, food security consultant, 01.03.2010, Accra, Ghana.

farmer-trader relationships are generally very positive. Farmers perceive that the overall ‘sweetness of business interaction’, the quality of relations, has vastly improved (see Figure 33).

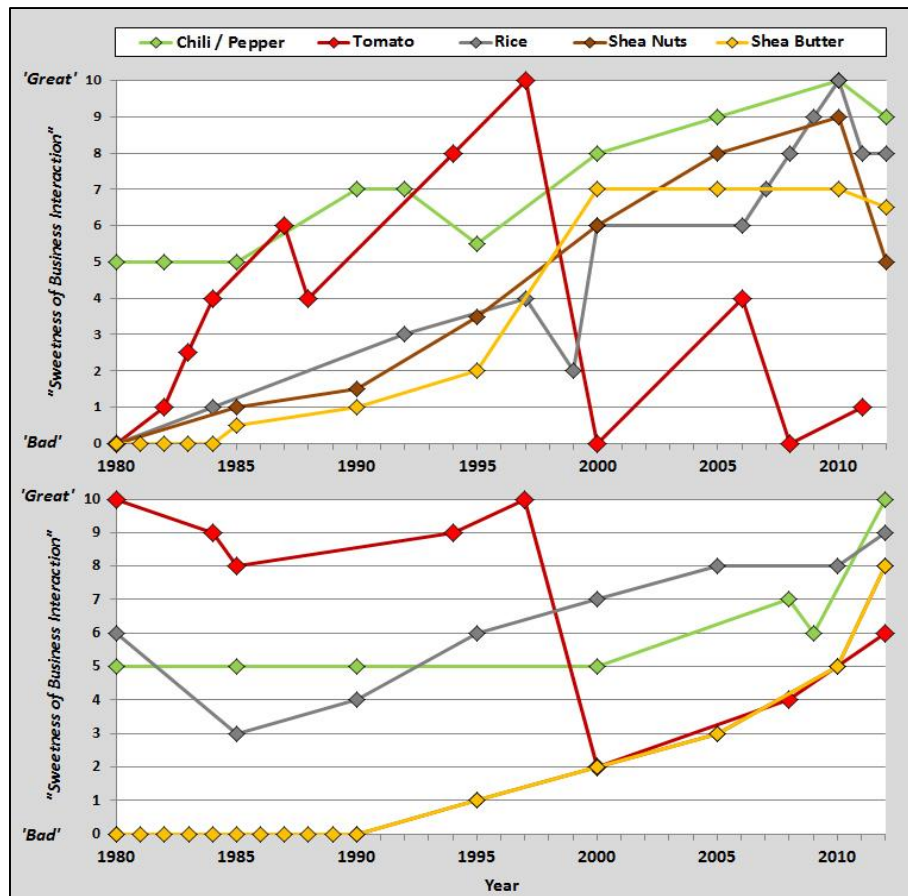


Figure 33: Trends in the ‘sweetness of business interaction’ (0 = ‘bad’ to 10 = ‘great’) in Biu (above) and Mirigu (below) with regard to selected cash crops (own figure, 2014, own FGDs).

Farmer-trader relationships are altered by many of the afore-mentioned public and private institutions. For farmers in Biu and Mirigu, ‘business relations’ often subsume all interactions with an economic background be they with traders, government agencies (ICOUR, MOFA) or entities like USAID. Locals do not differentiate between these since the various actors are all involved in advancing or conducting trade in agricultural products:

*‘People think that they [NGOs] just want to do business! [...] They will see these people as someone to do business with, but not an organisation here to help the poor in general, and it is true! [...] It pays me very, very well. Ha ha! It is the same with MOFA and ICOUR. People do not care about where they come from. They care if they can help them in their business!’<sup>60</sup>*

The initiatives of traders and government officials to help locals through credits (see before, Section 5.3.5.3) are endangered by popular livelihood strategies. Whether support in the form of inputs on credit is formally attained through public sources or informally through traders, they are

<sup>60</sup> Interview with a farmer from Biu, 24.08. 2012, Biu, Ghana.

always expected to be paid back. Locals are generally opportunistic in their search for improvements to their livelihood outcomes. Entities like MOFA and traders constantly have to watch out not to become victims of betrayal. However, interviewed traders speak of far smaller losses than government officials from bad return rates, roughly about a third for new buyers entering the local markets and less than 15 percent for established ones. Willingness to betray private actors is also high and prevails among the majority of local farmers; even if these actors support the farmers! Many respondents state their willingness to betray their public or private business partners, independent of how deep their interactions actually are. When support is granted, people are more reserved in attempting a scam. However, informal or formal contracts of any sort are never a full guarantee for the fact that farmers will feel in any way obliged to stick to conditions previously agreed upon, because a vast majority would still feel tempted to 'cheat'. People indicate a greater willingness to betray traders than government agencies, but the differences in numeric terms are almost insignificant when people are asked whom they would deceive (see Figure 34).

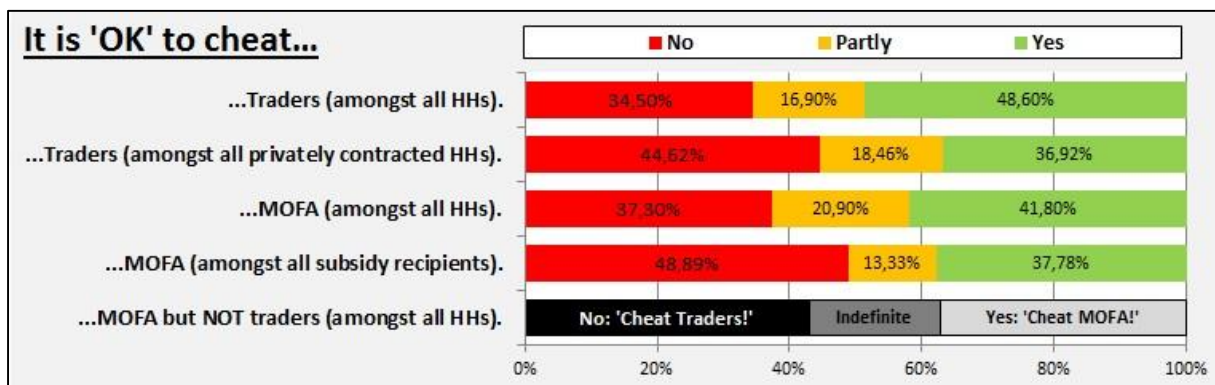


Figure 34: Willingness to betray government and private entities among the thereby supported and the general public in Bui (own figure, 2014, own survey, 2013, n=177).

When only considering female-headed households, the tendency is to attempt to cheat government officials, possibly because females are anyway disadvantaged in attaining support. Opportunism deriving from a self-exploitative 'hand to mouth mentality' could prevail as a major livelihood strategy by farmers, which could disrupt the emergence of favourable forms of vertical social capital that allow for improved market access and, with regards to relations to traders, further necessities. At best, willingness to betray is said to derive from an overall high level of poverty, especially hunger, among certain sections of local population:

*'To me, very poor people cannot think of the future. [...] If I am hungry and you bring a small and a big bowl of food, because of my hunger, I will take the big bowl so that I will be fully satisfied, at least for the moment. [...] If another market woman comes with higher prices we prefer her, even if somebody else has supported us before. We go for the bigger bowl, forgetting that if you take it today, tomorrow when you are hungry again, you can't get any [...]. It is because the*

*farmers don't understand, they don't think rational [...]! Because of the hunger they take the bigger bowl, forgetting that they will have nothing the next day. [...]..So, you take what you can!*<sup>61</sup>

Fraudulent deceit by the farmers is anyhow not punishable. As high-ranking MOFA officials frequently state, ‘no government would or could ever take their own farmers to court’.<sup>62</sup> Moreover, even for a private individual, it would take too long to do so, because the judicial system is most often characterised as being highly inefficiency and corrupt. Severe limitations are thus imposed on trader-farmer business relations, meaning that levels of contractualisation continue to depend upon social capital, thus mutual trust and respect, aside quality and price requirements imposed by market demands.

Yet farmers often characterise themselves as the ones being cheated in trade with most agricultural products and in their dealings with government officials. There is thus mistrust on both sides. In the case of agriculture, mistrust primarily stems from the fact that it is extremely hard to trace accurate farm gate prices and shares along the value chain. Farmers generally criticise a great lack of transparency in commerce. At the farmer level, products may be sold in wooden and plastic crates, plates, boxes, different types of sacks or ‘small’, ‘medium’ and ‘large’ calabashes, each with a different weight and price. There are further differentiations according to the buyer and season. Some buyers will want to ‘overfill’ packages while others will not. In the shea butter trade there are certain units of packaging that change in weight over the year, not in price; or sometimes in both. Drying of produce is another problem when wanting to measure prices according to weight. It took over five full working days to measure the average weight of each of these varieties of packaging according to crop and season, to later calculate and compare prices. In doing so, it turned out that farmers have little clue of the actual weight and thus per kilo price of their produce. One is left to conclude that agricultural market transactions at the village level are generally far from having any sort of transparency. Traders are quite reluctant to use scales because it greatly narrows their possibility to alter prices in their favour. Thus while it is true that most traders should be considered potential fraudsters, harsh critique expressed must be understood in terms of farmers’ underlying rationales, educational limitations and ideas of fairness:

*‘My people here will always feel cheated because they do not think. [...] How then can you tell me that the money is not good, if you cannot tell me how much you spend? Also, they think that because they have suffered so, so much, then they should at least get something more out of it. [...] They [the traders] just come here with their big money, buy, go down south and sell and live*

---

<sup>61</sup> Interview with a female farmer from Biu, 25.03. 2010, Navrongo, Ghana.

<sup>62</sup> Interview with the KNE MOFA director, 05.02.2013, Paga, Ghana.

*a happy life, while the sun is scorching us. [...]The perception is that any price they give us can never be enough and so we feel that they are cheaters.*<sup>63</sup>

Fraudulent behaviour also prevails in the higher-ranking classes of local society. At most of the FGDs in both Biu and Mirigu participants continuously emphasised that local elites – chiefs, the landlord, political and group and union leaders as well as local big-shots – would deprive their subordinates of livelihood opportunities, such as those arising through MOFA or USAID. An overwhelming share of the people, 73 percent, ‘partly’ or ‘fully’ believe that their ‘leaders do not act and speak in favour of whom they are to represent, but rather pursue their own agendas’ with the aim of increasing their individual benefits and those of their friends and family. Just less than a quarter would contest this idea. Another 63 percent of all questioned ‘fully’ attest to the idea that, due to elites, ‘whenever help comes here [...], it always goes to the wrong people, instead of the ones who really are in need of it’. An additional 27 percent agree with this ‘partly’, while 10 percent do not agree.

Interventions are channelled entirely through the local elites. The deeply embedded societal oppression and lack of political participation by the poor, empowers elites.<sup>64</sup> FGD participants believe that the strategically important positions that local elites hold are caused by the misallocation of external help.<sup>65</sup> Male elites hold several positions at the bottlenecks of interventions, since they can be FBO and farmers union and vegetable association leaders, large-scale farmers, chiefs and assembly men at the same time, thereby access government and NGO support and be given the responsibility to distribute help among ‘their people’. For example, the chief of Kandiga, who is relatively well educated and highly mobile, is the secretary of the local union and a big-time farmer, while being equally responsible for the allocation of input subsidies and further services. As his superior – the union president, big-time farmer, head of the vegetable union, rice farmers union and local transport union – explained, diversification is an elementary part of the local elites’ livelihood strategies.<sup>66</sup>

Locals do not dare to raise such issues when meeting with government or NGO officials because they are afraid to lose the little support they could still receive. Those who have brought external support to the village or those made responsible for further allocations actively monopolise their contacts and the powers thereby invested in them. They make use of the fact that people generally believe in an idea of exclusive and monopolisable ‘friendship’, especially in vertical relations, whereby outsiders such as officials cannot be approached proactively as they are

---

<sup>63</sup> Interview with an FBO leader from Biu, 19.09.2012, Mirigu, Ghana.

<sup>64</sup> Farmer from Biu during FGD, 10.11.2012, Biu Ghana.

<sup>65</sup> Participant of FGD, 11.12.2012, Biu, Ghana.

<sup>66</sup> Interview with the union president and secretary/chief of Biu, 20.02.2010, Navrongo, Ghana.

already close with others. Moreover addressing such problems can be difficult, if not dangerous, to livelihood upkeep, since the majority of people are *'fully'* convinced that they would face trouble if they were to speak out against their superiors, specifically their chiefs and the landlord. That goes for about 39 percent of male-headed households and, moreover, for 54 percent of female-headed ones. Only about a quarter to a third of respondents rejects this idea, while another fifth of male respondents and another quarter of female respondents agree *'partly'*. People are also afraid of the fact that they could be disadvantaged when it comes to the allocation of land through the landlord, or when facing legal disputes within the village. 62 percent of household heads, mostly males, are *'fully'* or at least *'partly'* of the opinion that *'public demonstrations, like protesting on the street and speaking out openly against problems can only take place when leaders support the cause and allow people to do so'*.

The top-down approaches pursued by government and more recently, by development organisations, lead these entities to remain unaware of the local political relationships that undermine the long-term successes of projects due to a lack of grass-root participation, especially by the poor. The MOFA management states that most development initiatives, as a result of government withdrawal since structural adjustment, are nowadays run by NGOs and foreign donors. This has not improved the pro-poor effect of development interventions, as they do not involve the poor in their projects. Farmers are reluctant to pursue the projects, and they end-up benefitting the upper strata of local society:<sup>67</sup>

*'The NGOs may not ask us about the problems we encounter during [...]. They only bring assistance through one man but they don't find out from the grassroots whether their help has really gotten to them [the poor]. No supervision at all! [...] Our culture does not even allow us to approach them, no matter how much they feel pain. [...] Culture does not allow that in this village [...]. Even if, [...] we would be punished one way or another by our leaders.'*<sup>68</sup>

A tight net of social interdependencies, often the basis of survival for the most vulnerable, hinders the emergence of social movements. Nepotism, elite capture and exploitation of the poor, abusive forms of vertical social capital based strategies, have a firm grip on local society when it comes to external interventions. These projects have become a major obstacle to broad-based development in both communities under investigation. Thus, while the vulnerable and poor depend on social capital for their survival, a similar strategy at higher ranks of local society induces and increases parts of the vulnerability of the poor. Vertical social capital may be consciously exploited to cement social (horizontal) standings, possibly to the disadvantage of others. It specifically affects market access, which is what external interventions aim to do. Social

---

<sup>67</sup> KNE MOFA Director, 05.02.2013, Paga, Ghana.

<sup>68</sup> Interview with a farmer from Biu during FGD, 10.11.2012, Biu, Ghana.



capital is said to rise according to the level of other assets, aside from being fixed by gender. Though traditional norms may conflict with striving for monetary outcomes in agricultural production, financial capital has the ability to generate vast amounts of social capital. Those men who were economically successful, it is said, often become local leaders.<sup>69</sup>

Mostly richer men hold the most important positions in local community decision-making, meaning that women have a hard standing in society, similar to their role in the household. When it comes to taking decisions that affect the whole village, 47 percent *'partly'* or *'fully'* believe that *'women have no say'*, though 54 percent oppose this idea. The circle of women included in community decision-making is quite exclusive. When looking back at their lifetime, about 42 percent of female-headed household heads claim their *'chances of being heard in community decisions'* has increased, which is almost twice the share compared to when looking at men only (27 percent). Women's levels of vertical social capital appear to be improving, though from a very low basis.

This is similar with the poor. 58 percent of all household heads questioned *'partly'* or *'fully'* agree to the fact that *'poor people have no say in community matters'*. Moreover, no matter how keen interviewees are on emphasising their poverty (see Section 4.2.1), they regard poverty a traditional taboo. Until today it can be considered an offence if one's poverty becomes so obvious that one would feel obliged to help. In fact, when *'a person exposes his/her poverty to others in the village'*, almost 44 percent of interviewees feel at least *'partially'* offended, and about a third *'severely'* offended. However, the vast majority of people (56 percent) do not mind at all. Yet, when asking for opinions on the counterexample, the majority of those questioned would say that *'one should not try to hide his or her riches so others in the village become jealous'*. Only about a quarter disagrees *'partly'* and about a third totally. Thus, the better-situated segments of society are provided with further social capital, while the disadvantaged are additionally deprived of it.

A lack of horizontal social capital derived from overall low livelihood outcomes, limits vertical social capital accumulation. Vertical relationships are increasingly steepened by the fact that norms and values may systematically enforce a widening of social capital and thereby prosperity gaps. Since the poor are underrepresented in community decision-making, the room to change this situation is limited. The poor try to convert vertical relationships into horizontal ones by trying to become personal friends with decision-makers and seeking public demonstrations of their successes, e.g. by handshakes with authorities in open places. Yet, this is done on an individual basis. Organisation among the excluded, poor and vulnerable is in fact fragile and undermined:

---

<sup>69</sup> This statement was frequently used in FGDs with focus on institutions in Biu as well as in Mirigu.

*'If we, the poor, go and organise ourselves to speak out on these problems pertaining to our poverty, somebody from our group will secretly go and tell our leaders. Before we know, they will be aware of what we are up to and will punish those who have taken the lead to organise the poor, while the one who cheated on us will become their friend!'*<sup>70</sup>

Interestingly enough, the most critiqued leaders are equally those said to engage in bringing help. Thus, one can conclude that the pro-poor engagement of most local elites and the institutions they represent must not be an end in itself but can serve as a way to further increase socio-economic differences, because it is often monopolised and deviated.

#### **5.4. Major Livelihood Outcomes and Opportunities**

The farmers of Biu appear better situated than those of Mirigu. Differences in socio-economic standing – between lower and upper classes of society – are smaller in Biu where the share of middle class farmers is larger. Looking at the social strata, MOFA extension officers in the districts estimated that in both Biu and Mirigu an equal share of locals are considered '*lower class*', about 40 percent of inhabitants. Another 30 to 40 percent are considered '*middle class*', and 20 to 30 percent '*upper class*'.<sup>71</sup>

This section distils further reasons for the differences in overall livelihood outcomes and tries to find leverage points for an improvement of these. The section examines the livelihood outcomes locals obtain, food and income security, well-being, and the sustainability of natural resource base usage. It derives summarised insights on the overall state of perceived vulnerability.

##### **5.4.1. Food and Income**

Food and income security are the primary determinants of livelihood rationales. Aside from own production, food security is obtained through income, the main entitlement factor. Locals are precariously equipped with both food and income. 78 percent of Biu's respondents state they annually experience seasons of hunger or food shortages. The deficit is generally greatest from February to June, with accumulations from March to May, during the dry season with a clear peak in April. In Biu, hunger lasts mainly for about three months a year. More than 20 percent of the population endure longer times of food shortages, some up to half a year, in rare cases up to 9 months. As locals state, income and food security interact because finances entitle access to food and so income-secure people are equally said to be food secure; but, not the other way round.

Overall there is a moderate correlation between the duration of phases in food and income security ( $r=+0,579$ ,  $n=177$ ). Over the year prior to the research, just 6 to 7 percent of Biu's locals

---

<sup>70</sup> This statement was frequently used in FGDs with focus on livelihoods and institutions in Biu. Similar statements were made in Mirigu, whereby participants were hardly ever ready to disclose the names of the people referred to, out of fear that these could seek revenge for doing so.

<sup>71</sup> Own survey, 2012, among all regional MOFA extension staff.

faced financial problems though not suffering from hunger at the same time; which is thus a relatively tiny share, the elite of locals. Only at the beginning of the year, in February and March, is that share significantly higher at about 15 percent of female-headed and almost 11 percent of male-headed households. Thus, female-headed households may be better able to overcome food shortages, as the correlation of income and food is less significant among women when compared to their male counterparts. Otherwise the seasonal pattern of food shortages is almost identical with that of financial endowment for both male- and female-headed households. Throughout the year, with the exception being the most crucial times of hardship, female-headed households are most often below average in terms of the share experiencing times of severe deficits in terms of income or food. The duration of phases of general financial scarcity and hunger is shorter for female-headed households, lasting on average about three months and six days, as compared to 3 months and 17 days for male-headed households. While female-headed households often experience one or two months of shortage, male-headed households suffer up to five (see Figure 35). Overall, trends in livelihood outcomes in terms of nutritional and financial deficits are positive. Locals have managed to improve their overall situation drastically; females comparatively better than male headed-households. However, about a fifth of female-headed households perceive they have stagnated in terms of access to food and money (see Figure 36).

The fact that female-headed households now do better than their male counterparts is surprising considering that women are severely disadvantaged in endowment and access to most assets. Despite an overall severely lowered base, women are seemingly able to provide better for their household members than their male counterparts. This is already reflected in the household tasks associated with women, yet they also seem to be more efficient in making use of the little they have on top of their more altruistic completion of household tasks. Thus societal oppression of women, which partly leads to an overall lower asset base among women, deprives a wider share of the population – part of which is male – from higher financial incomes and resource efficiency. As much as females attest a positive change in their societal standing, the majority of female interviewees are of the opinion that times of money shortages have generally decreased over their lifetime, in fact slightly more so (+3 percent) as compared to males. This trend is two-sided. Though a larger share of females, overall, may have been able to benefit from the fact that financial incomes have increased, the share of those reporting the opposite – more times of money shortage – is also larger than among male-headed households (+8 percent). It is similar with trends in food insecurity. Developments in terms of incomes are thus positive overall, but there is evidence that livelihood upkeep has become harder for some.

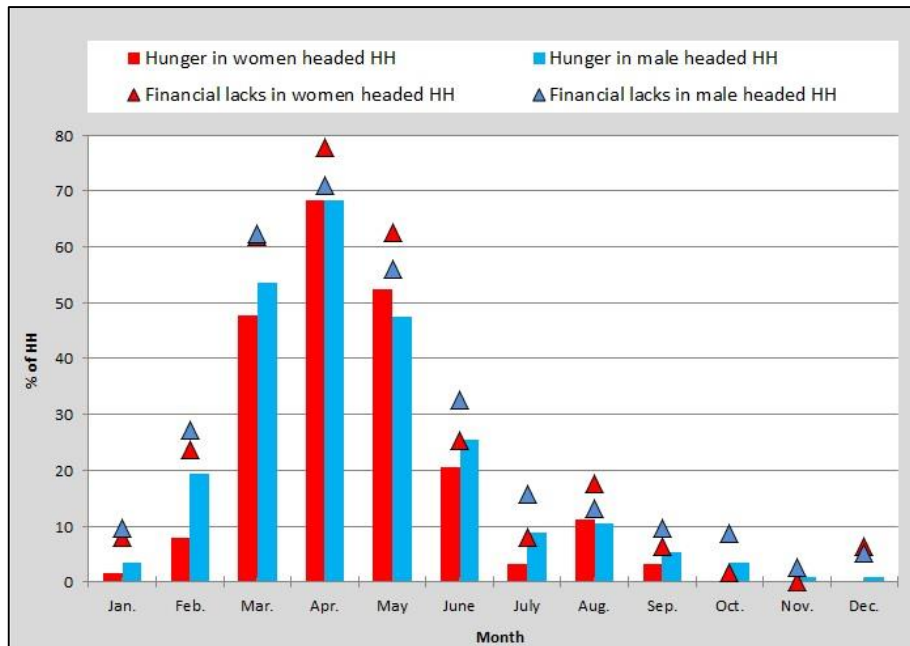


Figure 35: Seasonality of 'severe'/'above normal' lack of finances and times of hunger among female and male headed households in Bui (own figure, 2014, own survey, 2013, n=177).

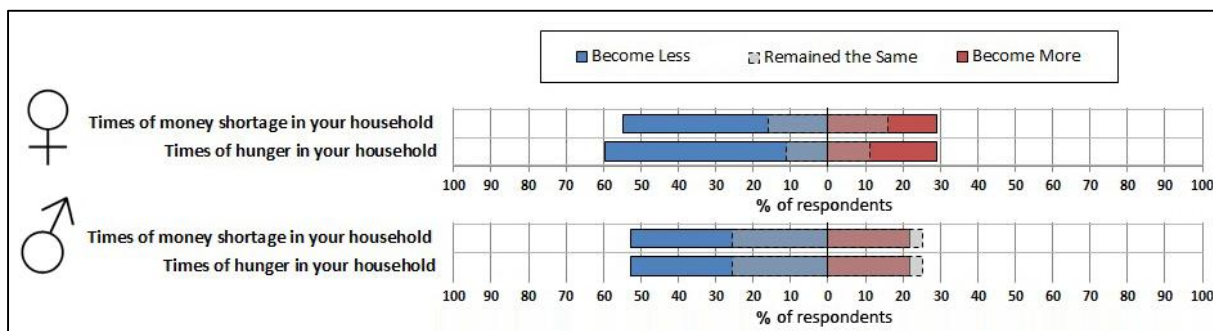


Figure 36: Trends in food and finances as perceived by female and male household heads in Bui (own figure, 2014, own survey, 2013, n=177).

Socio-economic gaps may therefore be widening, also in financial terms and also in terms of food security, partly because women produce badly paid crops such as shea. Yet, in Bui, relatively constant advancements in income and food security have been made over previous decades. Positive trends are evident among all cohorts of interviewees, including those born in the 1930s. Independent of the cohort looked at, with the exception being the eldest one, a clear majority is always of the opinion that both food and income shortages have reduced over their lifetime. The situation is different in Mirigu. Six months of insufficient food and money supply are said to be common for the majority of people. General livelihood trends are similar, though far less distinct, due to a higher insecurity in production resulting from a lack of easily accessible irrigation that can safeguard from drought, in combination with a higher population density. So, the differences in livelihood outcomes and trends evident when comparing Bui to Mirigu may stem from dissimilarities in access to irrigation.

Financial income to assure food security through cash cropping is tightly linked to irrigation. The people of Biu and Mirigu attribute positive livelihood trends to the access to it. Farmers state that the duration and quality of hunger is different for those with access to irrigation, since such households have more food and a more constant money supply over the year. So, there may be evidence that access to government irrigation promotes basic pro-poor effects, mainly because it is by far easier and safer to irrigate with furrow irrigation than by shallow groundwater irrigation (SGI), bucket or even pumping machine. Other than SGI, government irrigation also allows farmers to irrigate larger areas and an additional harvest of rice, which is good for both food and income security. Mainly by increasing these outcomes, the irrigation project could thereby have helped to create a larger middle class of farming households, or at the least, to have improved the situation of those having access. Yet, the pro-poor effect is not so clear when one takes effective food and income security into account.

When comparing those households in Biu who farm in the dry season to those who do not, results are surprising. About 82 percent of those who do dry season agriculture experience hunger, while 59 percent of those who do not farm in the dry season do not. There is not much difference in terms of the duration of shortages. Among those experiencing a lack of food in Biu, many do dry season farming and experience longer hunger seasons than those not practicing irrigation. The most extreme cases, in terms of the duration of food and income insecurity, are however always among those who do not have access to government irrigation. Yet overall there is no significant correlation between actual size of irrigated land and the duration of food shortages or even times of insufficient income. Access to land and thereby inequality in land use is thus possibly not the decisive factor in livelihood outcomes like income and food, though relevant for perceived well-being. There is only a weak correlation when considering merely irrigated lands. Seemingly, access to land and irrigation can improve food and income, however, greater land areas used in compound and bush areas can sometimes have the opposite effect. As a result of generally low correlation coefficients, it is clear that there are other decisive factors at work. Access to an irrigation project, easy dry season farming, and access to land help farmers, however, they do not guarantee improvement (own survey, 2013, n=177, see also Table 10).

		<b>Correlation:</b>	<b>Coefficient (r):</b>
<b>Land &amp; Food</b>	<u>Total land used to months of food shortage</u>		-0,018
	<u>Irrigated land used to months of food shortage</u>		-0,190
	<u>Compound land used land used to months of food shortage</u>		+0,101
	<u>Bush land used to months of food shortage</u>		+0,007
<b>Land &amp; Money</b>	<u>Total land used to months of money shortage</u>		-0,128
	<u>Irrigated land used to months of money shortage</u>		-0,200
	<u>Compound land used to months of money shortage</u>		-0,021
	<u>Bush land used to months of money shortage</u>		-0,163

Table 10: Pearson correlations of land uses and the duration of food and income insecurity (own table, 2014, own survey, 2013, n=177).

That neither land nor government irrigation are the decisive factor for livelihoods is backed by a comparison of money and food shortages between female and male-headed households in Biu. Female-headed households better improve their livelihoods than male-headed ones, even with fewer lands, a lower asset base and crops that allow rather smaller incomes, in the case of shea even just marginal ones.

The fact that women are less likely to drink and fight, have roles within households orientated towards the needs of the most vulnerable household members, especially children, and are risk-averse in agricultural production are all factors that support female-headed households' livelihood outcomes. Male-headed households tend to more expensive and risky production. Both men and women do staple and cash crops, but women are more likely to produce products that can serve both food and financial requirements<sup>72</sup>. Seemingly, women's risk-averse and less money dependent pathways are rewarded by greater food security. Women are able to generate incomes by producing shea nuts and butter even though this may not pay well. Decreases in hunger and financial constraints coincide with the time when shea nuts are harvested best, in June/July.<sup>73</sup> Yet, this is only a temporary solution, which becomes clear when comparing worker or shea processor incomes to that of pure agriculturalists, since the latter can easily achieve much greater incomes.

Women have a variety of forms of income generating activities. Since females are more engaged in casual work for others and receive more remittances from migrants, they may be able to make a better living by diversifying sources of livelihood. In Mirigu where only SGI is possible – which can be less accessible than the government irrigation system due to the labour involved – and where the possibilities to work on the fields of others during dry seasons are more limited because there are not as many farmers engaged in dry season production, hunger seasons and times of financial deficits are longer than those experienced in Biu. So, in terms of gendered livelihood outcomes with regards to income and food in Biu, it can be concluded that women may really be more efficient in upkeep, but that they also draw from sources that allow them to make a better living overall, within which irrigated lands play an important role in providing further sources of income. Indeed, the *'poorest'* in Biu are possibly better off than the poorest in Mirigu, because those without the possibility of working on their own fields during the dry season may have the chance to work on the fields of those who have land, i.e. immediate neighbours and friends. In Biu casual work for others is of great importance to improve and uphold livelihoods, especially for females and for those with no access to any dry season production. Through casual work for others, women attain comparatively lower incomes, as they are workers and not investors/employers and thus receive small payment, but in doing so they partly externalize the

---

<sup>72</sup> As based on Interview with USAID ADVANCE management, 12.04.2013, Bolgatanga, Ghana.

<sup>73</sup> Interview with a female shea processor, 14.02.2013, Biu, Ghana.

risks encountered in agriculture to those employing them. Incomes are partly independent of one's own agricultural production and can further alleviate constraints faced in own farming activities:

*'In the olden days [the past] if a fellow [somebody] doesn't carry [collect and sell] firewood he or she will not get money into his pocket, but today we just go to others for casual labour at the canal [the irrigation project] and make money for ourselves. So we can all now get money to buy food and fertilisers and then grow our own crops.'*<sup>74</sup>

However, the state of social capital among the poor and vulnerable, and especially women, makes it unlikely that casual workers are able to defend their interests against their employers. That is partly because the future share of the population reliant on attaining such worker incomes, and thereby the demand for labour opportunities, will increase reducing the wages being paid. In the long term these people would be better off if they had the possibility to do their own farming, for which they will need land, especially irrigated land. Given the level of inequality in access to land, social tensions are likely to arise in the future because socio-economic differences will become even greater if land allocation is not reformed. To aim for more broad-based poverty alleviation without land reallocation requires tackling the usage locals are able to make of their natural capital for which they need finances for inputs.

With most problems at the very base of agricultural production – soil infertility and a lack of animals – the access to costly, inorganic fertilisers appears to be the greatest determinant of basic livelihood outcomes, independent of gendered pathways. The duration of food and income shortages correlates with locals' ability to access inorganic fertilisers. It is thus evident that periods of scarcity are shortest among those having fewest problems in acquiring fertilisers. Those with 'little' issues in acquisition face financial constraints for less than one month and food deficits for less than two weeks a year, while those with 'extreme' issues are food insecure for about two and a half months and encounter financial deficits for more than three months of a year (see Figure 37). Developmental interventions content with fertiliser subsidies thus hit the spot conceptually when it comes to immediate food and income security.

If a wider share of locals had equal access to fertilisers, broader based poverty alleviation may be possible. That is principally the case because those crops in need of most fertilisers also generate highest yields and incomes. Moreover, such crops still suit climatic patterns during the wet season. It is similar in the dry season, with the advantage that crops like chili and tomato can be harvested at a time when food and money deficit is greatest. Allowing more farmers to venture into the production of such crops could allow income diversification and thereby improved incomes and less food constraints. A wider share of locals may be able to benefit if production

---

<sup>74</sup> Female interviewee, 05.02.2013, Bui, Ghana.

increased through fertilisers will then require more casual workers. Incomes thereby directly or indirectly advanced could then be used to foster wet season production. Interventions can thus improve livelihood security in the scope of existing possibilities to deal with changes or shocks (ELLIS 2000: 42). However, because most development interventions are content with fertiliser subsidies. So they do not directly advance the most prominent form of economic diversification pursued by women, shea processing, which also protects the environment and supports economic, thereby societal empowerment of repressed women. Furthermore, these kinds of interventions may not be justifiable in the long term, mostly because of their high dependence on fertiliser, a lack of organic material in soils, and non-existent soil management that undermines the environment.

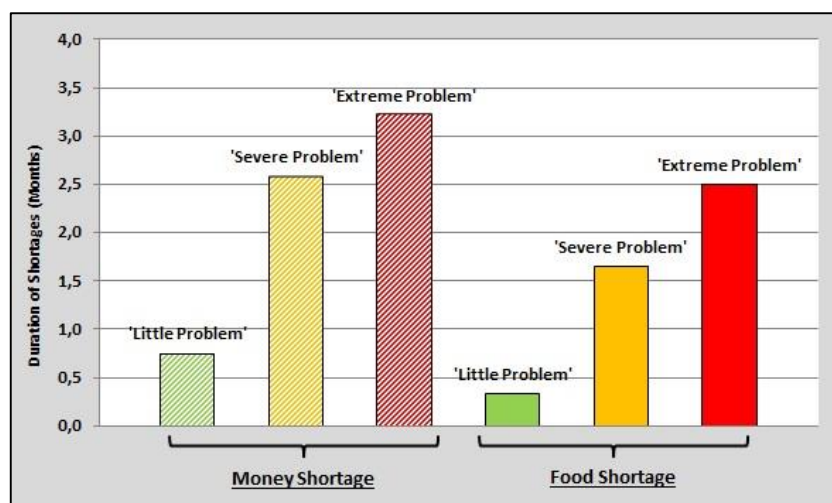


Figure 37: Duration of money and food shortages according to attested difficulty in attaining inorganic fertilisers in Biu (own figure, 2014, own survey, 2013, n=177).

#### 5.4.2. *Natural Resource Base Usage and Resilience to Climate Change*

The sustainable use of natural resources and resilience to climatic change is of vast importance in the long-term. Yet to locals, protecting the environment is in no way an end by itself, although they acknowledge its importance. Livelihoods depend mostly on insufficient agricultural outcomes derived from precarious land-based pathways; the use farmers make of their scarce and poorly equipped natural capital. Land allocation is highly unequal, especially for those lands that have the highest quality, especially irrigated land. Because land uses are generally characterised by large inequality, basic risks in production are unevenly spread. Those with comparably little land – the majority – are likely to incur substantial problems when their small production suffers from losses. This is the case especially for the irrigation project, which could help people withstand droughts during the wet season and allow for dry season production. Thus the potential of land for broad-based, pro-poor development is greatly underutilised, especially during the dry season. What further aggravates the situation for smallholders is the fact that the irrigation system is severely run-down, leading to more potential floods and also droughts.



The quality of the natural resource base is primarily constituted by the quality of soils used for agricultural production in combination with rainfall patterns. Based on both, soil and climate attributes, farmers' ways of livelihood upkeep are disadvantaged on a nationwide and global level. Consequently, farmers in the study areas are forced to live with an overall increased degree of risk in agricultural production and limited outcomes. Ongoing changes in the natural environment further aggravate the situation. Two partly interacting phenomena affecting farming activities are a degradation of soils and a shift in the onset of the rainy season, the latter as an expression of climate change. Only shea producers are partly decoupled from these major farmer livelihood determinants and instead depend more on land-reserves, bush lands with trees and intact agroforestry-systems that foster environmental sustainability.

With a young and still-growing population in both villages, pressure on bush lands will increase until population pressure starts to decrease as a result of demographic transitions. So major degradation processes in the local environment are likely to be initiated in bush areas, which are often ecological hot-spots. Of greatest impact in this regard – aside from population growth – are publicly subsidised export promotion programmes in the form of mango plantations, lying south of Bui. These dynamics illustrate a general problem evident when looking at who is most responsible for local environmental degradation. With the mango plantations, it is a small class of local elite that generates the greatest share of environmental degradation. Those responsible for establishing new farms on what was once virgin land, in bush areas, are the better-situated people that can afford to clear these areas. Bui's poor are forced to seek land in bush areas because they cannot access the irrigation project. Thus socio-economic inequality as a result of elite-capture is partly responsible for the ongoing destruction of Bui's last land reserves.

While many poor locals produce more relatively environmentally friendly and well adapted, traditional staples that consume little fertilisers and therefore have little negative impact on soils, those who are better equipped asset-wise go for less environmentally sustainable forms of irrigated tomato or chili production during the dry season, mainly to acquire money. It is relatively easy for farmers to work on many traditional staples and useful tree fruits like shea, however, financial thresholds do not allow everybody to partake in the very lucrative production of cash crops, mostly crops like chili and tomato. While soil degradation is partly addressed or countered by traditional staples, among them millet or agroforestry products like shea, exotic cash crops like tomatoes or chili increase degradation processes. Crops like rice and maize compromise in terms of costs, risks and environmental sustainability. An ecologically suitable alternative is more extensive shea production. Farming practices on compound lands in Bui and Mirigu, where most traditional staples are manured, must be regarded as most sustainable in environmental terms. However, production at the irrigation scheme and partly by SGI and in bush areas is less justifiable, especially in terms of given soil attributes. Yet, since SGI in Mirigu takes place on

flood plains, the production may be less destructive as compared to what happens in most parts of Biu's irrigation scheme. Nevertheless, also in SGI areas, soil degradation has an influence on attainable incomes, by limiting tomato or chili yields and quality, thereby also affecting food security by limiting financial incomes. So, locally, man-made environmental degradation in the form of soil degradation largely comes from a partial break-down of traditional farming systems and newer forms of more unsustainable cash cropping, mostly pursued by an elite of local farmers. This worsens the possibility of improving the most vulnerables' livelihoods in the long term, by decreasing soil quality while allowing only short-term improvements according to financial endowment.

Soil degradation is also problematic because if dry season cash crop production becomes increasingly insufficient, the incomes thereby produced will no longer help locals to deal with reduced outcomes of wet season production (and vice versa) which stems from a change in climatic seasonality. Changes in climate are most often associated with a change in agricultural cycles and thereby livelihood seasonality. Climate change is often understood as drought prevailing at the beginning of the season. Since equal amounts of rain fall within the remaining season, environmental changes are also associated with heavy rains and floods once the rainy season starts.

It is not clear if climatic changes are just a return to a situation already encountered, that there is a degree of cyclicity in patterns. However, at present a shortening of the rainy season is directly associated with changes in people's land use. Farmers are turning to faster growing varieties of crops, which not everybody can afford. Especially the MOFA and farmers in Mirigu claim that overall food security has reduced because the outcomes of rainy season production have become insufficient. These tendencies are found in Biu although partly alleviated through people's access to the government irrigation project that offsets the effects of drought. Consequently those poorly equipped with assets, especially financial and physical capital, suffer increased losses. Though most extensively grown traditional staples are well equipped to deal with soil quality reduction and calamities within growing periods, the season duration may no longer suit the growth periods of many traditional staples.

Changes to the natural resource base do not only limit farmer outcomes but lead to socio-economic polarisation. Most evident in Biu, inequality in access to land is a major determinant of livelihood pathways. Marginalisation processes ensure the most vulnerable encounter the most incidents of flooding and drought; hazards that are made worse by climate change. In Biu, upland soils suitable for the production of tomato or chili are in the hands of a few large farmers that now grow rice. Thus most smallholders have to grow rice in lowlands, and thus encounter high(er) incidents of flooding. As upland soils in Biu are well drained but nowadays also used for rice production, increased water consumption of the irrigation scheme and consequently drought in

lowland areas used by smallholders, results from a change in land use among large-scale farmers, local elites, as the irrigation system deteriorates.

Another livelihood effect caused by climatic changes are the effects upon housing structures of increasing incidence of torrential rains, yet not flooding as popularly claimed. In fact, torrential rain leading to housing collapse impacts far more people than floods, because rain is less spatially confined than floods, while most housing structures of the poor are weakly equipped when it comes to durability against rainfall. Housing vulnerability is further increased by changes in land use, specifically by population growth, fragmentation of plots and a trend away from (tall) crops like millet that used to protect mud structures from wind-driven rains. Land use trends endanger both ecological sustainability and housing sustainability, a major determinant of vulnerability.

The improvement of soils through manuring and other forms of organic material application enhances the water holding capacity of soils safeguarding from drought and general soil fertility leading to higher yields. If more industrial forms of agriculture are desired by governmental and developmental institutions – despite the fact that the local environment is only partly suitable – at the least there should be an entity dedicated to helping deal with the adverse effects on soils and on the environment as a whole. In any case, adding organic material/manuring is indispensable because this addresses the adverse effects of inorganic nourishment.

Public and foreign development organisations have yet to address environmental changes. Where they've attempted, they've done so indirectly and thereby environmentally unsustainably, by providing inorganic fertilisers. The degradation of natural resources cannot be sufficiently addressed by resource poor farmers themselves, so support is required. That government policies are not in line with environmental nor social needs creates a situation that imposes a special disadvantage on the poorest among farmers, even though these are the least involved in soil and environmental degradation. Government and development assistance action is in this context blind to what is happening on the ground. Government agencies in the areas are underfunded and dependent on externally imposed courses of action, unsuitable to the problems faced in natural environments and often incompatible with the realities of the vulnerable. Government's role in environmental changes may even have worsened the situation. If a lack of soil quality mainly comes from a deficit of manure, which is most often associated with the fact that vaccinations are no longer free, then government withdrawal, as a result of structural adjustment, has partly fostered environmental changes that have limited food security and have possibly also undermined market potentials.

So, further key steps in improving smallholder livelihoods could be made by readdressing of government policies and external development interventions to environmental concerns and adjusting them to local needs, whereby approaches could consider traditional land use systems and a holistic understanding of farmer livelihoods in planning and implementation. Furthermore,

testing of soils followed by action upon results has to follow. Greater financial support to government agencies is needed if they are to identify and combat environmental changes, specifically in soils. Alternatives to industrial agriculture, such as sustainable land use practices, must be made increasingly attractive in commercial terms. Special potential could lie in the cultivation of traditional staples, leguminous crops and agroforestry, specifically in shea. If (only) such crops were more viable then environmental and economic sustainability – preserving the natural resource base and generating income – could (at least partly) go together and not contradict, as they currently do. Furthermore, if traditional wet season staples were more lucrative, these could serve to improve access to and production of dry season crops. The improved incomes generated could allow locals to invest in durable housing and, until then, traditional crops could help to protect traditional, mud housing structures from growing incidents of torrential rain.

The following points may help farmers deal with changes in rainfall seasonality that alters the incidence of droughts and flooding. Primarily, more research should be done on changes in rainfall patterns at local level since they may heavily vary from assessments made on national and regional level. Furthermore, programmes must then be put in place to help deal with climatic changes. Within such programmes, further research should aim at traditional staples, as they show greatest potential in being resilient to climatic calamities, but require improvements in terms of faster growth periods. Here, more irrigation projects could be a solution, as a wider part of the population could participate in its usage thus alleviating farmers of their dependency on rainfall patterns while still allowing fallow periods to protect soils. Irrigated dry season production could be supported by governmental and developmental agencies, to decrease dependency on wet season agriculture. Programmes should further be prepared to help farmers deal with higher incidents of flood and drought. Crop varieties should be developed that are more suitable to climatic and social realities, thus, fast growing crops that require little inputs, while being more compatible with traditional beliefs, land usages and forms of production. Alternatively, access to fertiliser must be improved if agencies continue to supply and promote high yielding crop varieties. More extension services could foster learning processes of a broader section of society, allowing for greater spread of improved crops.

Addressing the specific needs of the most vulnerable by incorporating them in project planning and implementation is another key step to attain higher livelihood sustainability for the majority of locals. Contemporary development interventions may improve livelihood security on a short-term basis, but they do not lead to higher livelihood resilience overall, because they undermine the natural resource base and do not target those that would mostly require a restoration of functions of their survival system (drawing from BÜRKNER 2010: 24). Moreover, the vulnerable attest increasing inequality as a result of external interventions, which severely

lowers local well-being. Grass-roots monitoring is essential, which requires more and in-depth involvement of government and developmental organisations, to grasp allocation mechanisms and channels at the local level. Social issues, specifically inequality in livelihood assets and outcomes, are equally important issues to consider when compared to environmental constraints. Of special importance are dimensions of social inequality as well as marginalisation processes, both of which contribute to people’s well-being.

**5.4.3. Well-Being**

Well-being is defined as quality of life (JACOBS & MAKAUDZE 2012: 576), partly in non-material dimensions. Among these dimensions are social status and identity (ETZOLD 2012: 76), sense of control and inclusion, access to services, political enfranchisement and maintenance of cultural heritage (DFID 2001: Section 2.6). To analyse these aspects, this section presents indicators surveyed alongside insights on social capital (see Section 5.3.6).

Generally speaking, levels of well-being in both Biu and Mirigu are low, as the livelihood securing, agricultural activities pursued are not a result of freedom of choice. Feeling of external control is high, primarily because of growing environmental constraints beyond the influence of most farmers, especially the case in Mirigu. In Biu, 46 percent of households ‘fully’ agree, 28 percent ‘partly’ agree, and less than 25 percent disagree that they would rather make a living outside of the agricultural sector, if only they could. The basic reason for this perception is grounded in the fact that outcomes of agriculture are so meagre, most significantly in terms of food and income. Nevertheless, survey participants are also convinced of the fact that, as compared to former times, the ‘overall quality of life’, ‘chances to escape poverty’ and thereby the ‘chances of living a happy life’ have increased over their lifetime. Especially female respondents attest positive change (see Figure 38).

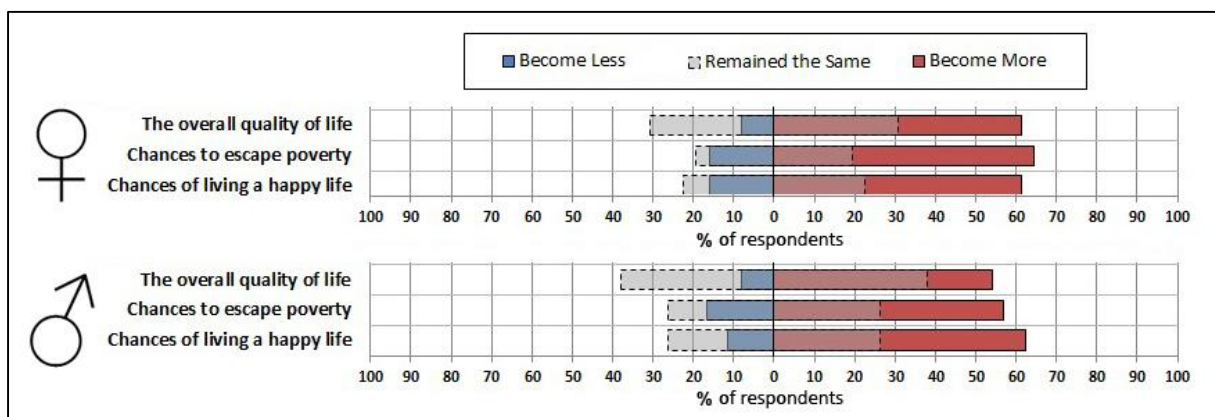


Figure 38: Trends in major well-being indicators as perceived by female and male household heads in Biu (own figure, 2014, own survey, 2013, n=177).

Male and female-headed households in Biu are very optimistic about livelihood trends, 79 percent are ‘fully’ and another 29 percent at least ‘partly’ convinced that their ‘future looks

*bright*'. Yet, farmers from Mirigu attest a higher deficit in well-being when compared to Biu's farmers, and they are also more pessimistic about trends.<sup>75</sup> The higher dependency on increasingly variable rainfall, translates into lower financial and food security and a higher dependency on factors beyond the control of locals, further exacerbated by climatic change. Well-being is low in Biu and Mirigu, but specifically in the latter due to a lack of irrigation services. Similarly, the association people have with well-being in Mirigu is of a far more elementary nature than the associations drawn among people in Biu. While farmers in Mirigu raise issues like food security and financial capital, when asked for crucial factors to their well-being, those in Biu will associate assets like horizontal and vertical social capital and generally tie well-being less to other livelihood outcomes as much as to factors beyond their control, contextual vulnerability. Although sheer access to public irrigation may not be the only key to more food and income and thereby quality of life, it is important in making people secure, optimistic, self-dependent, all of which are of utmost important to well-being.

It is a matter of well-being rather than a question of contemporary household survival that people from Biu complain about inequality in access to irrigated lands. People value equal opportunities as they are driven by an aim for social sustainability. The great appreciation they have for social capital – by itself a major determinant of well-being – can additionally be interpreted that locals are highly observant when it comes to differences in current and future socio-economic endowment and opportunities. Yet equal opportunities are not givens. A lack of social capital inhibits the attainment of further asset endowment and of higher resilience to vulnerability factors, like natural hazards and external development support. Overall social capital is reducing because livelihood pathways are getting increasingly monetised, in terms of agricultural production and in the pursuit of livelihood outcomes. This affects mostly women and the vulnerable because these groups are often worse equipped in terms of assets to deal with external changes, and experience growing dependency on external support while not being able to access that support as well as others.

Of further significance in this context are differentiations made according to gender and socio-economic differentiations in terms of vertical (/political and economic) and horizontal social capital. Well-being, in terms of political enfranchisement and inclusion is higher for males and elders, while being rather low for women and those perceived as poor/vulnerable, which is partly a result of cultural values. A culturally-based system of oppression lowers the overall development potential. A lack of female empowerment in society reduces the overall attainable level of well-being, not only because women form half of the local population, but because they are rather willing to give support to others, helping in the reallocation of assets. Similarly, as a

---

<sup>75</sup> Female farmer during FGD, 17.09.2012, Mirigu, Ghana.

result of a lack of organisation among the poor and the general disregard brought forward to those perceived as such, wider shares of the public feel excluded from community-decision making, which deprives them of equal access to livelihood opportunities and improvements, and thereby well-being. Well-being among women is further reduced because they feel more dependent on external interventions, yet they receive fewer of these. Women as much as the poor and vulnerable know about these happenings, but are not able to change the trends of events. This situation is taken advantage of, thereby (re-) produced, by the local elite. Exploitation is, however, often reciprocal, though based on uneven grounds.

Spatial marginalisation processes, which are a result of elite land capture, lower well-being. These processes make those affected more dependent on contextual variables like flooding, climatic changes and soil degradation, effectively lowering income and food security. Due to land allocation and a lack of financial capital, the poor have less freedom of choice as to which crops to produce. Especially costly tomato or chili best grown on the lands of those understood as the local elite, could effectively improve well-being by increasing livelihood outcomes in terms of income. But, in terms of cultural heritage, they are currently only partly compatible and more time to become better incorporated into societal valuation systems is required. In this context, making traditional staples and especially shea more economically viable could also lead to improvements with regard to well-being, gender equality, general cooperation, social capital or horizontal contractualisation, by taking more account of cultural values and forms of already inherent economic specialisation. It is mainly food-securing activities that are combined with an upholding of cultural/societal values, but this is not possible with the production of popular cash crops like maize, rice and especially tomato and chili.

#### ***5.4.4. Summarised Insights Generated on Overall Vulnerability and Potentials***

Overall vulnerability is a result of the interplay of manifold external and internal factors of livelihoods deriving from an interaction between a social and a physical/environmental sphere, within which people find themselves with the aim to make a living. Social, thus political and mostly economic, and environmental drivers at global, national and regional scales are transformed into results at the local level, through individual reasoning and action. According to the sensitivity of people, which is defined by their assets endowment and access, contextual vulnerability factors boil down to concrete exposure of locals, which then challenge or support livelihood pathways, thus adaptation processes and thereby livelihood outcomes. To grasp these interactions according to the insights derived so far, while not neglecting local perceptions, analysis makes use of all qualitative material attained locally over the course of research and the relationships therein expressed (see Figure 39).

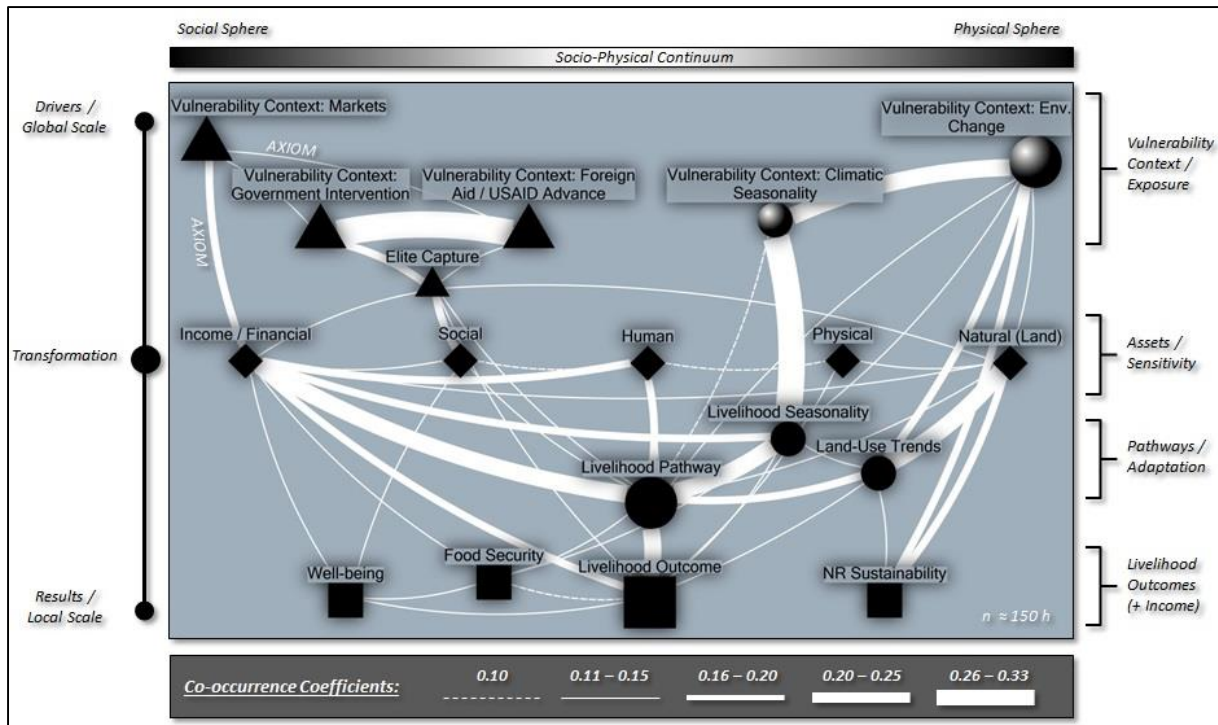


Figure 39: Major associations between relevant elements of vulnerability, as based on code co-occurrences in all qualitative data (own figure, 2014, own survey, n=150 h of recordings).

Livelihood pathways and outcomes in Bui and Mirigu show almost equal dependency on factors arising from social and natural/physical spheres, exogenous factors or ‘stressors’ (Figure 39) (BOHLE 2011: 48). As a result of the irrigation project in Bui, which comes with a greater endowment in government services, the tendency would be to emphasise social stressors over environmental ones in the case of Bui, and other way around in Mirigu. Thus, at a regional scale, the majority of people in northern Ghana will show higher exposition to threats from the natural environment, mainly because public irrigation is not widespread. Yet, the contribution of societal factors is not to be underestimated, especially not in combination with environmental constraints.

#### 5.4.4.1. Transformation, Results and Potentials of Environmental Factors

In terms of environmental vulnerability, qualitative associations point at negative environmental changes that manifest in a change in rainfall times, thereby incidents of flood and drought and torrential rains in combination with soil degradation processes, which challenge livelihood upkeep due to their effects on yields, food, income and housing. With regards to climatic endowments and changes, it is confirmed that the start of the rainy season has shifted to the later part of the year (CDKN 2014: 18) and so rainy seasons and thereby growing periods are shortening (ANTWI-AGYEI et al. 2012: 326; LAUBE et al. 2011: 759), though it is unsure if they will continue to do so (as was indicated by LAUX et al. 2008: 130). The same goes for the occurrence of dry spells within rainy seasons and temperatures. However, studies rightfully underline the increased risk of more pronounced, extreme climatic events accompanying changes in seasonality, like droughts and floods (BOKO et al. 2007; TSCHAKERT et al. 2010). These



hazards do not just accompany a change in seasonality, they result from it, because with similar amounts of rain falling within a shorter timeframe, more droughts may prevail at the beginning of the rainy season and more floods will occur with the onset of rains.

Though other studies suggest differently (CDKN 2014: 11, 18), there is sufficient reason to be convinced of changes in the occurrences of extreme events such as heavy rainfall. So when hazards such as flood are said to be on the rise, such trends are rightfully understood as a sign of climate change (ARMAH et al. 2010; TSCHAKERT et al. 2010: 491). Similarly to projections of most Global Circulation Models ‘on future precipitation amounts or seasonality’ (USAID GHANA 2011: 2) prognosis must remain vague. In accordance with other studies (CDKN 2014: 11, 18), it also remains unclear if rainfall patterns are due to either natural climate variability or show unusual extremes caused by human impact.

The assumptions on the impacts of hazards resulting from climate change are also poorly understood. It has to be underlined that the quantitative and qualitative capacities of NADMO need to be greatly enhanced (GOVERNMENT OF GHANA 2010: 49). However, a causal chain of extreme rainfall events, flooding and increased vulnerability of households, specifically for farmers’ crops and housing (ARMAH et al. 2010; TSCHAKERT et al. 2010: 491), is not confirmed and remains uncertain. The vast majority of houses and crops produced – those crops of primary value for food, though not income security – stand away from potentially flooded areas. In the case of threats to housing – shown to be a basic necessity of life, a most expensive item for households and a prerequisite for good health and well-being (UN-HABITAT 2010: IV) – changes in land use combined with higher incidents of torrential and wind-driven rains has the greatest impact on livelihoods through the breakdown of traditional housing structures. Housing and village structures are not just randomly scattered or dispersed, but meaningfully centralised on hill ridges where they have traditionally stood for millennia (WIDGREN 2010: 329, 337). Settlements have begun to spread into flooded areas due to population growth and unequal access to land plots. Of larger impact is the concentration of village structures that causes fragmentation and an overuse of soils.

The combination of population pressure, a lack of manure, and exotic, high-input food crop production technologies on fragile soils has led to ‘rapid chemical, physical, and biological degradation’ (KANG & TRIPATHI 1992: Chapter 1.7.1), mainly because the ‘primary rules’ of local natural systems are not being respected (KILCHER 2007: 35). Especially low soil organic matter, and thereby the availability of plant nutrients are not only bottlenecks to productivity in terms of quantities (USAID GHANA 2011: 5) but also determinants of product quality. Lack of organic matter constrains food production (BECX et al. 2012: 495) with serious implications on livelihoods (YIRAN et al. 2012: 204). Farmers are ‘in a trap of declining crop yields’ (DALTON

et al. 2014: 65), further worsened by a trap of declining quality. Soil exhaustion may be a greater hazard to livelihoods than flooding or even drought.

Preservation of the natural resource base, though not a greatly desired livelihood outcome by itself, is acknowledged as the key to maintaining long-term outcomes like income and food security. Thus increased efforts must be made to facilitate environmental sustainability, although some authors dismiss this (BLENCH 1999: 11; as also done by LAUBE 2007: 49). Farmers motivated by greater incomes could venture into more environmentally friendly forms of livelihood upkeep, specifically in agriculture and agroforestry. For this, farmers require support to ease financial constraints. Their traditional crops – with which land uses have been proven to be relatively environmentally sustainable (ADAMS 2004: 133; see also WIDGREN 2010: 324) and well adapted to local environments (BRINK & BELAY 2006: 63 and 131; CHANDRASHEKAR & SATYANARAYANA 2006: 299; DAGNOKO et al. 2013: 1111) – are both environmentally and economically sound. Principles of traditional forms of land use (as laid out by BARRAL 1968: 44; CALLO-CONCHA et al. 2012: 14; HAHN 2000: 142-143; HUNTER 1967a: 104, 106, 1967b: 41; LAUBE 2007: 152; RUTHENBERG 1971: 58-62, 111-112) deemed to be sustainable, have to a large extent been preserved at the local level as societal norms (as was proclaimed by HAHN 2000: 144), though these are fading away in some areas. These could be applied and thereby saved from extinction. This could accompany economic empowerment of the poor, and increasing cooperation amongst locals.

It is of utmost importance to improve or at least maintain and manage soils, yet government and development agency initiatives are nowadays advocating practices that do the opposite. In the eyes of locals, interventions are closely linked, mainly because they are effectively alike as both provide inputs – environmentally unsustainable fertilisers – for cash crop production. The narrow focus of interventions disallows them from addressing environmental vulnerability factors. The effects of trends in the natural environment are left to be addressed by farmers themselves, even though these have a more direct effect on livelihood pathways and outcomes, by altering livelihood seasonality – times of agricultural activities – and land usages (see also Figure 39). External interventions hardly cushion against the negative effects of environmental vulnerability, while no such project addresses these effects directly. So development of adaptation strategies that increase resilience (WASCAL 2010: 11), such as more traditional, yet environmentally and socially sustainably intensified forms of land use, is of high priority. These must further incorporate social or rather socio-economic aspects of vulnerability. The environmentally vulnerable are those:

- Without access to public irrigation,
- Living in traditional housing and those living in fragmented centres of the village,
- Living in flooded village outskirts (where land prices are cheaper)

- Exploiting local soils by unsustainable forms of agriculture,
- Not having finances or external support to bypass environmental constraints,
- Content with exotic, high-input crops such as tomato
- No longer preserving parts of their traditional forms of land use
- With the greatest lack of animals for manuring,
- That do not diversify their income sources.

#### ***5.4.4.2. Transformation, Results and Potentials of Social Factors***

Major external, societal factors can be summarised as (positive) trends in markets in combination with government and non-government interventions at the local scale. These are important because they support locals to generate income. Financial capital or income is the major asset people make use of for survival, while it is also considered as a primary livelihood outcome. Improvements in finances can boost well-being and food security and allow locals to invest in durable housing. Money is essential to improve human capital, when considering education, another primary determinant of livelihood pathways. Vice versa, human capital in the form of good health is fundamental to make a living in agriculture. Financial capital is, however, the only factor in livelihoods that has a hybrid characteristic or dual importance, because it serves as a highly desired asset useful to substitute most others as much as an economic outcome in itself. It really is the most significant influence on strategies/pathways pursued (SCOONES 1998: 7-8).

Economic vulnerability, also expressed in levels of incomes, side-lines defencelessness to ecological factors, as indicated by LAUBE et al. (2011). Yet emphasis should be put not only on global economic factors devastating markets and thereby livelihoods (also also done by LAUBE et al. 2008; PAASCH 2008; SCHRAVEN 2010: 18-21; SEND FOUNDATION 2008; SONGSORE 2011: 263). As shown by farmers' basic perceptions of globalisation tendencies and markets, income trends and trader-farmer interaction, markets have not necessarily failed as proclaimed (by LAUBE et al. 2011: 753). A general de-intensification of agriculture and generally low farm gate prices (LAUBE 2007: 75; SONGSORE 2011: 173-180, 264, 281-284) cannot, or can no longer be attested. On the contrary, over the last 30 years, since structural adjustments, prices and qualities of farmer-trader interactions have vastly improved and farmers do not necessarily feel greatly hindered by global competition, though objective constraints exist. Markets have thus, at a general level, often enhanced local adaptive capacities, whereby those of tomato may be an exception. Yet it is only partly helpful to conceptualise vulnerability factors separately. The interaction of environmental and economic/societal contextual factors – in local land use – is a factor in livelihoods.

Scarce access to quality land and insufficient money are the most important assets in defining sensitivity to external stresses, because positive market development can be made use of

and environmental stresses can be dealt with when the ability to acquire agricultural inputs is given. Thus farmers' attempt to adapt to climatic changes by engaging in increasingly competitive, globalised markets (LAUBE et al. 2011). These attempts are not necessarily hindered by markets themselves but by the financial ability of locals to engage in these crops in combination with (social) land allocation mechanisms and accompanying social and spatial marginalisation processes. Locals aiming for higher incomes alter land use trends, with natural capital being the basis to do so. Crops produced conflict with environmental sustainability, specifically with regards to soils, and thereby undermine the socio-economic potential of livelihoods in the long-run. So, environmental changes are not adequately dealt with and are further increased by the actions of locals themselves.

It is thereby a matter of local, internal coping mechanisms that hinders farmers in northern Ghana from greater livelihood sustainability, which also expresses itself in vast gender differences. Suppression of the poor and vulnerable, especially women, lowers these groups' household outcomes. Participation in positive market trends is not possible for all local producers, in fact only for a minority. While (externally defined) market dynamics are generally perceived as having shifted towards more favourable terms of exchange – local incomes have grown – such trends are undermined by a lack of assets, social marginalisation, and interventions that are unfavourably, socially embedded in vertical terms.

Interventions are problematic because they are associated with severe abuse in the form of elite capture and neglect of social realities (see also Figure 39). Support is accessed by those in possession of vast social capital, parts of which derive from finances and land. Differentiations in assets and thus societal power, which cannot be addressed by locals, are seemingly not considered by most external development interventions. Large obstacles to sustainability are thus found in interventions' concepts of local development, as they do not provide incentives to more sustainable forms of natural capital usage, especially for the poor, and do not speak of political or economic empowerment. On the contrary, it seems they widen socio-economic gaps and possibly increase environmental impacts as a result of their form of support and specifically because of a lack of grass-root participation and monitoring. Interventions thereby foster further livelihood polarisation in combination with present environmental constraints and in a context of change further exaggerated by marginalisation processes. Consequently, contemporary government and development agency policies are only partly in line with pathways aimed at well-being. When interventions become victims of local elite capture, they effectively lower well-being and contribute to the vulnerability of the poor. This points at internal, societal coping mechanisms as primary determinants of how externally imposed vulnerability affects locals. Vulnerability is not immanent because it objectively exists as a contextual threat, thus it is crucial to examine how locals are able to deal with these according to their societal position.

Social allocation mechanisms alter and often overshadow most natural phenomena. Consequently, livelihoods cannot be deemed to be sustainable according to their social context, as primarily necessitated in vulnerability evaluations (BÜRKNER 2010: 24). Livelihoods can neither be considered as being pushed sufficiently into that direction, though improvements are evident in many livelihood outcomes. Capacity or help to ‘cope with and recover from stresses and shocks’ and possibilities to ‘maintain or enhance [...] capabilities and assets both now and in the future, while not undermining the natural resource base’ (CHAMBERS & CORNWAY 1991: 6) is not generally given. The socially vulnerable are especially those:

- With the most lack in assets, especially finances, that cannot venture into lucrative and fast-growing crops or in doing so produce debt as a result of prior underfunding,
- Underfunded farmers doing highly perishable crops for volatile markets like tomato,
- Working on shea,
- Hindered from accessing external support,
- With smaller holdings who are equally spatially marginalised,
- Responsible for large (extended) families,
- Physically or otherwise disabled that cannot work themselves to make a living,
- In conflict with the chiefs,
- Locally most suppressed, namely women, children and those perceived as poor,
- Not covered by social safety nets,
- Uneducated that have no money for schooling and are challenged in decision-making by environmental changes and the need to strategize finances for market access.

## **6. Markets**

The access people living in the villages of Ghana's Upper East Region (UER) have to monetary incomes comes mostly through diverse agricultural activities. Therefore, agricultural markets and interventions in such markets are crucial to livelihood development. To understand pro-poor outcomes requires examination of how markets practically perform, how they are set up, and how government and foreign aid agencies intervene in them at and beyond the farm-gate level to increase farmers' incomes. This chapter combines the previous chapter's livelihood analysis with a more specific value chain and production network perspective. Value chain approaches are the main tool for enhancing agricultural development since about 2006 (GOVERNMENT OF GHANA 2010; OUMA et al. 2012: 227; YARO 2013: 12), but they must be understood within broader production networks and livelihood systems (see also Chapter 3).

Of special importance for livelihood development are the markets of tomato and chili, because these are major cash crops produced in both research communities, Biu and Mirigu. Of further major significance in Biu is rice production. Shea is another product of high relevance for locals. It is traditionally of importance for women and to household food security at crucial times of the year, however, it offers insufficient income to improve livelihoods in the long term. Currently no interventions are taking place at the village level in the Shea sector, thus analysis of Shea will not be pursued further.

Tomato and chili are two of the earliest purebred cash crops introduced to the area. Rice, though common for centuries as a traditional staple, became more widespread as an additional cash crop after independence in the late 1950s. Producers and markets of all three crops have received varying, yet fairly significant government support and protection since the time of independence. These support mechanisms, however, ceased when structural adjustments were implemented. Since then, most farmers were unable to hold pace with changes in agricultural policies as they were exposed to international competition while suffering from support withdrawal. Interventions at the dawn of the post-SAP period started to again support tomato processing. However, these attempts were largely unsuccessful, which made farmers concentrate on farming chili. The government then focussed on cereals like rice by raising import duties and, partly in cooperation with development agencies like USAID, further supporting and subsidising agricultural production (see also Section 2.5). The partly globalised markets of tomatoes, chilies, and rice, and dynamics encountered within markets at the national and local levels, parts of which result from publicly funded, post-SAP policies in combination with development agencies, are examined in this chapter.

## **6.1. The Tomato Market**

A small minority of locals at Biu's irrigation scheme produce a tomato cash crop, while farmers in Mirigu, where people are generally less well off than in Biu, grow tomato under shallow groundwater irrigation (SGI) during the dry season. Tomato products have always had to deal with stiff, global competition; however, this competition became more decisive due to trade liberalisation efforts by the Economic Community of West African States (ECOWAS). As will be shown, competition in tomato is side-lined further by cater-like structures within the market. Government programmes have tried to alter these trends, by intervening at the market level, and by creating government market outlets. These attempts have mostly failed, however, due to reasons explained in this section.

### **6.1.1. General Overview**

Alongside chili, tomato is one of the most important cash crops grown in Ghana nowadays (GHANA STATISTICAL SERVICE 2013: 298). Moreover, tomato is an especially important cash crop in northern Ghana. Its local origins date back to the beginning of the 20<sup>th</sup> century, when it was introduced alongside dry season gardening by catholic missionaries (CATHOLIC CHURCH NAVRONGO 1905-1920). After independence, in the early 1960s, dry season products like tomato were supported to allow the rural north to develop. Policies included protective duties, publicly funded input support and out-grower schemes, and provision of large-scale irrigation projects with market access linked to publicly funded, import-substituting agro-industries (ADU 1969: 17-18; AHWOI 2010: 5-6; AMANOR & PABI 2007: 56; FAO 1970: iii, 1; LAUBE 2007: 64; LAUBE et al. 2008: 9). However, the industries ran into major difficulties since their establishment, and thereby remain uncompetitive in the eyes of producers and consumers (FAO 1970: 2; SCHÜRMAN 1967: 4-11). The industries were characterised by underperformance and vast overspending, which further diminished government resources and led to the partial collapse of these industries from the mid-1970s onwards. Facilities had to formally close after structural adjustment, as donors of SAP and ERP funds saw no reason to further protect the tomato processing industry. The tomato factory, earlier mentioned in chapter 2, survived without government protection and support for only one season, until 1988/1989, although prior to that it had already experienced severe troubles for decades. Therefore, only a few years after the Tono irrigation project had been completed, to feed local agro-industries, the tomato processing plant closed due to an acute working capital shortage (CHRISTIAN AID 2003; VOSCON ASSOCIATES & MAGNA CONSULTING 1997: 6). Tomato paste imports from industrial nations rose in the following years, due to trade liberalisation efforts pursued alongside SAPs, leading to concern raised in scientific and NGO publications about the impact of this practice on local farmers (LAUBE et al. 2011: 753; PAASCH 2008; SEND FOUNDATION

2008; SONGSORE 2011: 263). The restoration of the local tomato paste factory was initiated at the onset of the currently prevailing, post-adjustment era, despite its vagarious past but just shortly before elections (AHWOI 2010: 9-10; KYEREMATEN 2007: 77; WHITFIELD 2011b: 31, 32). The attempts remain relatively unsuccessful (ROBINSON & KOLAVALLI 2010).

Ghanaian production of tomato has somewhat skyrocketed since the late 1960s. While about 20,000 tonnes were annually produced during the 1960s, 16 times as much was recorded in 2012, about 321,000 tonnes. Production has however, encountered severe ups and downs. Production rose considerably during the early 1970s, a time of vast government spending that also led to the establishment of tomato processing factories. Yet production then remained stagnant over that decade. Drops in production were encountered with the introduction of SAPs in the 1980s, throwing production levels back to those achieved 20 years before. From the late 1980s to the late 1990s, however, production levels rose drastically. By the time the Tono irrigation scheme was completed, the government processing venture was officially closed. Tomato production stagnated again at a relatively high production level, but encountered several throwbacks coinciding with ECOWAS trade liberalisation efforts in the early 2000s. Fresh tomato started to be imported from Burkina Faso. Furthermore, imports of tomato paste began as SAPs and ERPs set in. Paste imports rose until they reached about half of the level of domestic production in 2007. In recent times, 2011/2012, the major sources of tomato paste imports are China, followed by subsidised European paste from Italy, partly also Germany and the UK, as well as paste from the USA, South Africa, Morocco and Tunisia. Fresh tomato imports come from only a few countries, primarily Burkina Faso and despite growth in international competition. From 2007 to 2012, annual domestic production rose by another 178 percent, from 180,000 to 321,000 tonnes. Even more, minor exports of paste occurred from 2002 onwards with periodical increases and decreases until 2008, though on a rather insignificant scale (see Figure 40).

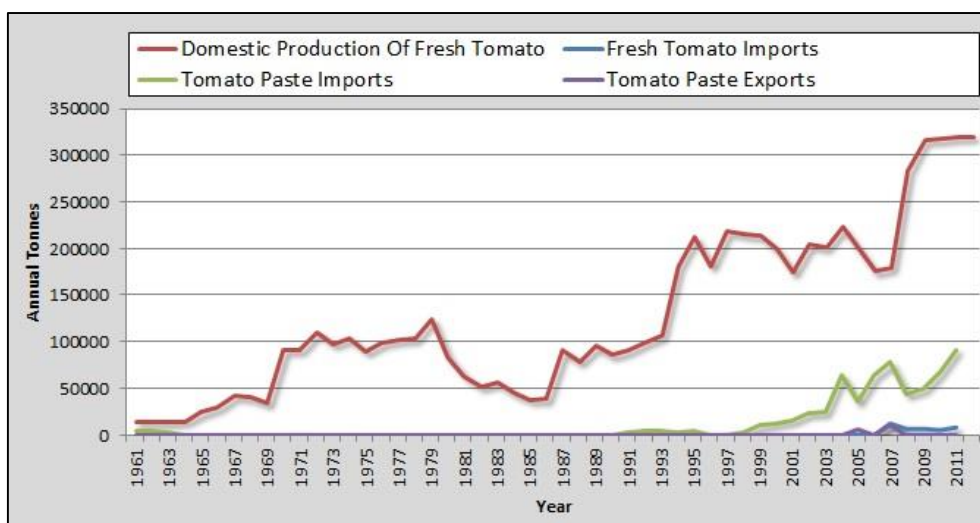


Figure 40: Production, imports and exports of tomato products in Ghana (own figure, 2015, based on FAOSTAT 2014).



Production of tomato in Ghana has increased while imports have also risen. In this context it is important to accept that tomatoes produced for either the fresh market or for further processing of paste can be considered and treated as being separate commodities, whereby markets are equally separate. Tomatoes used for either fresh consumption or paste processing require different inputs in production to attain substantially different tomatoes that vary accordingly in potential outcomes for producers. Generally, tomato for the fresh market pays better per kilo than tomato for paste, which requires further processing and thereby comes with higher overheads for processors and thereby lower farm-gate price for farmers (ROBINSON & KOLAVALLI 2010: 4).

Farmers interviewed in Biu and Mirigu (who on average look back over the past 50 years, see before, Figure 5) claim they have always sold to traders of the fresh product anyhow. That is primarily so because they state that most tomato production in the region began/became most popular far after processing of paste had ceased. It was only later, when the local government factory was revamped, that locals had the chance to enter paste markets. Thus, paste has never mattered to local farmers and developments in fresh tomato imports are far more significant for livelihoods than paste imports. At present, the best statistics available on the usage of domestically produced tomato are based on MOFA estimates. According to these, 95 percent of all tomato on Ghanaian markets is sold freshly on local markets, about 3 percent is processed into paste, and 2 percent is exported. Of fresh tomato, the vast majority is sold in southern Ghana's large urban centres – the country's 'golden triangle' – markets in Accra, Sekondi-Takoradi and Kumasi. Additional important markets are found in regional capitals throughout the country.<sup>76</sup>

As reflected in the countries of origin of fresh tomato imports, the decisive difference in fresh to paste markets is that the range of traders supplying fresh tomato is greatly limited by the perishability of the product, unlike when looking at paste. Fresh tomato is highly perishable and forms of cooling or storing them hardly exist. Thus the range of traders and thereby competition in fresh tomato markets is limited by the shelf life of tomato under the harsh climatic and road conditions of the West-African region. Domestic tomato paste production however, has to compete with global agro-industrial players that are often highly subsidised in their country of origin and certainly better equipped to compete on global markets. This may explain why, on a nationwide level, Ghanaian (fresh) tomato production did not suffer much from globalisation and liberalisation tendencies that expressed themselves in growing imports. Of course these imports meant that domestic paste production had to face stiff competition from global markets. That production of tomato actually decreased, as found in the study area in northern Ghana, is then a

---

<sup>76</sup> Interview with the MOFA administration, 05.03.2010, Accra, Ghana.

contradiction. Thus, production of tomato drastically increased on a nationwide level while decreasing in Northern Ghana.

### **6.1.2. Local Structure and Geography**

Inconsistencies between national and local trends are explainable by considering the seasonality of production throughout the West-African region. This seasonality exposes Northern Ghana to high international competition in trade with the fresh product. Cultivation of tomato takes place across Ghana, mainly in the forest-savannah transition zone of central Ghana, but also in the northern savannah and coastal savannah zones. Each zone has different seasons of production according to agro-ecological zone and local access to irrigation.<sup>77</sup> As a result, there are three main tomato seasons in the country. Season in the study area, the Upper East Region, and in neighbouring Burkina, falls between December and March. Between May and July tomato is harvested in central Ghana, the Ashanti and the Eastern Region. Then August to October is tomato season in the south of Ghana, the Greater Accra region (ASUMING-BREMOONG & ASUMING BOAKYE 2008: 15). Due to this seasonality, nationwide market supply of fresh tomato differs greatly throughout the year. Generally, domestic, nationwide supplies are more than abundant in August and September, but severe shortages occur between March and July (Ibid.). Ghana's tomato market is characterised by an annual 'intermittent glut – to – shortage – to – glut situation' (MONNEY et al. 2009: 7). The very north of the country, the study areas, harvest at a time when market supplies are inadequate and prices could be most favourable, December to March. Yet this is also the only region where harvests coincide with those of international competitors, Burkinabe farmers.

The issues arising from liberalisation in the fresh tomato trade are a specific problem of northern Ghana, while being rather irrelevant for the south of the country. While domestic imports of fresh tomato are insignificant in comparison to production on a nationwide scale, it is the impoverished north of Ghana that is most affected by these imports, while the rest of the country produces fresh tomato far more independently of competitors. Therefore, farmers in the study areas attest a decrease in tomato production as a result of a loss of tomato market access, because traders nowadays prefer to buy in Burkina Faso. Though on a national scale imports from Burkina Faso seem insignificant, during harvesting times in northern Ghana they actually made up 30 percent of all tomato sold domestically in 2010, as approximated by MOFA authorities.<sup>78</sup> In 2012 and 2013, customs interviewed at the Burkinabe border in Paga spoke of 30 to 40 trucks per day, each with about seven tonnes of produce, from December to June, until the rains set in Burkina. That equals over 45,000 tonnes a year, equivalent to 15 percent of national production, passing

---

<sup>77</sup> Interview with the MOFA, 05.03.2010, Accra, Ghana.

<sup>78</sup> Interview with the MOFA, 05.03.2010 and 04.04.2013, Accra, Ghana.

along one of two major road connections going to Burkina Faso.<sup>79</sup> Tomato could also come from Benin, Niger and Nigeria (OECD 2009: 99), because Ghana is a major horticultural market hub within the ECOWAS region, especially for tomato (GHANAVEG 2014: 39). However, it doesn't because local traders have blocked off competition, for example from Togo (see also LAUBE 2007: 207-208), while buying either in Ghana or Burkina Faso themselves<sup>80</sup>. Therefore, 96 percent of all imported, fresh tomato in 2012 came only from Burkina Faso (HCID 2015).

The National Tomato Trader Association (NTTA) deals with fresh tomato imports, wholesale and retail. Most of the sourced fresh tomato, varieties like '70', 'Roma' or 'Pectomech' (AWO 2010: 127), is sold on open-air, consumer markets alongside tomato paste. The few western-style supermarkets in Ghana mostly source Egyptian or Dutch tomatoes. Open-air markets are divided into large sections, according to the products sold. Areas where tomato products can be bought are supervised by the NTTA, by the so called 'tomato queens'.<sup>81</sup> The NTTA thus controls both fresh tomato wholesale and retail, aside large shares of retail of tomato paste, whereby the prior is of greater value for producers and traders and of higher popularity among consumers. Thus, markets of fresh and tomato paste are not entirely separated, but heavily dominated by (those into production of and trade with) the fresh product. For the NTTA, commerce in fresh tomato is not only a matter of farm gate price, but also of tomato shelf life, thus distance between markets and producers under the current conditions of transport. Therefore, while many publications on Ghanaian tomato markets point at price competition initiated by globalisation tendencies as being the decisive factor for NTTA chain participation (LAUBE et al. 2008; LAUBE et al. 2013, 2011; PAASCH 2008), government analysis points at tomato quality, as reflected in post-harvest losses along the whole chain of tomato, from producer to consumer. Losses range between 30 to 40 percent of total production per year. The latest governmental assessment of this undertaken in 2008 speaks of up to 176,000 tonnes lost per annum, which in 2008 topped the amounts of tomato being imported from Burkina Faso by a third.<sup>82</sup>

The most up-to-date analysis on domestic, horticultural value chains states that post-harvest losses are by far the most urgent issue for market operators in Ghana (GHANAVEG 2014: 37). With little that can be done about the quality of road conditions by merchants themselves, and high investments and running costs encountered for cooled trucks, one of the easiest ways of lowering losses during transport is by buying tomato that lasts and can endure the severe stresses of rough transport under semi-arid to tropical conditions. Thus traders travel slightly further to buy quality tomato in their neighbouring ECOWAS market, Burkina Faso. According to local

---

<sup>79</sup> Interview with a customs officer, 09.01.2013, Paga, Ghana.

<sup>80</sup> Observation and interviews with several market queens of the NTTA, 21.02.2010, Accra, Ghana.

<sup>81</sup> Ibid.

<sup>82</sup> Interview with the MOFA, Horticultural Division, 19.02.2010, Accra, Ghana.

farmers and various experts interviewed, Burkinabe tomato is grown on soils of higher quality and with more application of manure, which leads to better, harder fruits, as explained later in detail. Traders prefer these tomatoes, because they ‘travel better with little spoilage during transit’ which ‘brings better returns’ than local ones that are watery and ‘easily squashed’ (MOFA 2009: 1). Tomatoes from Burkina Faso ‘not only have a better overall taste and appeal, but also tend to retain these qualities longer’ and so ‘imported tomatoes are generally more lucrative for traders than those grown by local producers’ (VENUS et al. 2013: 33). This led to a collapse of market access for northern farmers. However, access partly recovered over the last decade (see before, Figure 33). Presently traders from Tamale, located about 200 km south of the study areas, patronise local farmers. They say they come only when they are unable to afford the trip to Burkina Faso. The traders buy lower quantities and pay a worse farm-gate price than those that once came from further south.<sup>83</sup>

Alike problems with quality had been reported in the past. They made locally produced tomato paste unattractive to Ghanaian consumers, while government was still heavily involved in agro-industries. Yet, despite that the NTTA started to prefer Burkinabe fresh tomatoes over local ones, attempts were made to reintroduce tomato processing, to serve as an outlet for fresh tomato. The government revamped the regional tomato factory in 2006, the Northern Star Tomato Company (NSTC) in Pwalugu (see Photo 12). To support this endeavour, the government teamed up with a private player from southern Ghana. ‘Expom’, formerly ‘Trusty Food’, a co-partner of the Italian tomato giant ‘AR Industrie Alimentari S.p.A.’ set foot in Ghana in 2003, in its free trade zone in Tema, near Accra. The company supplied the West-African market with tomato paste brands such as ‘La Perla’, ‘Walgusto’, ‘Russo’, ‘La Bianca’, ‘Bonne Mama’, most of which are common throughout the country. Expom dominated the Ghanaian tomato paste market and its exports heavily, as there was no other source of tomato paste in the country.

Just 7 percent of the tomato used by Expom for production came from domestic supplies. According to an interview with the Ghanaian Food and Drugs Board, the little Ghanaian tomato paste that was produced and exported, really derived from previously imported paste.<sup>84</sup> 93 percent of Expom’s paste were said to have derived from the canning/repacking of imported tomato paste, namely subsidised bulk tomato paste from China. Expom sold this on the ECOWAS markets as a Ghanaian brand. Yet, out of at least 900 tonnes of paste running through the company each year, about 75 percent went to Nigeria while just a quarter was sold on the Ghanaian and other ECOWAS markets. The major customer in Nigeria was ‘Sosaco, part of the ‘Wantamal Group’, a leading provider of fast moving consumer goods, owner of famous tomato paste brands like

---

<sup>83</sup> Diverse FGDs with farmers in Bui and Mirigu and interviews with NTTA members from Tamale.

<sup>84</sup> Interview with the head of the Food and Drugs Board, 25.02.2010, Accra, Ghana.

‘Gino’ – which is also common on Ghanaian markets – and thereby the largest distributor of tomato paste in retail packs in West-Africa. Sosaco exported to another 26 countries in Africa (AR 2011; EXPOM 2011; GHANAWEB.COM 2005; GSA 2010; ROBINSON & KOLAVALLI 2010: 1; WATANMAL GROUP 2012).



Photo 12: The NSTC paste factory in Pwalugu, UER, Ghana (own photo, 2010).

Back in Ghana, Expom has made efforts to source an increasing share of tomatoes from domestic markets. It sold know-how and machinery to the government for the revival of the NSTC and later bought bulk tomato paste from the government company. Expom was in fact the NSTC’s only customer for bulk tomato paste, which it bought at prevailing world market prices. However, the NSTC meanwhile ceased to operate. It seemingly could not compete with global prices, as growing amounts of paste were brought into the country, parts of which were imported by its ‘partner’ Expom. Furthermore, high overheads that resulted from too high a water content in local tomatoes in combination with governmental mismanagement, rendered processing completely unattractive.<sup>85</sup>

The Ghanaian tomato value chain structure as a whole and its geography remains heavily dominated by southern Ghanaian tomato production for the NTTA, with minor integration of northern Ghanaian farmers, vast imports from Burkina Faso and minor ones from Egypt and the Netherlands, paralleled by Chinese paste (re-) imports from global and ECOWAS markets. To regain better tomato value chain access, farmers in northern Ghana will have to live up to the standards imposed by Burkinabe or world market counterparts, depending on whether fresh tomato or tomato for paste should be produced in the future. Drying tomato is thereby not an option because returns are then too low for profitable production. Paste and fresh tomato value

<sup>85</sup> Interview with the NSTC farm operations manager, 15 03.2010, Pwalugu, Ghana.

chains come with different opportunities. No tomato paste factory will ever be able to pay higher prices per kilo than the fresh market, due to the overheads that arise from processing. Only the production of larger quantities could allow for greater farmer incomes overall, which would require an increase in farmer yields and thereby vast efforts by any entity taking up paste processing.<sup>86</sup> Yet, competing in global markets via paste may be more difficult than facing competition within only the West-African context through fresh tomato markets. The great advantage that could arise in terms of development for northern Ghana is that a profit-orientated management of the tomato factory would require vast year-round supply of tomato and thus allow all-year production and assured market access for farmers, unlike the fresh tomato trade that prefers producers closer to markets in the south whenever tomatoes are in season in such areas. A running factory in Ghana's north would promise substantial growth in (nationwide) tomato production. Yet both alternatives – fresh and paste markets – require improvements in product quality (see Figure 41).

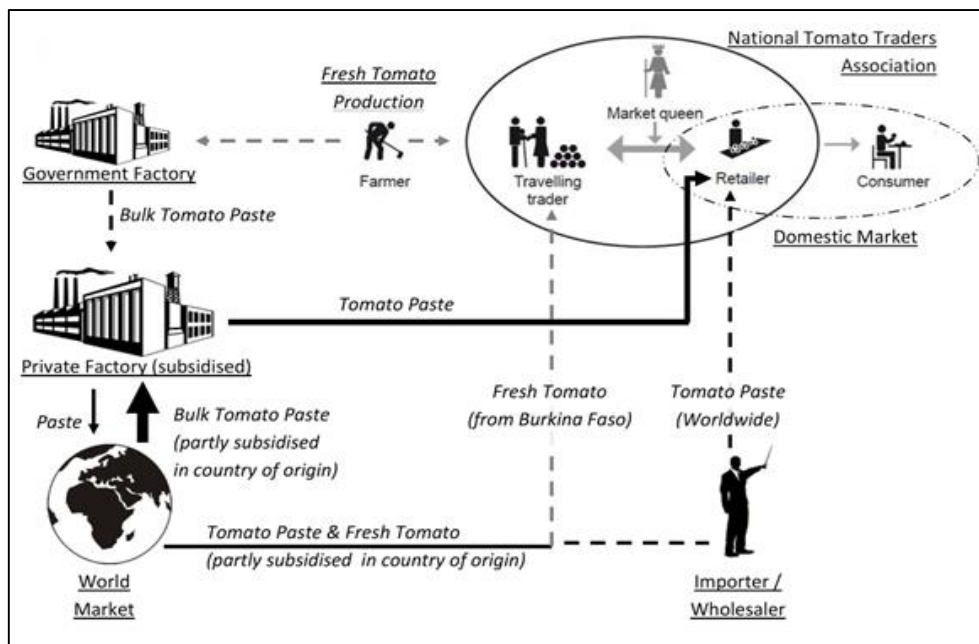


Figure 41: The Ghanaian tomato value chain (own figure, 2015, own expert interviews, 2010, AMAKYE et al. 2008: 70; AMANOR & PABI 2007; CLOTTEY et al. 2009; FAOSTAT 2014).

Hope that private sector engagement in tomato processing can reindustrialise Ghana's north arises from the offers made for further investments. Firstly, as government processing was largely unsuccessful, Expom jumped in and offered to take over the NSTC in 2009 for one million US\$. This amount is just one-fourth of what the government had paid to Expom for its consultancy services and machinery for revamping the factory. The government found Expom's proposal 'laudable', but was not ready to sell at such a small price (MOFA 2009: 2). In any way it seems

<sup>86</sup> Interview with Anna Antwi, food security consultant, 01.03.2010, Accra, Ghana.

Expom meanwhile closed down. Since then another offer has been made by a southern Ghanaian company called ‘Mercury Tomato Industries’ (MTI), which proposes formation of a public-private joint venture with NSTC (MOTI 2012). Furthermore, there may be potential to revive trade in fresh tomato.

The sub-sections below will compare the alternatives farmers (could) have at hand – being production for the fresh market and past production for either Expom or MTI. Although some of these alternatives are no longer at hand, they give an impression about the conditions under which different tomato value chains could work, allow identification of crucial leverage points in the chains, and thereby help to assess the degree to which they could provide or limit the scope of opportunity for development through tomato in Northern Ghana. Access to chains, required monetary inputs, and resulting outcomes of chain participants are examined.

### **6.1.3. Access, Inputs and Outputs**

Farmer access to the fresh tomato value chain in Biu and Mirigu is primarily defined by the lack of financial abilities of farmers to venture into production with the aim to make money. Access to the value chain is primarily associated with financial and natural capital. The reason the most vulnerable people in Biu and Mirigu cannot participate in tomato production is because it is so heavily capital and labour intensive. Farming is also male dominated because of high labour constraints in tomato and specifically in SGI farming. Farming tomato also draws on social capital, as it is not a traditional crop. Also, in Biu most upland suitable for tomato is now used for rice, which means that neighbouring fields can no longer be used for production of tomato because they would be flooded. Thus a majority of locals would have to venture back into tomato, to thereby convince the irrigation system’s management to switch upland land use back to tomato production.

In both Biu and Mirigu the timely start of the tomato seasons is difficult. Since the optimal time of starting tomato (October) clashes with the harvest of previous crops, only those who can pay for labourers or acquire free labour are able to do quality tomato production, assuming that quality also depends on a favourable climate. With an ongoing shift in climatic seasonality this may become harder. Moreover, early rains setting in by February can destroy harvests. Potential outcomes of tomato value chains are already more variable as compared to any other crop:

*‘Tomato, it can fail you significantly. [...] It will do what it wants and you will regret doing it and it will then fail you brutally. But, rice or pepper will fail you [...] only little.’<sup>87</sup>*

If tomato production is successful, farmers primarily associate it with income, thus further financial capital. However, farmers acknowledge that they undermine the natural resource base in

---

<sup>87</sup> FGD participant, February 2013, Mirigu, Ghana.

the long term, as production is not environmentally sustainable under current conditions. Furthermore, both Bui and Mirigu's farmers tend to (need to) clear increasing amounts of (scarce) virgin lands for tomato production, as doing so increases crop quality, makes less likely that their production suffers from soil disease, and saves on fertilisers. Improving soil quality in areas where tomato production currently takes place could limit the ongoing destruction of land reserves, because such farming is so demanding on already poor soils. Tomato's perishability increases vulnerability because reliable and fast market access is required, which is beyond the control of locals (see Figure 42).

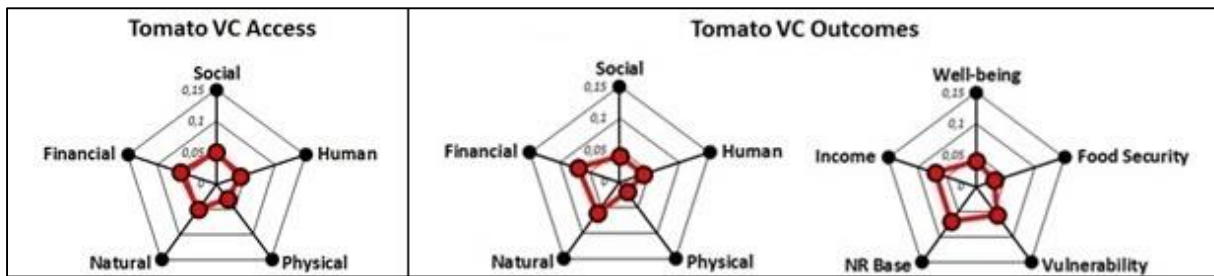


Figure 42: Intensity of associations made between tomato chain access and assets required (left) and chain outcomes for farmers' assets and livelihood outcomes (right) (own figure, 2015, according to co-occurrence coefficients, own interviews and FGDs, 2012/'13, n=150 h).

Of all the assets required for value chain access, when finances for fertilisers and suitable land are at hand, quality of land most affects yields and farm gate prices for tomato. As soil quality is said to be worse in Bui than Mirigu, farmers have a lower yield and worse quality tomato, thus lower average farm gate prices, despite spending more on agro-chemicals and especially fertilisers. Farmers in Bui make higher investments in farm inputs and hired labour, while farmers in Mirigu invest more in terms of their own efforts. They dig wells and irrigate by hand, often manure lands, have even less access to mechanisation; but they are rewarded with a greater net return (see Figure 43).

Overall the costs and profits for tomato farmers in Bui and Mirigu differ from official estimates, mostly in terms of estimated farm-gate prices and tomato yields. When assuming the minimum wage for farmers or their workers in 2012, a margin of about 40 percent was still possible in Bui, 68 percent in Mirigu or a weighted average of 63 percent in total, which is very close to the officially estimated farmer margin of 67 percent. Break-even prices are officially (and on average) reached at 0.30 GHC/Kg (in Bui at 0.43, Mirigu at 0.27 GHC/Kg). Locals in Mirigu thus have more room in manoeuvring with prices. Farm gate prices dropped severely in 2012, from about 1.7 GHC/Kg in January to 0.51 in February, continuing thereafter at a low price. It was thus extremely lucrative to sell at the very beginning of the season. Generally, as ICOUR data suggests, it always pays best to sell at the very beginning of seasons, when few sell. In this regard



people from Mirigu have higher chances to be 'on time' as unlike Biu's farmers, they are not busy in rice fields at the time when tomato should be prepared.

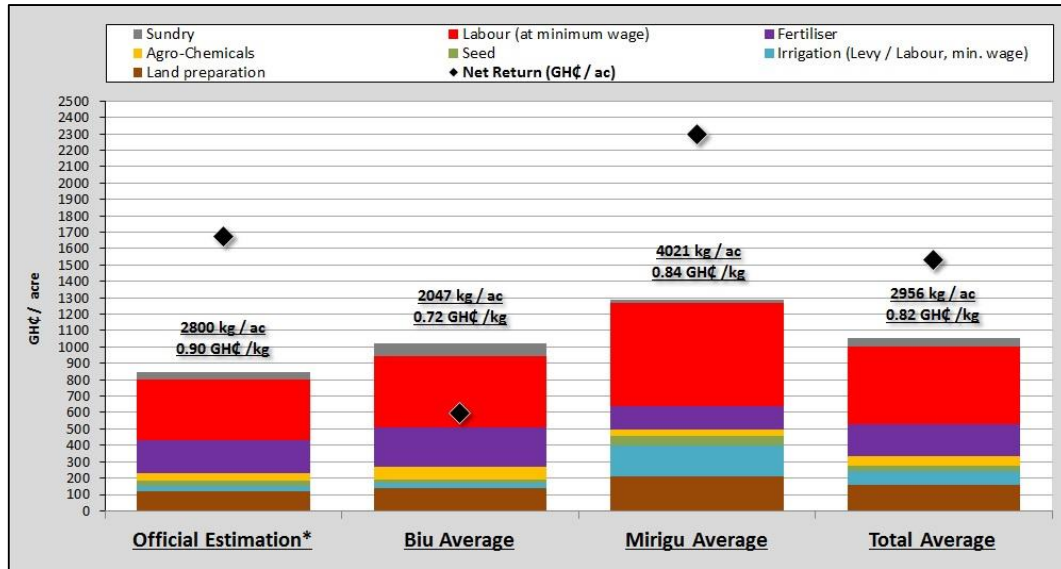


Figure 43: Illustration of tomato production costs, expected yields, average prices (January-March 2012) and net returns per acre at minimum wage of 4.8 GH¢/man-day (own figure, 2014, own survey, 2013, n=6 and \*based on ICOUR and MOFA data, 2013).

### 6.1.3.1. Fresh Tomato Trade

Local farmers compete with Burkina farmers to sell tomato to the NTTA, whose traders nowadays comes from Tamale. Those traders supplying southern markets like Accra via northern Ghana or Burkina Faso can often pay higher farm gate prices, because consumers (can) pay higher retail prices. In fact, in 2012 retail price was about 4.83 in Accra (Agboghloshie), while being only 1.58 GH¢/Kg in Tamale. Therefore, the most lucrative form of sourcing tomato could derive from regaining the favour of Accra/southern traders. To access potential benefits, a primary economic factor is then farm gate pricing. In terms of production, there is indication at the nationwide level that tomato (excluding labour) is most costly to produce in southern Ghana, followed by production in the Upper East Region, and then central Ghana, the Brong Ahafo Region (Ibid. 12). For an international comparison, there is not much data available. But, government sources concerned with the competitiveness of tomato in Ghana's north say that there is indication that farm gate prices paid are occasionally lower in northern Ghana than in Burkina Faso. For example, in the dry season of 2008/2009 the NTTA imported tomatoes from Burkina Faso valued at between 0.44 GH¢/kg (lowest farm gate price) and 2.22 GH¢/kg (highest farm gate price) (MOFA 2009: 1). At that time, prices at the Tono irrigation scheme were between about 0.32 GH¢/kg (lowest farm gate price) and 0.70 GH¢/kg (highest farm gate price) (data obtained from ICOUR, 2010). Burkina Faso tomatoes were thus, at times, up to three times as expensive as those produced under the Tono irrigation scheme, when comparing the highest farm gate prices recorded. When observing average wholesale prices from 2009 to 2011, one can see that at the

beginning of the year, during tomato harvesting season in the study areas, prices are generally lower in Bolgatanga – the regional capital of the Upper East – than in Burkina Faso’s Po (see Figure 44).

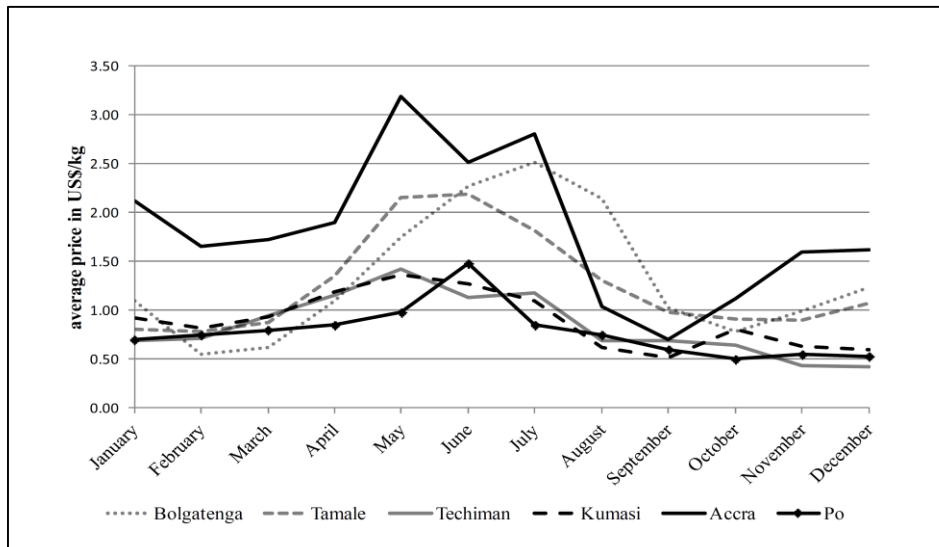


Figure 44: Tomato wholesale prices in Ghana (2009-2011) and Burkina (Po, 2008-2010’) (VAN WESENBECK et al. 2014: 5).

Prices, therefore, are possibly not the greatest factor in value chain access. Even if farmers in Burkina Faso receive just 72 percent of what is paid in Ghana – as traders have indicated during FGDs and as used for further calculations – the overall profit of wholesalers in retail prices is only marginally larger than when compared to Ghanaian tomato. Wherever bought, about 60 percent of (given) consumer prices go to wholesalers as profit, while retailers make less than 10 percent. In Ghana an average of just 6 percent goes to farmers. Burkina’s occasional advantage in farm gate pricing is clearly limited by additional costs, among them higher expenses for transport, customs and police bribes, duty, monies to be paid to middle men that may subcontract further commissionaires, aside from the extra time spent on the road and slightly higher wages for loading. Another key variable in traders’ rational is a factual increase in farm gate price that results from post-harvest losses due to bad quality of tomato. 30 to 40 percent of tomato from northern Ghana spoils along the way (35 percent used for further calculations), whereas traders have estimated spoilage to affect just 15 percent of those tomatoes sourced in Burkina Faso. Consequently, these losses lower wholesale or farmer margins, respectively room for negotiation. Given the overall allocation of profits and thereby power within the chain, it is likely that such issues will give traders the upper hand. If quality were to be the same, farm gate prices in Burkina Faso would be slightly lower, but the fact that differences in post-harvest losses are so vast should be considered an expression of overall risk encountered by wholesalers. They are not willing to take this risk when imports promise even higher incomes (see Figure 45).

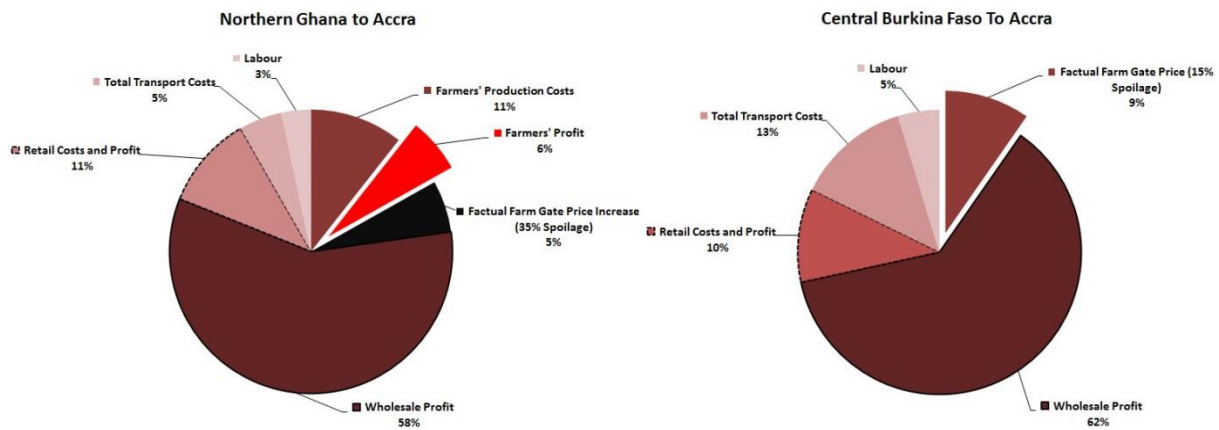


Figure 45: Composition of the average kilo retail price of tomato from northern Ghana and Burkina Faso, sold in Accra from January to March 2012 (own figure, 2015, based on own calculations, own trader FGDs, 2013 and ESOKO data, 2013).

The overall composition of retailer prices of tomato bought in northern Ghana and transported to Accra can vary greatly, such as when looking at the 2007/2008 seasons. An average of 20 percent of retail pricing went to farmers, while 80 percent was left to wholesalers and retailers. Thus in 2008 the northern Ghanaian farmers' shares in retailer prices were similar to what they were at the time of this study in Burkina Faso. It appears to be increasingly unfavourable for southern buyers to buy tomato in the study area. On average, 9 percent of the final retailer price went to farmers, 13 percent to wholesalers and 8 percent to retailers as profit. Overall a profit of roughly 30 percent was generated along the chain. Almost half of all profits went to wholesalers, while farmers and retailers were left with about a quarter each. Thus wholesalers, directed by tomato queens, had enormous influence on the value chain; they literally reigned over it, as the NTTA controlled three-quarters of all profits. Wholesalers of the NTTA seemingly managed to attain an even more favourable position within the chain, as they shifted profit allocation in their favour to the disadvantage of farmers and retailers.<sup>88</sup> However, wholesalers faced increasing risks when daring to buy soft tomato in northern Ghana or travel further to Burkina Faso. Furthermore, retail prices fluctuate by season and so profits vary. From a wholesaler's point of view, higher risks justify higher shares of profits. Thus transport risks must be dealt with first of all, which boil down to an improvement of local tomato quality by improving soils with organic material, in order to advance value chain accessibility for farmers in Mirigu and Biu. This is hard for individual farmers to achieve and thereby requires government assistance by more 'close-to-nature approaches', if not at least by providing organic material:

*'It [the inorganic fertilizer] forces the tomato to mature fast [...]. The thing becomes soft and watery and the shelf life is very, very low. But, when you use only manure, the shelf life is about two to three times longer. [...] Why isn't everybody doing it? Well, it's [...] the animals, the high*

<sup>88</sup> Own calculations based on data obtained from ICOUR, 2010.

*mortality of livestock, not many people have got big animals [...]. Then there is the haulage. [...] But if it's inorganic fertilizer, [...] you can even carry it on your bicycle.*<sup>89</sup>

Back in 2010 those farmers still successful in selling their tomato strongly emphasised the positive effects of manuring. When asked why traders preferred farmers in Burkina Faso, locals in Biu and Mirigu referred to improved tomato quality resulting from manure usage and less dependency on inorganic fertilisers. Though knowing of the practice, they were, however, not able to copy this example due to a lack of manure.<sup>90</sup> Participation in tomato value chains thereby depends on access to manure and thus animals, which directly favours better-off farmers (livestock owners). However, NTTA's value chain partly gives small-scale producers, such as Mirigu's, the opportunity to provide high quality produce through their small but sophisticated gardens, although there are only limited income opportunities. Though not intending to do so, the NTTA rewards farmers for more environmentally sustainable production, which also favours the production of other crops throughout the year. Successful interaction with the NTTA may thus partly create islands of environmental and economic sustainability that could allow for increased resilience to environmental change.

Quantity is a further factor on the side of farmers, though a relatively mild one when compared to processing scenarios. Farmers and traders constantly express that, since tomato production in northern Ghana decreased, the likelihood of attracting traders at all has become smaller – a self-amplifying process. Wholesalers are afraid of being unable to instantaneously fill their trucks with sufficient produce, which would render their activity unprofitable: while waiting for more tomato to be brought, previously loaded tomato would spoil. One truck load, shared by about two traders each, conveys at least 125 crates or 7250 kilograms of tomato, which brings an average profit of over 10,000 GHC per trader-trip. On average at least 2.5 acres of tomato fills one truck, or 1.8 acres in Mirigu and 3.5 acres in Biu. As most farmers are unable to produce sufficient amounts by themselves, wholesalers, if they come at all, demand farmers to synchronise their production with others, to organise themselves to be able to conduct loading and trade within the shortest time possible. One farmer's risk thereby becomes another farmer's. Risks are increased for individual farmers within such forms of (forced) horizontal contractualisation because if someone's harvest fails or when tomatoes are not ready to be harvested at the agreed upon date, this can mean a loss of customers for all farmers involved. As cooperating farms can be spread across various areas, the likelihood that at least one of them will be affected by some natural disaster, disease or pest is great.<sup>91</sup>

---

<sup>89</sup> Interview with the KNE MOFA director, 05.02.2013, Paga, Ghana.

<sup>90</sup> Interview with a farmer from Biu, 12.03.2010, Biu, Ghana.

<sup>91</sup> Interview with a farmer from Biu, October, 2013, Biu, Ghana.

Quantity of production is thus an issue to tackle when wanting to assure future success of northern Ghanaian farmers in fresh tomato value chains. A properly run farmer-based organisation would be required that includes more than just a few local producers trying their best to fill a single truck. Farmers must increase cooperation among one another and, moreover, plant at the same time to then harvest together. That, however, if done on a larger basis, reduces farm gate prices. Farmers are actually, therefore, more interested in harvesting at a time when nobody else is to attain greater prices. Thus social organisation among tomato farmers is limited. It would require a vast degree of cooperation among farmers, a working association, to coordinate farmers with traders in ways that allow everybody to partake in selling whilst also evening out seasonal production and thereby price differences. Under the current setup it is unlikely that tomato farmers can achieve this. Farmer coordination in terms of the quantities produced is of even higher importance, when looking at tomato processing and the paste market provided by NSTC, as a factory needs to be supplied all year round regardless of farm gate prices.

#### **6.1.3.2. Public Tomato Processing**

The most recent data for the Northern Star Tomato Company's (NSTC) activities date back to early 2010, when the government company last bought tomato. The NSTC bought fresh tomato at a fixed price of 0.13 GHC/KG, which at the time was less than a third of the average, yet fluctuating price offered by the NTTA. By selling to the factory, tomato farmers had the chance to make a margin of only 10 percent on their invested capital. Through processing, a kilo of local tomato was then transferred into about 0.063 kg of paste, meaning about 16 kilos of fresh tomato were required to produce 1 kilo of paste, which was far below national and international standards.<sup>92</sup> It was, in fact, almost twice as much as was needed when looking at Ghana as a whole. ROBINSON AND KOLAVALLI (2010: 10) estimate the normal national ratio of fresh tomato to paste be to 8:1. The main issue with tomatoes bought by the NSTC was their low quality and high water content, because a low content of soluble solids (as expressed by Brix values) determines the industrial/processed yield (DA SILVA ET AL. 2008: 17). Paste was sold to Expom for 1.4 GHC/kg, the prevailing world market price at the time, where the product was canned, labelled and distributed. Thereby, and when looking only at the difference of bought fresh tomato to the selling price of paste, NSTC made average losses of about 0.66 GHC per kilo of paste produced and sold to Expom.

Yet further costs for running the factory occurred. Based on estimates from 2010, production costs of one kilo of tomato paste were about 3.59 GHC/kg, thus 2.08 GHC for the buying of fresh tomato and an additional 1.51 GHC for processing. By comparison, the cost of imported tomato concentrate from China was at 1.99 GHC/kg and thus by far cheaper

---

<sup>92</sup> Interview with the NSTC farm operations manager, 15 03.2010, Pwalugu, Ghana.

(ROBINSON & KOLAVALLI 2010: 3). The factory could not compete with paste imports, mainly due to the low content of soluble solids (brix) in local tomato varieties. 57 percent of costs comprised buying tomato. The local varieties used were not at all suitable for processing, which was thereby only possible because of government subsidies. The second largest cost of production, about 27 percent, came from transport of tomatoes to the factory. Additional costs for water, labour, electricity, and maintenance depreciation of equipment are of minor impact on processing overheads. When taking the costs for tomato buying and processing and subtracting the price the NSTC gets from Expom (1.4 GHC/kg paste), NSTC produced losses of 2.19 GHC/kg paste. As NSTC's production was about 150 tonnes of tomato paste, this translates into losses of more than 300,000 GHC. As said, that was less than what should or could have been produced within a day, but if the factory had run as it was supposed to the losses would have gone into the millions (see Table 11).

<i>Item</i>	<i>Costs (GHC per kg paste)</i>	<i>Share of costs (%)</i>
Fresh tomato (16 kg at 0.13 GHC/KG)	2.080	57.9
Water	0.336	9.4
Fuel	0.960	26.7
Labour	0.100	2.8
Electricity	0.016	0.4
Maintenance of equipment	0.076	2.1
Depreciation of equipment	0.025	0.7
<b><i>Total cost</i></b>	<b><i>3.593</i></b>	<b><i>100</i></b>

Table 11: Estimated costs of NSTC's processing of 1 kilo of tomato paste in 2010 (own table, 2011, own survey, 2010, and ROBINSON & KOLAVALLI 2010: 3).

The refurbishment of the factory has already been a costly undertaking (more than 4 million US\$/6 million GHC at the time). Under the running conditions explained, huge amounts of government money were spent while farmers only received small incomes. It would have been more profitable for the factory not to run than to do anything at all. Quality of tomato is not sufficient, as higher brix results in higher processing/industrial yield and brings down production cost. Production, as it is until now, is only legitimate when viewing it as a form of subsidy, which is lucrative to farmers when compared to losses made by the factory, but certainly not when compared to possible profits farmers could attain when selling to the NTTA. Yet, selling to the NTTA was often not possible, which was the reason for the government's intervention to revitalise the factory. Sadly, selling to the factory was just as unreliable as selling to the NTTA and, as a result of insufficient funding and planning, caused losses for farmers when neither the NTTA, nor the NSTC could buy any longer. Thus, government intervention in processing was unsustainable and uneconomic, under current trade regimes, and hardly helped local development in the long term. Unlike the government, private entities may be better equipped to handle competition, as under greater pressure they assure an economically sound production.

### **6.1.3.3. Private Tomato Processing**

Expom offered to take over the NSTC in 2009 (MOFA 2009). Expom planned to replace local tomato varieties by new high-performance, hybrid plants, the ‘Nemagiant F<sub>1</sub>’ tomato, which would have come from the Italian company ‘United Genetics’, a company that designs and distributes hybrid seeds worldwide. The tomato would have been suitable for industrial processing as well as selling on the fresh market. The seed was somewhat adapted to local climatic conditions, as it was reported to perform well in Tunisia, Algeria, Togo and also southern Ghana. However, it performed less well in rainy times, which is at least half the year in northern Ghana. Furthermore, soils determine yields. Ideally these should be of medium to clay composition. Poor or degraded soils could limit yields severely. Another limitation is that the variety is a F<sub>1</sub> hybrid, which would have meant farmers would have to buy seed each season. F<sub>1</sub> hybrids are bred to give a high yield in the ‘first generation’, hence the name F<sub>1</sub>, but the seed gives a low yield if planted again. Thus re-using the seed would lead to segregating plants with fewer resistances to pests and disease and would reduce yields. Furthermore, optimal yields with the F<sub>1</sub> seeds could have only be achieved with application of pesticides, to combat fungi and worm attacks, despite the fact that the seed is supposed to show tolerance against Verticillium Wilt, Fusarium Wilt (both fungi), root-knot nematodes and bacterial spot. However, the plant is not resistant to Tomato Yellow Leaf Curl Virus (TYLCV), possibly the major tomato disease frequently occurring in the area. An insect control programme is in fact the crucial factor for the success of the F<sub>1</sub> seed variety in order to avoid transmission of diseases such as TYLCV. Thus large amounts of agro-chemicals would have to be used on plants.<sup>93</sup>

Production costs would have risen drastically due to fertiliser and agro-chemical usage. When comparing Expom’s suggested costs, as defined back in 2010, to that of average costs of tomato production in 2010, overall cost of production for Expom would have been more than twice as high as for the NTTA, without considering farmers’ labour input as Expom did in its official offer. Production was supposed to result in higher yields, a maximum of 80 tonnes/ha once cultivation had reached its full potential, instead of the currently prevailing 5 to 10 tonnes/ha (2 to 4 tonnes/acre respectively). Expom expected yields to be 30 tonnes/ha in the first and second season, 50 tonnes/ha in the third and fourth season, and reach a maximum of 80 tonnes/ha in the fifth and sixth season of production, as farmers’ knowledge about growing of the variety increases. Farm gate prices would have changed accordingly, starting with a price only slightly above the breakeven point of 0.14 GH¢/kg at 30 tonnes/ha and almost no margin to attain for farmers. Thereby, Expom’s production model could not have been as profitable as regular production for the NTTA, due to the low farm gate price, but only in the initial seasons. Once

---

<sup>93</sup> Email from Remo Ludergerani, United Genetics and [www.unitedgenetics.com](http://www.unitedgenetics.com), 10.02.2011, Italy.

yields would have increased to 50 tonnes/ha in the third season, through Expom's support, production would have become economically viable for farmers, allowing big incomes despite that farm gate prices would have decreased. However, for the first two or three seasons, for a maximum of one year, farmers would have needed financial support to maintain comparable income levels. Only at the maximum yield of 80 tonnes/ha would farmers' seasonal margin have been similar to that theoretically achieved with the NTTA (see Table 12).

Season	Yield (t/ha/season)	Farm gate price (GHC/KG)	Net returns (GHC/ha/ season)	Margin/season/ha (%)
1 & 2	30	0.140	86	2
3 & 4	50	0.125	2.136	34
5 & 6	80	0.125	5.886	59

Table 12: Development of yields, farm gate prices, farmers' net returns and margins under Expom's production model (own Table, 2014, calculations based on MOFA 2009: 6).

As NTTA would not patronise local farmers throughout most of the year, Expom's offer would have allowed for more assured and profitable specialisation in tomato markets on a regional level, unlike sticking with only the fresh market. Once fully in place, farmers could have made large, all-year profits. Expom's economic future would have been secured, unlike that of the NSTC. When looking at processing costs in combination with farm gate prices paid once yields have reached 50 tonne/ha and more (0.125 GHC/KG), and when assuming the common 8:1 processing yield, Expom's paste price would have been almost 12 percent below than that of imported Chinese paste (1.99 GHC/kg from China, 1.77 GHC/kg from Ghana). Farm gate prices in this processing scenario could have been higher, up to 0.15 GHC/KG when taking the price for Chinese tomato paste with the same brix value (36-38 percent) as a benchmark in 2010. Vice versa, a further profit of 0.028 GHC/KG could have been made for a processor like Expom (see Table 13 and compare to Table 14).

Item	Costs (GHC/kg)	Share of costs (%)
Fresh tomato (8kg at 0.125GHC/kg)	1.000	56.53
Water	0.168	9.50
Fuel	0.480	27.13
Labour	0.050	2.83
Electricity	0.008	0.45
Maintenance of equipment	0.038	2.15
Depreciation of equipment	0.025	1.41
<b>Total cost</b>	<b>1.769</b>	<b>100</b>

Table 13: Estimated cost of Expom's processing of 1 kg of tomato paste in 2010 (own table, 2011, based on survey, 2010, ROBINSON & KOLAVALLI 2010: 3).

Item	Costs (GHC/kg)	Share of costs (%)
Cost of tomato concentrate	1.320	66
Freight	0.450	23
Customs duty and clearance (12.5%)	0.221	11
<b>Total cost</b>	<b>1.991</b>	<b>100</b>

Table 14: Landed cost of 1 kg of imported tomato concentrate (36-38 % Brix) from China in 2010 (MOTI 2012: 10).



Expom would have added further value and profit by redistribution of the paste. These values cannot be estimated due to a lack of data: Expom was unwilling to share such data. Anyhow, Expom no longer seems to exist. Instead Mercury Tomato Industries (MTI) then offered to partner with NSTC (MOTI 2012).

#### **6.1.4. Governance Dynamics**

Northern Ghanaian farmers are faced with three alternatives, the NTTA, the NSTC and a privately run version of the former. The important difference lies beyond sheer inputs and outputs of value chains. It is defined by the dynamics of governance of these production networks. Advantages and disadvantages are provided to farmers and the future of the northern Ghanaian tomato value chain, by the NTTA, publicly and privately run processing facilities.

##### **6.1.4.1. Fresh Tomato Trade**

Value capture increasingly favours wholesalers over producers and retailers. Indeed, wholesalers and moreover their representatives, the tomato market queens who reign over their wholesalers and retailers, hold most of the governance power within the chain. Established in 1985, around the time government withdrew support from agriculture and tomato production, the National Tomato Trader Association (NTTA) comprises women traders from all major towns and markets in Ghana. All regions of Ghana started to have associations that regulated and controlled activities of their traders, meaning they eventually altered prices to their favour, by limiting the quantities supplied to markets. The NTTA, nowadays a tightly organised association or cartel, factually has the exclusive right to sell to Ghanaian markets. Right to sell is often handed down to family members, via association membership.<sup>94</sup> The association includes (male) truck drivers and local middlemen, who organise contacts with farmers in Burkina Faso and sometimes Ghana. The entire tomato value chain beyond the farm gate is controlled by NTTA, as a farmer from Bui explained:

*'There was once a farmer here, who took all his tomato to the Accra market himself. He paid for the truck, loading and everything. Then, when he came to the market, the women were not even minding his tomato [ignored him]. In fact, they were chasing him [away] and all his tomato got spoiled. So you better not even try it!'*<sup>95</sup>

Traders of agricultural commodities report that it would be very hard, if not impossible for them to access domestic tomato markets, unlike with other produce, because of the NTTA. The association simply does not allow non-members to sell their produce on local markets, making

---

<sup>94</sup> Interview with several market queens of the NTTA, 21.02.2010, Accra, Ghana.

<sup>95</sup> FGD participant, February 2013, Bui, Ghana.

them wait for such a long time to sell that their tomatoes start to go bad.<sup>96</sup> NTTA members hold identity cards and meet annually in the Upper East or the Northern Region, to discuss issues faced in business and to coordinate time schedules with drivers and middlemen. The NTTA cooperates closely with tollbooth officials at the border of the Upper East and with customs at the Burkinabe border, to assure that only the desired number of wholesalers will go to buy tomato. The government officials check that wholesalers have the required paperwork, i.e. allowances issued by NTTA executives. Quantities arriving at markets are thus tightly controlled, but where these stem from, Ghana or Burkina Faso, is up to the individual trader. Prices paid by wholesalers for allowances do not differentiate between the two countries and so there is little threshold for traders to travel further to Burkinabe competitors.<sup>97</sup> Under the strict supervision of ‘tomato queens’, the NTTA sources its tomato via travelling merchants. Members are under intense pressure to follow the regulations of NTTA. If they do not, traders may be fined or suspended from work. Through its full control over the tomato value chain, the NTTA has attained greater influence on domestic politics (AMAKYE ET AL. 2008: 27, 64-66; AMANOR & PABI 2007: 58; ROBINSON & NGELEZA 2011). Thus, ‘hardboiled’ market women, working in hierarchically, highly organised groups actually ‘dominate agricultural market channels from the farm gate to the consumer’ (LAUBE 2007: 198).

Farmers in Bui and Mirigu almost always describe fresh tomato value chain governance as being entirely buyer-driven and fully market-based. Transactions are mostly based on single sales and feature low complexity, if they occur at all. In terms of farmers’ levels of contractualisation, production for the NTTA shows features of a typical informal production model. Financial engagement of traders is minimal, short-lived and highly speculative and default risk is high for all parties involved. Little to no information is passed on from traders to farmers and production risks are entirely in the hands of farmers. Traders, however, have to face increasing risk in transport due to spoilage, which they primarily counter by buying in Burkina Faso instead of northern Ghana. Sometimes, tomato trade is also organised through middle men, mostly in Burkina Faso though, making it an informal intermediary production model, which breaks direct contact between farmers and wholesalers. Sponsors may lose the little direct control they had over production, prices, amounts and quality of the product, which can result in even lower incomes for the farmer as well as irregular production and low quality standards (SEE ALSO EATON & SHEPHERD 2001: 45, 52-56). Integration of farmers into the fresh value chain is thus increasingly difficult.

---

<sup>96</sup> Interview with a rice trader coming from Accra, 05.01.2013, Navrongo, Ghana.

<sup>97</sup> Interview with a middleman from Paga, 09.01.2013, Paga, Ghana.

However, there is reason to believe that the fresh tomato value chain holds potential for a far more producer-driven form of governance. This is due to the high value of tomato, the relatively high sophistication required in production, the potential of northern Ghanaian farmers to compete on international markets and the nationwide seasonality of market supply – leading to shortages while tomato is in season in northern Ghana and Burkina Faso. A higher degree of contractualisation – at least modular or relational forms of governance – could provide higher incomes for farmers, possibly broader-based poverty alleviation in northern Ghana, while tomatoes are in season, three months a year. Interestingly, such forms of governance may have prevailed in the past. Literature indicates past ‘arrangements’ between farmers and traders which have broken down over time, and ‘soft loans’ that were once given to northern farmers by the NTTA (AMAKYE ET AL. 2008: 27, 64-66; AMANOR & PABI 2007: 58). It is thus worth examining changes in NTTA’s governance, as encountered in the study areas.

Farmers and Tono Irrigation Cooperative Farmers’ Union (TICFU) representatives<sup>98</sup> report that relationships to wholesalers were much better in the past. They generally date the change in this relationship to the first years of the 21<sup>st</sup> century – the time that traders started to go to Burkina Faso – accompanied by a decrease in profitability. The same wholesalers had previously visited the farmers each dry season; produce was picked up right at farm gate and traders occasionally used to sponsor farmers. Back in 2010 some of these arrangements were still in place, though probably fewer in number. By 2012 no farmers could be found to report of such arrangements. Thus, contract farming arrangements have largely broken down although they have managed to persist for some time, despite trade liberalisations efforts:

*‘If we would still have that help today, I would be relaxing and enjoying the fruits of my work. [...] We were making a lot of money! Now it is not like that anymore! Until about 8 or 9 years ago the traders would give us fertiliser, chemicals for spraying the tomatoes and we were sure that when a farmer farms, they [the traders] would come and buy. If the market women gave a farmer money and fertiliser, it was that same women who will come and buy.’<sup>99</sup>*

The former arrangements led to several advantages for those farmers included in them. The first was reliable market access. Farmers were able to rely on their wholesaler coming to buy their tomato at the time of harvest, leading to comparatively little losses at or after harvest, despite the informality of contracts. Farmers were in contact with traders long before the beginning of the growing season and arranged the amounts of tomato to be planted in accordance to their customers’ abilities and needs. Farmers occasionally received finance, seeds, fertilisers and chemicals, inputs they otherwise could not afford, as credits to be repaid in kind. Farmers were

---

<sup>98</sup> Interview with the regional GAWU director, 19.02.2010, Bolgatanga, Ghana.

<sup>99</sup> Interview with farmer from Biu, November 2012, Biu, Ghana.

thereby able to start production early/in time and had a bigger chance of not being hit by early rains during fruiting or high temperatures that could further limit quality and quantity. Moreover, they were able to expand their farming activity, which speaks for the profitability of these arrangements.<sup>100</sup>

Shortly before harvest, farmers arranged pickup times with their wholesalers. Prices paid followed prevailing prices, but left room for adjustment on both sides. All interviewed farmers reported that they had been willing to reduce the price paid to them, should tomato prices have been uncommonly high, and that on the other hand, traders were ready to increase their prices when farmers would otherwise have run at a loss. A few arrangements went so far as to serve, when sufficient trust between stakeholders was given, as an informal insurance against natural hazards. Some farmers reported that traders were once willing to cover up to one-quarter of all investments that had previously been forwarded in the form of agro-inputs. However, as indicated, arrangements between traders and farmers were reciprocal. Price fluctuations were balanced and both sides were assured of being able to conduct business, partly because both were able to do long-term planning. Moreover, tomato, while generally paid for in cash, was also sold on credit. Traders did not always have the means to pay at the farm gate and so farmers waited for them to pay after the produce was sold on markets in the south of Ghana. Reciprocity and closer interconnectedness further derived from the exchange of gifts. While farmers generally described this as a strategy for the upkeep of *'friendship'*, concrete monetary advantages derived from such exchanges. Tomato traders are reported to have brought zinc roofing from the south, while farmers presented traders with animals. As roofing is far more expensive in the north of Ghana as compared to the south, and durable housing is highly desired among locals as a result of increasing incidents of torrential rains through climatic changes, this was a beneficial arrangement for farmers. In 2010, it was reported that traders supported farmers far beyond buying their goods. It was supposedly not uncommon that merchants helped in times of needs should a farmer be unable to afford transport to a hospital or payment of school fees.<sup>101</sup> Back then, the liaison of tomato traders and farmers seemed to be more than just a monetary relationship:

*'We have become very good friends! Sometimes they bring me yam that they buy along the road side. They will also bring sweet bananas for my children. Before I am home my children will already run to me, smiling and tell me what nice things the women have brought for us. For my wife they will buy some clothes and they even brought bread for my farm boy. So everybody is happy whenever they come around!'*<sup>102</sup>

---

<sup>100</sup> Interview with a farmer from Biu, 03.04.2010, Biu, Ghana.

<sup>101</sup> Interview with Anna Antwi, food security consultant, 01.03.2010, Accra, Ghana.

<sup>102</sup> Interview with a farmer from Biu, 03.04.2010, Biu, Ghana.

Farmers claim that aside from trust, another major reason for their integration into such highly beneficial arrangements was the good quality of their tomato. Despite the fact that traders and farmers had arranged their terms of exchange through local leaders, when traders came to buy, some farmers insisted on higher payment. Vice versa, farmers were not able to act collectively, to stop selling, when prices were too low, as the poorest among them could not afford to wait, which undermined the effort. Partly as a result of such (poverty-driven) opportunism, trust among farmers, and between farmers and traders, was lost. Traders then coordinated more closely among one another to counter these trends. Similar behaviour by traders led to the farmers' breach of informal contract farming arrangements. The traders united as an association, withdrew for some weeks to lower prices of the perishable produce, which severely frightened local farmers. From then on, traders arranged commerce in a way that came close to a spot market with prices changing by the hour, for example between the price agreed in the morning, the price following harvest and at the time of pick-up in the evening. Traders thereby forced farmers to reduce prices, because by then they had no alternative but to sell at any price, considering the perishability of tomato. This increased tensions between farmers and traders.<sup>103</sup> Traders emphasise that the primary threshold to pre-arranging with or even sponsoring farming (again) is trust, or rather assurance of terms and conditions agreed upon. Informality in arrangements means that trust or social capital is the substitute for legal certainty:

*'Assuming you arrange with the farmer, agree and come to buy a crate [standard unit of weight] at the [agreed] price, the farmer can later on change his mind and raise the price! So that is why it is difficult for us to partner with the farmers and tell them what to produce for us. When they realise that you have brought the truck and that you cannot make the truck return empty, they try to do that and you will be compelled to buy at any price. They are cheats! So, how can they be asking us for help any longer?'*<sup>104</sup>

The farmers' potential to misuse arrangements was only possible for as long as traders had no alternative, up until about the year 2000. Till then the producers were in possession of a seasonal monopoly at a nationwide level, enabled by protective duties in fresh tomato trade, safeguarding from Burkinabe/ECOWAS competition. That may have also been the reason why farmers, at first, enjoyed relatively favourable trade conditions with NTTA. Increasing organisation among tomato traders must be considered a reaction to an otherwise more producer-driven chain. With great success in cooperation among traders, alternative producers in Burkina Faso and a lack of trustworthiness and coordination among northern Ghanaian farmers, aside the high perishability of (local) tomato, the NTTA managed to take over the entire governance of the

---

<sup>103</sup> Ibid.

<sup>104</sup> FGD with NTTA members waiting to cross the border to Burkina Faso, 02.02.2013, Paga, Ghana.

fresh tomato value chain. With the aim to increase their incomes, traders could now simply wait for local tomatoes to go bad, as their business could still be secured through Burkinabe produce.

This, however, was a self-amplifying process. Perishability of tomato also gave basic reasons for traders to organise among one another as tightly as they do today, because their cartel-like structure assures them immediate selling on local markets. Accordingly, in Burkina Faso, which provides high quality, durable tomato, value chain governance is said to be more favourable. There, former verbal farming arrangements have been formalised. The Burkinabe Ministry of Food and Agriculture and their local irrigation scheme managers are said to have meanwhile signed contracts with the NTTA on behalf of their farmers<sup>105</sup>, despite that traders were initially quite reluctant to venture outside of Ghana, as they didn't know the language, didn't know any farmers and were unfamiliar of the conditionalities under which commerce in Burkina Faso took place.<sup>106</sup> But, quality issues with northern Ghanaian tomato, resulting from a loss of soil quality, became increasingly pressing and contributed to a loss of market access. Farmers have lost the affection of tomato traders to their counterparts in Burkina Faso, claims the local Ghana Agricultural Workers' Union (GAWU), due to quality issues that relate to soil degradation, specifically a lack of organic material. MOFA officials and farmers in Biu confirm this, adding that a lack of organic material in soils further shortens harvesting seasons and the shelf life, which makes them increasingly unattractive:

*'The difference is in the soil! In Burkina Faso they don't use these chemical fertilisers. They use a lot more of manure [...]. So, their soil there is stronger than ours here. Here we put many chemical fertilisers and water on the soil and you see the tomato looking bad and being soft. [...] Still we need to use chemical fertilisers, because if we don't, we don't have any results'*<sup>107</sup>

Lack of animals and manure means farmers cannot comply with quality needs, which further affects cooperation between farmers and traders. When traders started to select farms to buy from, instead of having farmers do that for them as had been done previously, selected farmers secretly mixed their fruits with the worse quality fruits of others (their neighbours and friends). Farmers were thus unwilling to take new quality standards seriously, which rendered growing shares of their harvest unsellable, while competitors from Burkina Faso complied and had better overall quality. In the eyes of traders, farmers were trying to betray them.

Traders were no longer ready to buy tomatoes that could not withstand transport to southern Ghana. Traders claim that a trace of rotting tomato can spoil the share of produce still of sufficient quality. So, traders started to source tomato with the help of knowledgeable locals that check

---

<sup>105</sup> Interviews with the ICOUR monitoring officer, 2013, Navrongo, Ghana.

<sup>106</sup> FGD with NTTA members waiting to cross the border to Burkina Faso, 02.02.2013, Paga, Ghana.

<sup>107</sup> Interview with a farmer, 09.04.2010, Biu, Ghana.

quality requirements. Since these were more closely related to local farmers than to southern traders, they could not impose higher quality standards due to a lack of authority. Quality became harder to meet, through growing distance between players within the chain, which hindered further transfer of knowledge.<sup>108</sup> Quality is now the number one determinant of market access. The level of product quality is to some degree equivalent to how the NTTA chooses to govern over its value chain and producers. Quality loss therefore resulted in a loss of demand for northern Ghanaian tomato and so prices fell. Vice versa, as prices fell, farmers reduced inputs and especially labour in production, which may have decreased the yields and quality of quite sophisticated tomato production.<sup>109</sup> This initial downfall of local tomato farming was rather slow as compared to what happened a few years later.

Government authorities reacted to traders' demands for improved quality through a 2002 initiative launched by the then District Chief Executive (DCE) of Kassena Nankana District (KND). He ordered the acquisition of Burkinabe seeds and their distribution among local farmers through the MOFA, to thereby allow locals to compete with cross-border trade. Later, the regional MOFA even took farmer representatives to Burkina Faso on a study tour to learn from their Burkina counterparts. However, the seed did not make any significant difference and, even worse, was not at all resistant to local pest and disease populations:<sup>110</sup>

*'The sickness was too much! You will just get nothing! [...] They said the quality would improve but really, everything died. The seed we had before was good. The tomato plant would grow very tall, only that the quality of the fruit became worse. [...] But see what happened! All was dead and the Accra women [traders] never came again. [...] Everybody here changed the seed, so now our own tomato, that did not become sick, is gone for good!'*<sup>111</sup>

Indeed, the decisive and long-term blow for tomato farmers in the study areas came from the Tomato Yellow Leaf Curl Virus (TYLCV), or Nematodes, in 2003/2004. Authorities speak of region-wide losses of up to 90 percent of total harvests.<sup>112</sup> Locals refer to it as a '*disaster*' that in the worse sense '*revolutionised*' trends, as from thereon traders patronised Burkinabe farmers instead. Contract farming arrangements broke down almost entirely, partly because of massive crop failure and the resulting, outstanding debts of farmers.<sup>113</sup>

---

<sup>108</sup> FGD with NTTA members, February 2013, Navrongo and Paga, Ghana.

<sup>109</sup> Interview with a teacher from Biu, 04.05.2013, Biu, Ghana.

<sup>110</sup> Interviews with ICOUR monitoring and extension units, director of the UER SEND Foundation, the MOFA director Paga and his monitoring officer, 2010, 2012, 2013, UER, Ghana.

<sup>111</sup> Interview with a farmer from Mirigu, 03.03.2013, Mirigu, Ghana.

<sup>112</sup> Interviews with ICOUR project manager, monitoring and extension units, the MOFA director Paga and his monitoring officer, MOFA extension Navrongo, 2010, 2012, 2013, UER, Ghana.

<sup>113</sup> Interview with an elderly farmer from Biu, March 2013, Biu, Ghana.

As a result of financial distress, farmers reduced the areas used for tomato production in the seasons to follow, moreover, because they were rightfully 'afraid' to fail again. This scared those traders still visiting the area, as traders run into losses when there is not enough tomato grown to satisfy their quantitative needs. Farmers in the study areas, however, continued to cultivate tomato. The rationale behind a continuation of possibly unprofitable production under worsening conditions, derived from the hope of rising profits, because farmers were speculating on higher farm gate prices as a result of others dropping out. It was in the interest of large-scale farmers, most often FBO or union leaders that others fail in tomato production, so they themselves can receive higher farm gate prices. On the other hand, genuine smallholders have frequently indicated a great degree of path-dependency resulting from a lack of control over their lives imposed by their poverty. The tomato 'lottery', they hope, will help them overcome this. To farmers, tomato was the only cash crops they had:

*'If you are under the scorching sun [...] and there is no tree to hide under, is it not better you just stay under the hot sun, than to be roaming around in the heat, looking for a tree? [...] Farming tomato is sometimes the only option. If we should need to leave it, it is ok, but where are we going and what will we eat from? That is why we continue. If we also run [quit], [...] there will be no more tomato farmers, but maybe buyers will still come. So, that would be disastrous! I hope if just a few people are doing it, [...] I will become the richest person.'*<sup>114</sup>

Moreover, farmers state that outcomes of tomato production are needed for reinvestments into further irrigated and rainfed production. Thus, they indirectly state that even minimal profits are sufficient, as long as they outweigh inflation and especially growth in fertiliser prices. Furthermore, females say that if tomato was not as male-dominated as it is, and women would possess more power to decide over venturing into production, women would have dropped out of tomato production faster, since men are supposedly more path dependent due to their risk affine habitus and have more assets at hand that they are willing to risk, occasionally against the will of female household members.<sup>115</sup> So, for possibly irrational but also practical reasons, as much as cultural reasons, the plight of tomato continued.

NGO activities highlighted in the media spurred on further developments. In 2006, a huge advocacy grant was given to local tomato farmer groups through the Business Sector Advocacy Challenge (BUSAC) Fund. Consequently, over 57,000 GHC were spent on a media campaign to put pressure on the government – in time for the 2008 elections – and to make it re-open the tomato processing factory in the Upper East. Furthermore, the farmers' advocacy groups Ghana Trade and Livelihood Coalition and Send Foundation became involved in organising and

---

<sup>114</sup> Interview with a farmer from Mirigu, 03.03.2013, Mirigu, Ghana.

<sup>115</sup> Interview with a teacher from Biu, 04.05.2013, Biu, Ghana.



mobilising local farmers. Further contact was established with international NGOs, among them FIAN, OXFAM and others. Increased news coverage, speaking of annual suicides committed by local tomato farmers (of which there were actually only about two according to local farmers), led to further international NGO and research activities on the topic.<sup>116</sup> By early 2007 anger among farmers rose, to the extent that farmers blocked the border to Burkina Faso. NGOs, via farmer representatives, organised locals for public protests, to hinder traders from crossing the border to Burkina Faso. Physical violence erupted at the border station in Paga, between farmers and those traders that insisted on travelling. Fights were stopped by force:

*'The leaders around this area sat for a meeting with the NGOs and later we all went to the market women [...]. We used different means of stopping them [the women traders] by crossing the road with stones and weeds. We came with our big men and were ready to fight them [...]. When their vehicles came around, we would go and trouble them severely and deflate their tyres. We were violating them, beating them badly and making noises. The police chairman at Bolga [Bolgatanga] even came with his men to stop us with [tear-] gas.'*<sup>117</sup>

As a result, Ghana's government closed the border to Burkina Faso for about two weeks, while it urged market women to buy domestic tomatoes instead of foreign ones. The women traders were, however, less than ever ready to buy comparatively expensive, yet bad quality tomato from farmers who had previously violated them. To meet ECOWAS protocols, however, cross-border trade had to continue.<sup>118</sup> The production of tomato almost ceased in the region. Only farmers with higher quality tomatoes, often those doing SGI in places like Mirigu, managed to keep attracting customers, but only customers from nearby Tamale. Farmers in Mirigu still had the telephone numbers of these female traders, and were in contact with them over the year. But, these traders no longer forwarded inputs as before and instead ask to buy on credit, since the general market for tomato broke down. But, along with ongoing media coverage of happenings at the Burkinabe border came the promise by local politicians to restart production at the NSTC. Initially at least, this revived the production of tomato in northern Ghana.

#### **6.1.4.2. Public Tomato Processing**

Value capture with Northern Star Tomato Company's (NSTC) part of the paste value chain primarily favoured its former partner Expom and, at least in comparison to the NSTC itself, farmers. The latter, however, only marginally, because the NSTC's little production was completely economically unsustainable, while farm-gate prices paid were very low in comparison

---

<sup>116</sup> Interview with Dale Rachmeler, director of BUSAC Ghana, 06.08.2013, Accra, Ghana.

<sup>117</sup> FGD participant in Biu on tomato VC dynamics, 16.07.2012, Biu, Ghana.

<sup>118</sup> Interviews with several local farmer union leaders, March 2013, UER, Ghana.

to the fresh market. This was due to the additional costs involved – the bad processing yields – stemming from the bad quality of local produce. With processing costs determining farm gate prices, selling quality tomato to a factory can only be a rational thing for farmers to do, if the alternative is a total loss of harvests, if yields improve drastically and if all year tomato production – implying at least a captive relation if not a hierarchic one throughout three fourth of a year – is actually desired. Farmers would need assurance in selling and support of their production beyond the current state. If farmers were not be part of an assured contract farming scheme that supplied them with inputs on credit to notably boost production and income all year round and possibly provide further benefits going beyond immediate economic interests, thus involves itself closely and positively in local society while using its attained closeness as a way of exercising social control over farmers, it is questionable if locals would want to and could in any way be made to comply with processing requirements. These are vast. If the NSTC were to run at a full capacity of 500 tonnes per day, for just 300 days per year,<sup>119</sup> that translates into about 150,000 tonnes per year, which would equal about 83 percent of Ghana's annual, countrywide production in 2008, respectively a little less than 50 percent in 2012 (FAOSTAT 2014). However, NSTC's efforts were actually close to non-existent and badly administrated.

The NSTC management initially relied on radio broadcasts to motivate farmers to go into production, but failed to follow up.<sup>120</sup> The majority of farmers did not receive support of any kind or formal contracts to go into production. Nevertheless, announcements on the radio had a big effect, as farmers all over the Upper East went into tomato production once more. At Biu's irrigation scheme for example, the acreage used for tomato doubled from 2006 to 2007 (data obtained from ICOUR, 2010). Farmers were disappointed later, when they realised how small NSTC's farm gate prices were. But the major problem was that the NSTC did not even have enough trucks and crates to allow for transport to the factory. The factory lacked money, because the management misused and misdirected the public finances provided.<sup>121</sup> The chief of Kodima, also the secretary of the local union, tried to organise transport himself. His subordinates, however, were forced to sell their tomato to him at less than half the factory price. The outcomes for most farmers were losses due to mismanagement and elite capture.

The managing director of the NSTC was exchanged by the dry season of 2007/2008.<sup>122</sup> Beforehand a few formal contracts were fixed between the factory and farmers. More than 800 farmers spread throughout the region were supposed to be supplied with seeds. However, most

---

<sup>119</sup> Interview with the NSTC farm operations manager, 15 03.2010, Pwalugu, Ghana.

<sup>120</sup> Interviews with the ICOUR director and NSTC farm operations manager, March 2010, UER, Ghana.

<sup>121</sup> Company-internal documents obtained from, and interview with the NSTC farms operations manager, 15 03.2010, Pwalugu, Ghana.

<sup>122</sup> Interview with the MOTI, February, 2010, Accra, Ghana.

farmers did not take seeds from the factory for various reasons, notably because of the traumatic experience they had had with government/MOFA seeds only a few years back. The people that did receive seeds signed formal agreements with the NSTC. Farmers were thereby supposed to receive financial support for farm maintenance and were supposed to be assured of purchase. But, none of that happened. Support other than seed, which is by far the cheapest input, was not given. In fact, the amount of tomato that could have been produced with these seeds would have lasted the factory for only about 26 days. The seeds supplied were not suitable for production in the wet season, limiting production to about three months a year.

Consequently, the effort to initialise contractual farming for processing had no success. After that, contracts were not signed again.<sup>123</sup> In the years to come, the factory permanently failed to buy enough tomato to be regarded as a true alternative to the NTTA. Further trust was lost when in early 2010 (the dry season 2009/2010) no work was underway at the factory even though it had been announced on the radio, quoting Ministry of Trade and Industry (MOTI) and factory management spokespersons. The factory continuously failed to live up to its promises. All farmers interviewed shared the opinion that the factory frequently came too late to buy tomato. In fact, the only positive thing farmers could report about the factory was that it was not at all selective over the kind of quality it would buy. The NSTC thereby successfully convinced farmers that their production could continue as in the past.

Production under the NSTC was an unsustainable, ad-hock hybrid of different models. It merged several ways of organising contractual farming in an unfavourable way. It had traits of a multipartite model, as it involved multiple organisations with joint responsibilities, and included statutory bodies and corporations working with privately owned companies and local farmers. This choice of setup, due to the multiple actors in this form of arrangement, made internal management difficulties more likely unless there was excellent coordination between players. NSTC incorporated elements of a centralized model, as it bought from a large number of small farmers. Such arrangements are most common for vegetables for canning or freezing. Ideally, these are strongly vertically coordinated, thus under captive or hierarchical relations, with quota allocation and tight quality control. Sponsors' involvement in production can vary from minimal input provision to the opposite extreme where the sponsor takes control of most production aspects, however, normally farmers are at least contracted and often are provided with management advice, materials and further inputs (EATON & SHEPHERD 2001: 44, 56, 150). None of this was done on a sufficient basis. NSTC could not live up to its own requirements, or those of tomato producers.

---

<sup>123</sup> Company-internal documents and contracts obtained from, and interview with the NSTC farm operations manager, 15.03.2010, Pwalugu, Ghana.

Most of the Northern Star Tomato Company's business was transacted informally, sometimes including farmer leaders that had previously negotiated over farm gate prices. That these leaders bought tomato for themselves at cut-throat prices makes clear that they were not necessarily representing whom they were supposed to. Farmers often stated that these 'leaders' did not pass on information from the factory. Moreover, these large-scale farmers were preferred by the NSTC whenever the company actually managed to pick up tomato. Farmer leaders reported having had good and personal contact with the factory, while farmers did not even know how to contact it at the time of harvest. Consequently, trust towards the factory and leaders, indirectly representing the NSTC, was lost to the point that some farmers claim they will no longer react (i.e. pay attention) to these authorities. The local branch of the SEND Foundation, which was close involved in the process, explain how the people's representatives are '*in bed*' with a factory that betrayed the people at a time when they were in need of help. One major issue was the lack of a united farmer front. In meetings farmers pointed out that many of their leaders had been bribed by the company and were no longer working for their benefit. The tomato farmers association did not seem to have the confidence or support of its own farmers.<sup>124</sup> Farmers and the NSTC management see the true reason for the rehabilitation of the factory based in political opportunism, not in a long-lasting attempt that seriously aims at sustainable running of the plant. Stopping traders to go to Burkina Faso was not possible due to ECOWAS agreements and so the revitalisation of the factory was simply the next best thing to do, shortly before upcoming elections.<sup>125</sup> In fact, a GIZ paper states that the factory was permanently influenced by politics, had no functional management team, no clear governance structure and no functional strategic business plan whatsoever.<sup>126</sup>

Market power remained in the hands of the National Tomato Trader Association (NTTA), which would hardly patronise the area anymore. The factory was limited to producing bulk tomato paste/puree, while it showed no attempts to enable product or market differentiation. It continuously depended on its one private customer Expom, which held a monopolistic position in the paste chain. Public investments in the paste value chain and specifically NSTC's business were too small to enable proper running. Government underfunded the venture and so finance and credit were inadequate. Financing of and responsibility for production of the raw material for processing was entirely in the hands of farmers, as was risk and uncertainty. The factory had no incentives to successfully run. For example shutdowns did not seem to be a factor motivating the factory's management or supervisors in Accra's ministries. The government could have kept on

---

<sup>124</sup> Interview with the director of the regional SEND Foundation, March, 2010, Bolgatanga, Ghana.

<sup>125</sup> Interview with the regional GAWU director, 19.02.2010, Bolgatanga, Ghana.

<sup>126</sup> Documents obtained from the GIZ, 2010, Accra, Ghana.

investing or even increased its efforts in the otherwise unprofitable venture, however, it did not have the ability or the willingness to keep on supporting the misuse of public funds. Further barriers to farmers wanting to enter the paste value chain derived from the factory's substantial mismanagement, lack of reliable government finances and lack of essential equipment for transport. This favoured already successful farmers over those who were in need of help.

That processing frequently started too late created additional barriers, excluding smaller and larger farmers alike because climatic conditions limit the timeframe within which tomatoes can be harvested. All in all, a potential future processor would therefore primarily have to rebuild trust in the factory, increase the production of farmers, and assure pre-financing for the thereby encountered costs, because hardly any farmer will be able or willing to do so by him or herself. Compared to what has happened in the past, so locals believe, the most realistic opportunity that could allow long-term success in local paste markets can only derive from a privately managed and thus governed processing factory.<sup>127</sup>

#### **6.1.4.3. Private Tomato Processing**

Expom's initial attempt to source tomato for processing was based on a nucleus estate model, characterised by having a central estate or plantation for self-production and gathering produce from local farmers. Such a central estate is typically used to guarantee raw material supply and sometimes used only for research or breeding purposes (EATON & SHEPHERD 2001: 44; MOFA 2009). Some few locals were to be employed to work on Expom's plantation. First attempts had been made to acquire land along the White Volta River, close to Pwalugu.<sup>128</sup> In order to secure further supply of raw material, farmers throughout the Upper East Region, Ghana even, were to sign contracts, guaranteeing that all production would go directly to Expom, most likely because such 'large-scale investments, [...] often require a monopoly in order to be viable' (EATON & SHEPHERD 2001: 17). Expom was not ready to invest into the factory, but to guarantee pre-financing of farmers' production and to buy at harvest, which to the locals is the most important criteria to motivate them back to tomato.

Contact through FBOs and a union was established<sup>129</sup>. Expom then wanted to introduce new hybrid seeds to farmers, but also further inputs on credit like fertilisers and agro-chemicals and further assistance in training farmers to adopt improved technologies. The company was aiming at a 90 percent recovery rate for its provided loans. To increase productivity further, Expom wanted to install a drip irrigation system, on a total of 2400 ha. Almost 60 percent of the equipment would have been made available on UER irrigation schemes (mainly at Tono and partly at Ve), about

---

<sup>127</sup> FGD participant in Biu on tomato VC dynamics, 16.07.2012, Biu, Ghana.

<sup>128</sup> Interview with NSTC and the MOTI, February 2010, Pwalugu/Accra, Ghana.

<sup>129</sup> Interview with the MOTI, February 2010, Accra, Ghana.

20 percent to Bontanga, near Tamale in the Northern Region, and another 20 percent to Akomadan, in the south of Ghana, the Ashanti Region. Another 100 hectares were supposed to be cultivated with pumping machines by private farmers along the White Volta. Expom expected the set-up to take about three years.

During that time, farmers were to be identified and selected for production by ICOUR, the Ghana Irrigation Authority and through FBOs. Thus, Expom's model made use of multipartite models. Financial institutions for further financing of production for those not supported by Expom were to be found. A nursery was to be established for growing of seedlings by Expom. Seeds were to be imported, allowing cultivation of tomato from the third month onwards, coordinated in such a way that the factory could be constantly supplied with raw material. Expom offered to pay in cash at the farm gate and to bear the cost of transport, whereby farmers would have been allowed to sell 25 percent of total tomato production – thus three months a year, current dry season production – to the National Tomato Trader Association (memo examined at the MOTI, 2nd March, 2010, Accra, and MOFA 2009: 2-3).

Allowing farmers to sell 25 percent of their production to the NTTA was a precondition set by the government. It assumed that the increases in farmers' productivity and the resulting additional amounts of tomato produced could serve both fresh and paste markets and thereby lead to higher farmer incomes. Such a mixed scenario would have been most favourable to farmers with regards to monetary advantages. Furthermore, the government only partly agreed to Expom's efforts to establish a monopoly in northern Ghana. So, to limit competition with the NTTA, it emphasised that that a quarter of production should be available to the fresh market, which would partly even out differences between the fresh and the processed market. The government did not allow Expom to set up captive relations in tomato processing. The company's governance, as reflected in its strategy to source materials, was precarious.

Expom wanted to make use of an informal model. The supply required to feed the factory was supposed to be gathered equally from Expom's own fields, contracted farmers with full input support by Expom, and so called 'freelancers' with no support at all from whom tomatoes would have been spontaneously bought in case of shortages. Farmers would have been rewarded or sanctioned, according to their compliance to Expom, by being granted either status.<sup>130</sup> It is questionable, therefore, how freelancers would have to enter into tomato production at all. Vast investments by freelance farmers would have been required to allow them to make use of economies of scale, to be able to sell profitably and with sufficient quality, to become a contracted farmer. Further issues were likely to arise among those contracted, when using FBOs and unions as mediators, to organise farmers and distribution of inputs and repayment, because these are

---

<sup>130</sup> Ibid.

highly unreliable and are characterised by elite capture. The potential for local farmers was furthermore limited by the fact that, once yields are at 80 tonnes/ha, only 2,250 ha would have to be cultivated in order to supply the factory with produce. Thus, the more effective tomato production would have been, the fewer farmers would have been needed. That would have had an effect on the fresh market, if extremely efficient, contracted farmers could have then beat their competitors in Burkina Faso price- and quality-wise, but also their non-contracted, fellow farmers. Moreover, as Expom's scope of processing activities was not limited to Ghana's north, a running factory under Expom may have benefitted better-situated farmers from southern Ghana who would have been more able to live up to the costly production standard. At least 40 percent of raw material requirements would likely not have come from the Upper East.

How hybrid seed would have done if farmers had taken it up is unknown. Currently soils seem degraded, and rains in the wet season could very well influence production negatively, so both factors would limit yields, thus decrease profitability. Producing for Expom would have resulted in permanent monocultures of tomato. The enormous amounts of inputs needed would have increasingly affected the environment, if not farmers' health when using agro-chemicals incorrectly. But, processing of tomato seemingly cannot work profitably without the introduction of new seeds, new methods of cultivation and larger amounts of input use, resulting in huge increases in efficiency by means of industrial agriculture. This is what Expom was aiming at, but these hopes are hardly compatible with the agro-ecological realities of the study area. Environmental concerns should have been of concern to Expom, though they seemingly were not.

Expom meanwhile closed as a result of massive tax frauds, uncovered by a presidential task force. The company, 'which often kept their imports in bonded warehouses manned by the state or customs officials', was 'supposed to pay duties before clearing them. However, they succeeded in compromising customs officials and cleared the goods without paying the required amounts to the state'. Overall, more than 20,000,000 US\$ thereby bypassed authorities (ARKU 2013). Such criminal behaviour is hard to understand, especially when considering that Expom already paid significantly fewer taxes as it was situated in a Special Economic Zone in Tema. Expom's integrity turned out to be more than questionable when it sold Chinese tomato paste as a Ghanaian brand to be able to access ECOWAS markets, and when it sold services and goods to the NSTC for over 4 million US\$, to then want to buy them back at one-quarter of the price. From this perspective, doubts about their potential conduct with farmers seem more than justifiable. However, their proposal may have been a better choice compared to the offer made by Mercury Tomato Industries (MTI) (MOTI 2012).

The decisive difference in MTI's current offer is that it is not really considering pre-financing of farmers, though it claims to somehow want to 'finance' production. The extent of sponsoring is not explained at all. MTI does not reflect on the inputs required for suitable tomato

and paste production. According to their own survey data used in the proposal, farmers in the Upper East could produce a kilo of tomato for under 0.15 GHC/KG – which is their proposed farm gate price. Like Expom however, MTI did not consider labour in its production cost estimates, even though this is one of the largest inputs in fresh tomato production. The data give the impression that MTI may be planning to leave farmers' production the way it is, as its offer draws on contemporary estimates of farmers' yields. MTI wants to venture into the processing of vegetables (possibly chili and pickles), whenever it is not tomato season, and wants to go into juice and shea-butter processing, ketchup and hot sauces, canned pickles and water bottling. Thus, the company would try to diversify production heavily, for which it proposes further investments in machinery.

To source raw material for just its tomato section, MTI asks for areas to be put under drip irrigation, which it sees as the decisive factor for attaining quality produce. Yet the extent of irrigation, where it will take place or who will come up with the required money is not mentioned. MTI assumes that 500 farmers would be sufficient to feed the plant, while another 20 to 30 workers and another five managers are to be employed to run the factory for six days a week at three shifts per day. MTI plans to rely on the government to 'jointly' manage the factory, despite the fact that the government failed to run it. The real task for the government in this would be to provide its factory estate and machinery for free and to assure exclusive market access for MTI. The government ought to allow them to become the only provider for their nationwide, public school feeding programme and for supplying further governmental programmes and institutions. MTI asks the government to buy at prevailing market prices, but offers a flexible discount. Possible overproduction is supposed to be exported to ECOWAS partner countries. However, the reason for why MTI remains rather vague in all of this derives from the fact that it needs to determine and secure the required funding, for which it hopes to win over the government. Attained start-up funds are to be used first and foremost to cover own operating costs, including payroll, taxes and utilities and to purchase further machinery. In total, about 60 percent of all funds are to be spent on operating the factory, not on sponsoring farmers or setting up irrigation, while the rest will be used for further assets until profitability is realised. Support for producers may come later (MOTI 2012: 3-6, 8-9).

Under such conditions, the question of why farmers should sell to the factory arises. There is no reason for farmers, assuming they are able to produce sufficiently good tomato by themselves, to sell at extremely low prices to Mercury Tomato Industries (MTI). Quality tomatoes could again attract the National Tomato Trader Association (NTTA). If farmers cannot produce better quality by themselves, processing will most likely run at a loss, or farm gate prices would have to drop further, by about 50 percent, which then implies an even less profitable price for farmers. The likelihood of facing stiff competition from the NTTA is even bigger due to the fact



that tomato is not required all year around. Thereby the NTTA and the factory would require local tomato at the same time, whereby, the NTTA could not be beaten in terms of pricing. With no support granted to farmers for an indefinite timeframe, it is questionable how the company wants to assure farmers' motivation to go into production, how sufficient quality can be produced and how profitable processing would be and who could actually participate.

The same goes for other agricultural products that could be processed, e.g. chili. In the case of shea, it has been shown that buying nuts at common prices for further processing on the side of MTI would leave those engaged in picking with an attainable wage below all local averages. Their workforce, as much as anybody's supplying the factory, is outsourced to independent pickers/farmers. Only if MTI was to buy and then refine locally made shea butter, which it is not aiming to do, could women possibly attain higher incomes. So, with these great uncertainties and the fact that achievable farmer (livelihood) outcomes seem rather low, government would be wise not to risk pumping further capital into a venture that, in initial financing and later market access, depends on subsidies and allows MTI to attain a monopoly through exclusive access to government programmes and institutions.

If the government possessed higher skills to manage the factory, then it would be better for it to do so, rather than the MTI. Thereby, the best alternative currently remaining for northern Ghanaian farmers is production for the NTTA cartel, whereby farmers need government support to beat Burkina Faso's farmers in terms of quality. This seems more feasible than wasting public monies on processing, which seems rather unsustainable in social and environmental terms, though profitable for farmers if done under the right conditions with sufficiently financed and trustworthy, private partners. It is also interesting to consider if the Ghanaian tomato market can be freed of the NTTA monopoly in fresh tomato trade. Without much investments required, that could lead to greater competition among wholesalers and thereby allow farmers to achieve greater prices, albeit only for three months in a year.

#### **6.1.5. Conclusion**

The overall dynamics of tomato market structures and their respective value chains, with relevance to local farmer livelihoods, are characterised by worsening market access with a negative impact on local producers' livelihoods. That primarily has to do with dynamics in the fresh tomato market, as paste markets were never of significance. Tomato for fresh or paste markets are rightfully understood as separate commodities, also in livelihood contexts, with fresh tomato being far more lucrative than processed tomato (ROBINSON & KOLAVALLI 2010: 4), assuming no sponsoring of local farmers' production.

Trends in the fresh market were triggered by regional trade liberalisation efforts. With borders to Burkina Faso open, seasonal patterns in nationwide production, which had prior

provided a seasonal producer monopoly for northern Ghana (ASUMING-BREMOONG & ASUMING BOAKYE 2008; MONNEY et al. 2009: 7), became a disadvantage for northern Ghana's farmers access to markets. Burkinabe competition came at the time of year when prices could otherwise be most favourable. So trade liberalisation through ECOWAS agreements affected fresh markets and thereby northern farmers, thus regional trader regimes, and not necessarily SAPs or ERPs leading to global paste imports. Quality issues were identified as the primary factor of worsening of market access, because they determine the losses that wholesalers encounter (aside from processing yields). Quality differences between Ghana and Burkina Faso overshadow price competition when it comes to value chain participation. These findings stand in contrast to other studies on the issue (AWO 2010, 2007; LAUBE et al. 2008; LAUBE et al. 2013, 2011; PAASCH 2008; SEND FOUNDATION 2008; SONGSORE 2011: 263), while aligning with more specific publications and government analysis which point at quality and consequently post-harvest losses as being the most urgent issue in the fresh market (GHANAVEG 2014: 37; MOFA 2009: 1; VENUS et al. 2013: 33). Yet, competition with foreign paste has not made it easy to find alternative market avenues.

The popular engagement of the government in its aim to provide alternative market avenues for foreign paste – as requested by studies that blamed SAPs and price competition – has not made things better. Rather it's made conditions far worse, was short-lived and thereby precarious. Government has not set reward structures, roles that offer higher and more stable returns, as well as routes for arriving at these goals (GIBBON 2004: 26-30). The government itself caused the full collapse of most producers, by spreading seed not resistant to local pests. This cemented already prevailing, yet minor tendencies to source tomato elsewhere. Equally, trader-farmer relations completely broke down when crop disease put a halt to (prearranged, defined and timed) flows of tomato. The then publicly supplied alternative, the local processing facility, remained uncompetitive, mismanaged and generally underperformed. It was characterised by vast overspending in processing, whilst overall being underfunded and suffering from acute working capital shortage, thus it continued to fail locals that reinitiated tomato production for the factory. The public factory is unviable both with and without continuous government protection and support. Just like prior to SAP times (CHRISTIAN AID 2003; FAO 1970: 2; SCHÜRMAN 1967: 4-11; VOSCON ASSOCIATES & MAGNA CONSULTING 1997: 6), the factory remained of little significance for locals and thereby had little to no positive effect on livelihoods. At the onset of northern Ghana's post-adjustment era, the restoration of the paste factory by the New Patriotic Party (NPP) government (WHITFIELD 2011b: 31, 32) was merely a campaign goody for elections.

Outlooks for private processing in Ghana's north are equally disappointing. Despite the fact that ROBINSON and KOLAVALLI (2010: 10) assume economical paste production to be

possible in principle, they neglect the issue of tomato quality, which makes local paste uncompetitive and unattractive to consumers. Even if locally sourced tomato paste could compete, would it really be desirable for locals to be integrated into processing? It would be accompanied by vast environmental impacts, create potentially severe economic disparity under even more exclusive and captive relations with private partners, and without greatly increased yields of farmers would pay far below all standards. From this view, it seems that offers made to the government were not as 'laudable' as proclaimed (MOFA 2009: 2; MOTI 2012). They would have required 'a monopoly in order to be viable' (EATON & SHEPHERD 2001: 17), which would have replaced the less tight and more decentralised monopoly in fresh tomato with an even stricter one in processing. So, the primary issue with the tomato value chain beyond farm gate, remains with the cartel-like structure of potentially lucrative fresh tomato markets, which suffers from severe and increasing value capture through wholesalers, as outlined by other studies (AMAKYE et al. 2008: 27, 64-66; AMANOR & PABI 2007: 58; LAUBE 2007: 198; ROBINSON & NGELEZA 2011).

In purely theoretical terms, temporal dynamics in the coordination and governance of chains from a farmer's point of view are characterised by worsening forms of chain coordination and less rewarding functional positions with less value added and deteriorating returns, thus economic downgrading rather than what is known as 'upgrading' (DIETSCHE 2011: 31, 33; GIBBON & PONTE 2005: 87-88; SCHAMP 2008: 8). A producer-driven, fresh tomato chain became a buyer-driven cartel, accompanied by shifts in power. Chain governance was not formerly characterised by high technological competency and resulting supremacy of farmers, but stemmed from the fact that northern Ghanaian farmers enjoyed a quasi-monopoly during the dry season. Contemporary, buy-driven chain governance is now characterised by considerable flexibility in exchanging producers according to quality that determines prices for wholesalers through its impact on post-harvest losses. A turnaround in chain governance was possible because of an influx in the numbers of possible tomato producers, which in turn accompanied trade liberalisation efforts in ECOWAS markets. Meanwhile a tight and highly professional cartel of lead firms was formed, the NTTA, which monopolised market access, thereby took control of the commodity chain, and started to dictate terms including prices. Consequently the present chain setup provides only marginal opportunities for value addition, capacity building and independent development to producers (as was theoretically laid out by BRAUN & SCHULZ 2012: 209-210).

From a traders' point of view, 'territoriality' of the chain needed to be expanded as policy and thereby 'institutional structures' changed towards regional trade liberalisation, which allowed traders to alter value addition to their benefit (in reference to theory laid out by GEREFFI 1995; 1994). It can be concluded that market arrangements and governance of chains really depend on how production is done and the resulting quality in combination with further physical product

flow, especially the harsh climatic and road conditions that further increase post-harvest losses in fresh tomato trade. Furthermore, quantity and timing, as reflected in a breakdown of market access through crop disease, are rightly assumed as further major determinants in tomato chains (HUMPHREY & SCHMITZ 2002: 1021), and can have a long-lasting aftermath. The same goes for the transaction costs therein reflected (TRIENEKENS 2012: 54). This abstract, linear, sequential, dichotomist perspective was contested in the local context (BRAUN & SCHULZ 2012: 210-211; DIETSCH 2011: 29).

Further theoretical potential to illuminate the situation arises from a Global Value Chain (GVC) perspective (GEREFFI et al. 2005). This perspective highlights that the degree of codification in the chain is enlarged by real and perceived distance between actors, which further worsens the competency of partners in the chain to live up to requirements. So, lower vertical integration in chains really decreases the possibility of implementing more standards in value chains (BRAUN & DIETSCH 2008: 13; BRAUN & SCHULZ 2012: 243-244). The transactions in terms of information and thereby product flow between farmers and traders has become increasingly hard. The perishability of a product like tomato should already raise transaction costs, which is why tomato traders should be naturally inclined towards contracting, higher coordination or by integrating farmers in their endeavours, to reduce costs. But, worsening quality and also opportunism on the side of local farmers increased transaction costs, making local producers unattractive and superfluous once alternatives were at hand. Relational value chains became modular to market based (see also BRAUN & SCHULZ 2012: 212-213; KULKE 2007: 121-122; SCHAMP 2008: 6-8).

Neglecting many economic realities, however, a wide set of non-commercial actors and institutions made further significant differences in governance and coordination, as revealed by the Global Production Networks (GPN) perspective. Among the wider horizontal entanglements of relevance were NGOs, governments and unions, actors who are not directly integrated in vertical relations but seemingly exercise vast power (as was indicated by ROSSI 2013: 224). Local dynamics could only be understood through relations and connectivity amongst entities (HENDERSON et al. 2002: 442) in combination with a bottom-up perspective that 'addresses social, political and cultural contexts 'on the ground' within which production processes' of the 'most powerless' were embedded (DARBY 2013: 45). This is reflected in the demand for public processing, partly as a result of NGO and farmer initiated media campaigns, and the resulting, economically and socially unsustainable, transient actions taken by the government to win over voters. Processes of value creation, enhancement and capture derived from societal embeddedness and power (COE 2009: 557-558; HENDERSON et al. 2002: 448), and social and institutional contexts (COE 2009: 557-558). They did not work to the advantage of weakly organised, local farmers, who could not compete with the market power of fresh tomato traders. Furthermore

public (government), institutional power (KULKE 2013: 146) evoked in social and institutional contexts was extremely frail in enabling avenues for broad-based livelihood upgrading.

### **Avenues for Upgrading**

Future interventions should perhaps focus on fresh tomato markets and forget about processing. Of primary importance to fresh markets are trader barriers. Traders should be able to enter the market without having to be part of the NTTA cartel, whose tight control blocks international competitors that could serve an alternative sale avenue for local farmers. NTTA as it functions decreases demand for local farmers' produce (see also LAUBE 2007: 207-208). On the whole, governance structures and power differences, not necessarily the level of competency and knowledge (COE & HESS 2008: 268), seem of greatest importance for upgrading. With a break of cartel structures, consumer prices could, theoretically, drop while comparatively high farm gate prices could increase.

It is hard to understand why a country like Ghana embarks on neoliberal, free-trade reforms with some success, but at the same time tolerates a monopoly that works mostly to the detriment of the poorest, those in northern Ghana. An answer may be found in the political power the NTTA holds. International trade has mostly benefitted traders of tomato but not northern producers. Allowing more competition and higher demand could alter trends. Farmers would be motivated to aim at improvements in processes and products, sophistication of production, and thereby provide more rewarding functions and higher value addition (FOLD & LARSEN 2011: 42-44; MILBERG & WINKLER 2010: 1). Yet, consumers' and traders' demands for higher quality are a prerequisite to domestic value chain entry and even more so for trade over longer distances. Process and product upgrading (NAVAS-ALEMÁN 2011: 1388; ROSSI 2013: 223), at least to a certain degree, has to take place beforehand, which points at local farmers' competency and knowledge levels (COE & HESS 2008: 268).

Long-ongoing difficulties in meeting quality standards – formerly covered by exorbitant duties – have worsened as a result of environmental degradation, primarily caused by a lack of organic material such as manure. This has had a vast impact on market dynamics. The external side of environmental vulnerability – its transformation at local scale and a lack of coping with these dynamics, primarily a degradation of soils – is revealed when examining tomato production. Decreasing product quality eroded fresh produce trade, rendered processing increasingly uncompetitive, and allowed only marginal farm gate prices. While the fresh market became gradually selective as a result, codified quality standards were imposed that implied greater attention be given to environmental concerns. The factory, on the other side, encouraged farmers to continue production as it was. So reward structures, roles that offer higher and more stable returns, routes for arriving at these goals, and learning processes that are central to upgrading

(GIBBON 2004: 26-30) were all hindered by government and supported by the NTTA (ROSSI 2013: 223).

Soil quality, the very basis of farmer livelihoods, has to be improved against ongoing degradation to attract traders. An increasing number of locals are well aware of this, yet do not have the means to do so, namely livestock. That is not to say that farmers should be completely withheld from following a more intensified or even industrialised form of agriculture, such as required for processing, as these can be highly lucrative and thereby good for poverty alleviation. In fact, because the extent of production under shallow groundwater irrigation (SGI) is constrained by physical strength and thus youth, demographic trends namely an aging of population will make tomato value chains less accessible in the future, lowering outcomes because the dependency ratio will increase. Intensification, improved and more irrigation – through government schemes or pumping machines – and mechanisation are needed.

The efficiency of fertilisers over manure also speaks for more intensive practices. Pests and disease may need treatment with agro-chemicals. But, the negatives effects of more industrialised farming must be clarified and dealt with adequately, so that farmers can achieve long-term advancements by themselves, for example by improved market access through higher quality. With Ghana being a highly developed country within the West African context, and thus equipped with a higher living and wage standard, prices cannot be the advantageous factor to locals. Farmers could pursue quality, sophistication, and organic forms of production that would appeal to southern Ghanaian consumers. ‘Environmental upgrading’, more ecological sustainability, is very much an economic consideration (BRAUN & DIETSCHE 2008: 13; DIETSCHE 2011: 37). Free animal vaccinations could, in this context, do much to support locals to apply their existent societal knowledge for sustainable land use.

Social upgrading – in terms of wider external effects and societal issues of poverty alleviation, irrespective of purely economic concerns – are rightfully emphasised by scholars (such as PONTE & EWERT 2009: 1648) on top of environmental, economic improvements. In comparison to processing, access to fresh markets is easier, which is good for locals’ well-being as it allows easier participation and incorporates traditional traders, thus cultural heritage. If tomato was to be manured, further food-securing activities could benefit from improved soils on former tomato fields. On the other hand, processing tomato often comes with the need to produce tomato all year round. How are farmers supposed to keep on practicing traditional, wet season farming, when they already struggle with coordinating their labour activities throughout the year?

Under the most profitable processing scenario, farmers could earn an annual income of less than 18,000 GHC per hectare and annum. Most locals don’t even cultivate that amount of land, but if they could, would it cover the expenses required to buy food for a family throughout the year? Risks will be high, when no form of assurance against climatic calamities or tomato disease

outbreaks is provided, and food security could suffer tremendously. It is also questionable if local farmers would be willing to go that way, because diversification is an elementary part of their survival systems and deeply embedded in local society, for good reason. The amount of external labourers at hand for tomato plots is also relevant. At certain times there are none available to handle a greatly enlarged production for processing. But it is questionable if workers would receive higher wages. Apart from the few sponsored by a processor, there is no room to increase wages for those in serving the processing market. Furthermore, it would take tremendous efforts to convince farmers to venture into processing at all.

‘Sustainable’ or ‘livelihood upgrading’ – desirable economic, social and environmental effects – that enables the majority, or at least a large part of the poor, to cope and deal with stresses and shocks and enhance current and future capabilities and assets while preserving the natural resource base (see also CHAMBERS & CORNWAY 1991: 6), could be achieved by allowing locals to produce for fresh tomato markets with the right support. To provide adequate backing, the government’s institutional capacity must be enhanced both quality and quantity-wise. Attention must be given to the unfavourable way in which the tomato value chain and resulting interventions are embedded in livelihoods and in the collective power of farmer organisations.

Support systems in terms of sale are dominated by elites at the local level that can and do alter dynamics according to their desires. The continued reliance on FBOs and unions would further cement the standing of elites, to the disadvantage of the majority of farmers and a threat for future attempts in processing. To allow for a united and thereby powerful farmers front that could withstand the market power of already united buyers, respectively a large-scale processor, FBOs and unions should be reformed or rather scrapped and set-up anew. The few studies that hint at former ‘arrangements’ and ‘soft loans’ once given to northern farmers producing for the fresh market, that indicate better relations between farmers and traders in the past (AMAKYE ET AL. 2008: 27, 64-66; AMANOR & PABI 2007: 58), should be taken seriously and capitalised upon.

Farmers have to organise themselves to deliver sufficient amounts of quality tomato at the right time in order to be potential business partners for the NTTA. Genuine farmer representatives and possibly neutral entities are needed to negotiate between parties, since ‘collective power’ (BRAUN & SCHULZ 2012: 216-216; KULKE 2013: 146) is currently too weak. The prevailing informal intermediary production model – which breaks direct contact between farmers and wholesalers, makes sponsors lose control over production, prices, amounts and quality of the product, and results in lower income for the farmer (SEE ALSO EATON & SHEPHERD 2001: 45, 52-56) – could be transformed into a more mutually favourable form of contractual farming. Possibly a public entity like ICOUR would be able to negotiate, similar to in Burkina Faso where local irrigation management bodies have been able to arrange formal contract farming.

Overall there is potential to help locals succeed through and in tomato value chains, but the efforts required are vast. Government and other entities concerned with development will not need to alter tariff structures in Ghana, but are primarily required to start setting suitable support structures for sustainable production and cooperation amongst farmers. The advantages of northern farmers need to be exploited on domestic and international markets. International prices of fresh tomato are already favourable, however, under current conditions most locals have had to abandon tomato completely. Only some farmers could switch to the more rewarding, but also more expensive chili production. So only some were able to perform ‘chain upgrading’ (ROSSI 2013: 223), especially in Mirigu where locals had no other choice, whilst the majority of people in Biu was able to turn to rice instead.

## **6.2. The Chili Market**

As with tomato, a minority of locals produce the highly valued cash crop chili in Biu, while it is of greater importance in SGI communities such as Mirigu. In many ways, chili is the predecessor of tomato within both study villages. Not only is the crop quite similar to grow, it is often the same people that participate in its production. The structure and geography of the chain are similar to and overlap with that of tomato. It is therefore likely that chili value chains encounter similar developments to those of tomato. Unlike in tomato, however, government or NGO interventions have not yet taken place in the study areas. Thus this section presents an overview of the markets and possible leverage points for future interventions that could help to improve livelihood outcomes of the chain.

### **6.2.1. General Overview**

Chili is at present cultivated on a slightly larger acreage than tomato in Ghana (GHANA STATISTICAL SERVICE 2013: 298). The history of chili in Ghana dates back to colonial days, although tomato was more popular initially. Production of chili increased since the 1960s, despite having encountered ups and downs in the fresh market. In 2012 Ghana became the world’s ninth largest producer of chili, after India and many Asian countries. Within the (West-) African context, Ghana is in fact leading by some distance. The largest competitor within ECOWAS markets, Benin, produces about 67 percent of what Ghana does. Northern Ghana’s traditional competitor in the tomato trade – Burkina Faso – is not even listed as a producer. Ghana is thereby responsible for almost half of West Africa’s total chili production (FAOSTAT 2014). Also evident is that there is hardly any globalisation tendency visible. Only some exports and even fewer imports seem to have occurred. These are on such an insignificant level that they would, together, mostly not even make up a percent of annual production, which is why they are not displayed in the figure below (see Figure 46).



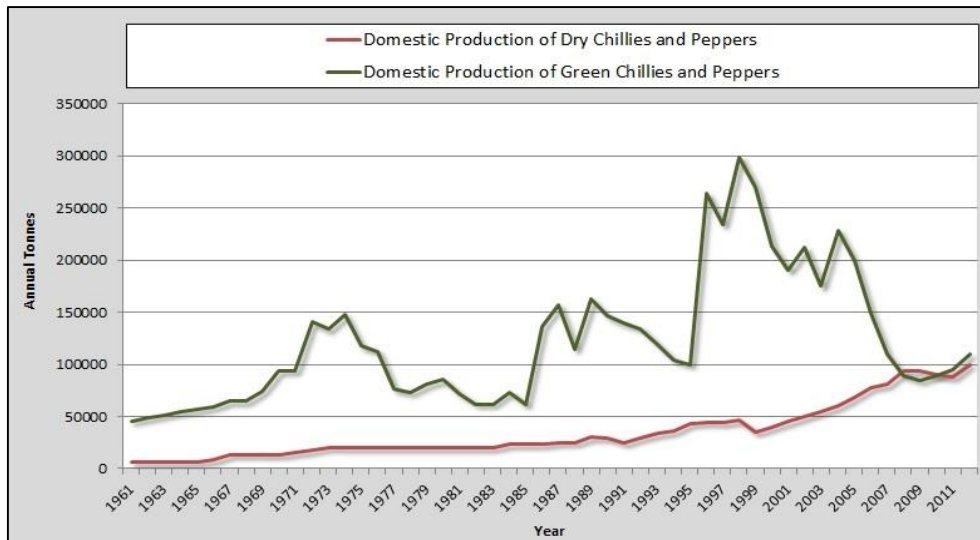


Figure 46: Production of chili in Ghana (own figure, 2015, based on FAOSTAT 2014)

Other sources available on the basic set-up of the chili market talk of substantially different dimensions to that of tomato. The Millennium Development Authority (MIDA) indicates stagnant production figures for chili from 2001 to 2005 and less than 1 percent of growth from 2006 to 2008. This however, sums up to about 280,000 tonnes per annum, which is substantially more than mentioned elsewhere. Their figures indicate that, at best, just less than 1.5 percent of annual production is being exported, as was the case in 2007, while showing even fewer exports for 2005, 2006 and 2008. Imports seem not noteworthy (MIDA 2012: 4). Equally, GHANAVEG indicates no imports, but instead a few exports to European markets, specifically the UK, Germany and the Netherlands. According to them, in 2013, roughly 1400 tonnes went to the UK, which is less than 1 percent of domestic production, as assumed by the FAO that year (FAOSTAT 2014; GHANAVEG 2014: 14-15). According to UN data, exports of chili products have made up about 0.65 percent of domestic production from 1996 to 2013. Larger quantities were exported throughout the late 1990s, but have since dropped. The largest customer was said to be the European Union (COMTRADE 2015). Otherwise there is hardly any data available.

Government publications talk about the vegetable as being a popular produce among farmers all over the country (e.g. MOFA 2011a), but cite no figures. Field research revealed that – at national, regional and district government level - no statistics exist to help shed light on the basic structures of the Ghanaian chili market. Insights derived thus remain tentative. Despite this overall lack of data, it seems correct to assume that the Ghanaian chili market is overall successful, has encountered turbulence, but holds further potential for exports. However, it is almost entirely characterised by domestic consumption. Domestic chili markets suffer less from global or intra-regional competition, specifically foreign imports, as is the case with tomato. On the contrary, Ghana seems to have the potential to dominate in West Africa and to compete globally. International markets, however, come with high standards.

Most Ghanaian exports derive from traditional chili varieties, red pepper varieties that are not as lucrative as others, such as the exceptionally hot varieties of ‘Bird Eye’ or ‘Scotch Bonnet’. The latter are produced in Ghana, but often fail to meet higher quality standards and are therefore not exported. Most farmers are not Global G.A.P.<sup>131</sup> or otherwise certified. Also, productivity in Ghana is comparatively low due to the quality of seeds used, the lack of irrigation and poor agricultural practices. This makes chili highly expensive according to global standards, though cheaper to transport out of the country than compared to East Africa for example. Moreover, on a nationwide scale, the export market window of Ghanaian chili is unfavourable, since it coincides with harvests in southern Europe and the Mediterranean, which are closer to foreign consumers. In Ghana, harvest and thereby export times are bound to the major wet season, from March/April to September/October (CSIR SARI 2008: 3; GHANAVEG 2014: 15).

Ghana is thus only partly equipped to further venture on international markets and is at risk of facing imports in the future, also reflected in a decrease in exports. Ghana was unable to contest with the largest suppliers to European markets, currently Israel (holding 33 percent), Morocco (32 percent) and Turkey (19 percent) (COMTRADE 2015). Yet, in terms of pricing, Ghana had no issues in competing with, for example, Israeli chili. In the past the unit value of air freight chilies from Ghana was about half the cost of Israeli ones, but quality issues made them unattractive on EU markets (JAEGER 2008: 29, 37). Northern Ghanaian farmers have probably not contributed to European imports or Ghanaian exports anyhow, but rather to domestic markets, because they are mainly harvested during off-seasons. The off-season falls at the opposite time of the year to the rest of Ghana, namely from March to May (own survey, 2013, n=177), which is outside of the regular export market window mentioned. Local specifics further alter opportunities for market access by northern farmers.

### **6.2.2. Local Structure and Geography**

Farmers from the study areas, nowadays, mainly produce ‘Scotch Bonnet’ varieties of chili, which are explicitly produced for the domestic fresh market. The rate of spoilage of this fresh chili during transport is generally ‘high’ and so trade distances are limited. It is rather dried chilies that are exported and, in any case, these exports are said to stem entirely from the south of Ghana. It is equally these dryable versions of the crop that are commonly used for further processing into paste, powder, or chili sauce known as ‘shito’, though in total, just 5 percent of domestic production is said to be processed. New freshly bought varieties cannot be dried, because it gives them an unfavourable appearance in terms of shape and colour. Besides, fresh markets pay better for all involved. Even if overseas or processing markets were to pay better, assuming that quality

---

<sup>131</sup> Minimum level of certification required to target EU supermarkets (GHANAVEG 2014: 17).

and quantity could be enhanced and producer prices lowered, seasonality of production gives locals an advantage in accessing domestic markets.<sup>132</sup>

Domestic markets do not require certification, and there are currently no international or domestic competitors faced at harvest time in northern Ghana. Farmers thus have a seasonal monopoly. While chili gluts occur for the majority of Ghanaian farmers during wet season harvests, northerners able to produce the crop using irrigation can access markets at times of scarcity. Production over the country is divided into three phases. The first season is in the south, the Accra Plains, followed by Ghana's middle belt, followed by the north of the country. At the same time, demand in Ghana is high throughout the year. Chili is used in almost every Ghanaian dish and consumption is expected to rise due to increasing shares of the population residing in urban areas in the south of Ghana, where living standards have improved over recent decades. Domestically produced quantities are therefore generally insufficient and especially so during harvesting time in the UER. This explains why trends in local production patterns contradict those encountered at the national scale (see before, Figure 46).

Unlike in the rest of Ghana, production of fresh chili has seemingly increased in the study areas. Buyers already compromise on quality in order to get sufficient produce from northern Ghana. While currently beneficial to farmers in the study areas, such insufficiencies in market supplies make future imports more likely. Shortage of fresh market supplies may help northern farmers to have the upper hand in price negotiations, which may alleviate issues with quality on the domestic market, but leave much potential for future competitors.<sup>133</sup> So, with increasing international competition, competitiveness in local, regional and international markets needs improvement. Processing is less of an option in northern Ghana, because the market for processed chili is rather small and most of the local demand points entirely at fresh produce. Furthermore, as with tomato processing, potential outcomes for farmers are limited by the engagement of sponsors in terms of improving productivity. Until then, highest farm gate prices can only be achieved through the domestic fresh market.

Within domestic markets for fresh chili, trade is mostly conducted through (local) intermediaries that buy for large wholesalers coming from the south of Ghana. There are also instances where wholesalers go to farmers directly, as is the case in more southern production areas, though not in the study areas. In very few cases, southern farmers sell to retailers directly (ADDAQUAY 2004; CSIR SARI 2008: 1, 3, 9, 10, 13). Thus, another significant difference in chili as compared to tomato markets is that, intermediaries dominate market access in northern Ghana, while merchants have not managed to form a cartel. From a farmer's point of view,

---

<sup>132</sup> Interview with Dr. Yeboah, University of Tamale and GIZ consultant, March 2013, Tamale, Ghana.

<sup>133</sup> Ibid.

market access through intermediaries is not optimal, but generally the chili market is more liberal than that of other vegetables. However, traders of chili may also be traders of tomato at different times of the year, and retail of chili products often takes place in the same or similar areas, in open-air markets in southern Ghana. Thus, to some extent, the NTTA cartel has influence on the chili value chain, though mostly through retailers which sell under its banners (see Figure 47).

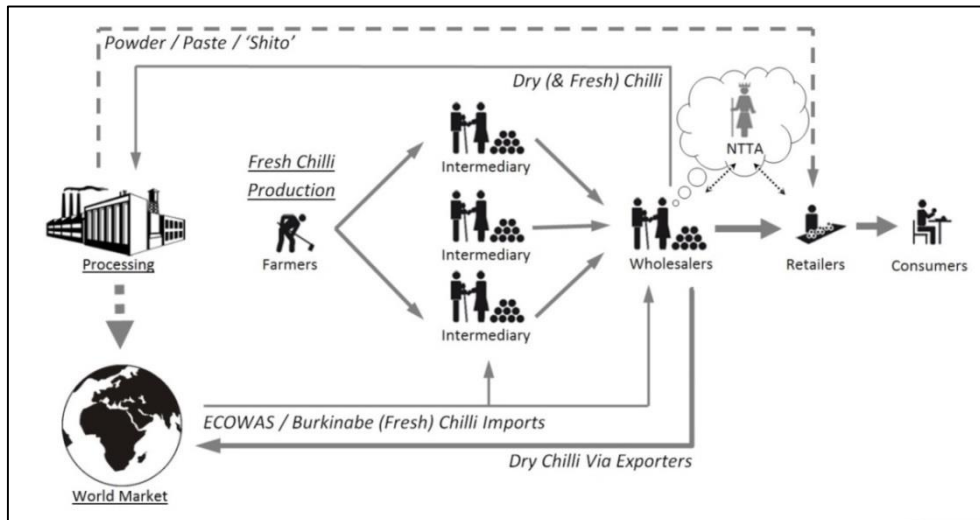


Figure 47: The (northern) Ghanaian chili value chain (own figure, 2015, own trader FDGs and expert interviews, 2012/'13, partly based on AMAKYE et al. 2008: 70; COMTRADE 2015; FAOSTAT 2014).

Trends in chili could soon resemble those encountered in tomato. During the time of research, intermediaries and wholesalers indicated that they source growing amounts of fresh chili from Burkina Faso, because local supply is inadequate during the dry season in Ghana's north, the time locals harvest, and because of growing quality issues.<sup>134</sup> Growing international competition and the inability of locals to contribute to exports should be alarming to northern chili farmers. Chili traders seemingly face the same issues as in tomato, being post-harvest losses that derive from bad quality of local produce, which are possibly alleviated through the seasonal monopoly northern Ghanaian farmers still enjoy. From a trader's point of view, there may be potential to imitate trends found in tomato chains, by increasing imports from Burkina Faso. Altering a rather producer-driven chain into a more buyer-driven one potentially puts northern Ghanaians at risk of more unfavourable forms of market integration.

### 6.2.3. Access, Inputs and Outputs

Chili and tomato markets, and access to the chain, are closely related from a farmer's point of view. As previously indicated, due to problems in accessing tomato markets and a resulting decline in production, chilies were increasingly patronised by farmers in the study areas, as an

<sup>134</sup> FGDs with chili intermediaries and wholesalers from Accra and Navrongo, March, 2013, Navrongo, Ghana, and interview with Dr. Yeboah, University of Tamale and GIZ consultant, March, 2013, Tamale, Ghana.

‘alternative crop’ (see also ICOUR 2013: 37). Trends in tomato are closely related to those in chili, as farmers in Biu and Mirigu emphasised frequently. To them the change of crops was primarily made possible by the fact that chili and tomato farming are somewhat alike and because production had often already been quite diversified. Chili offered a good alternative to tomato, because demand is currently very high, marginal returns are said to be greater, and because chili is a far more robust crop and less perishable. Tomatoes are said to be more difficult to handle, since fruits are more volatile.

Yet, while farmers in Biu felt less forced to venture into chili, people in Mirigu point out that moving into chili production was somewhat without alternative and of greater importance for livelihood upkeep. Chili had been common in the community for a much longer time than in Biu, but it was only in recent years that the crop became a commodity helping to deal with the adverse effects of environmental change; by improving incomes, thereby food security, and by reducing outmigration through economic opportunities on SGI farms:

*‘The land is now infertile and a lot of conditions are not favourable for production. [...] So, my face [eyes] fell on the new pepper. I could not sit down idle and I also didn't want to migrate. But, I was thinking that there is now an alternative of survival, which is pepper, so that I can get money to supplement my family's food security.’<sup>135</sup>*

The traditional variety of chili, locally produced in former times, was a different one to that which prevails today. All farmers in Biu and Mirigu reported to have switched from finger-like, green chilies, which were dryable, to fresh ‘Scotch Bonnet’ varieties. Intermediaries claim to be responsible for the introduction of the new varieties. They state that southern chili wholesalers supplied them with seed, which they spread among farmers, in order to establish new production areas in northern Ghana and thereby to source larger amounts of chili throughout the year.<sup>136</sup> Locals in Mirigu still cultivate old varieties, but only during the wet season and for subsistence. Newer varieties of chili, introduced around 2004, are different from traditional ones. They are grown as cash crops, since they require greater and different inputs, most notably costly inorganic fertilisers and chemicals instead of only manure. New, fresh varieties are, however, the only ones that sell well, unlike the older, dryable ones that did not allow local farmers to progress much in life.<sup>137</sup> Farmers from Mirigu and Biu therefore emphasise that their vulnerability has generally decreased by intensified production of exotic, fresh chili, although they also perceive higher investment requirements as a major risk factor imposed upon them, which could possibly withhold others from participation. Furthermore, the downside of this trend from tomato to more

---

<sup>135</sup> FGD with chili farmers from Mirigu, January, 2013, Mirigu, Ghana.

<sup>136</sup> FGDs with several chili wholesalers from Accra and Navrongo, March, 2013, Navrongo, Ghana.

<sup>137</sup> FGD with chili farmers from Biu, February, 2013, Biu, Ghana.

expensive chili is that it went along with increased socio-economic differentiation, because most people cannot afford the production of chili, which coincides with the time of year when farmers already suffer from a lack of money:

*'When the tomato was gone, we didn't get money to eat. [...] Now we must go for farming pepper, which is very difficult, because if you want to farm pepper and you don't have even more money at home now, forget it! [...] So, not everybody can afford to do pepper. [...] We can buy chemicals and fertiliser, but our neighbours cannot. [...] They sit [are idle]!'*<sup>138</sup>

Those content with tomato give the same reasons for why they do not venture into chili. As a result of poverty the possibilities of local farmers are limited. Locals state they would be able to finance a crop like tomato, but not to produce new varieties of chili. Alternatively, they undergo vast risks, threatening livelihood upkeep and social capital, if friends and family have credited their last resources for an unsuccessful chili production.<sup>139</sup> With no other form of support/credit available, it is richer farmers who were less affected by the change to chili. They could quickly substitute tomato, as they could afford higher inputs and had experience in vegetables through tomato, if they had not already grown chili. However, in Bui, just as the poor did, elites most often went from tomato into rice, because rice production is less risky and promises good returns with fewer investments, while also serving as food.

The trend towards more rice in Bui rendered vegetable production increasingly difficult, because the irrigated uplands that were available for the production of vegetables were under the control of local elites, who did not produce rice. As a consequence, suitable land has become the crucial factor for chili production. Cultivation is thereby bound to take place in bush areas, often former virgin lands that need expensive/labour intensive clearing, also because soils are better in these areas. These lands also require irrigation. Moreover, as a result of large-scale farmers now using well-drained uplands for rice, overall water consumption of the irrigation scheme has drastically increased which in turn requires saving more water outside of rice seasons and further worsens accessibility to chili value chains.

Thereby (chili) producers in Bui are directly constrained by the livelihoods of others. Only the few with access to the right land can venture into chili. What richer farmers on the uplands do determines the scope of action for others. This is so because chilies or vegetables cannot be irrigated and grown if the plot borders with a flooded rice field. Further, irrigation is sometimes turned off from December to January – the middle of the chili season – to save on water because the rice boom has increased water consumption so drastically.<sup>140</sup>

---

<sup>138</sup> FGD with chili farmers from Mirigu, February 2013, Mirigu, Ghana.

<sup>139</sup> Ibid.

<sup>140</sup> Interview with a teacher from Bui, 04.05.2013, Bui, Ghana.

Due to the overall exclusivity of chili and its additional lack of affiliation to tradition, production of the crop challenges social capital, which may be required to access credit to go into production. However, envy is most prominently expressed of those farmers content with its production, which must demoralise locals from participation. Chili farmers are criticised because their livelihood activity is perceived as purely money-oriented, due to the exclusivity of production and rising socio-economic differences in the community. This even leads to accusations of use of black magic to acquire riches, and thereby discrimination.<sup>141</sup>

Access to the chili chain is also constrained by gender, because the chili is highly cash, labour and risk-affinity demanding.<sup>142</sup> Of highest importance however, are natural capital and financial capital, both of which are highly scarce. If available, financial capital can grow tremendously and safely, which improves well-being and reduces vulnerability. Whether production of the crop will undermine the natural resource base in the long-run, as was evident in tomato production, is debated.

*‘With the way we have been misusing the soil, the lands have already lost their fertility and so you are only going to get money in the first year of chili. [...] If you plant the second year it will never do well and you have the pepper looking bad, [...]. You then migrate to a virgin land, to clear.’<sup>143</sup>*

Overall chili yields are comparatively low when compared to tomato. Tomato can be done by more farming households, on larger acreages, and thereby create more job opportunities for those not able to produce tomato themselves. In chili production, most labour cannot be simply handed down to everyday labourers, because they may easily spoil the expensive crop. This limits the extent to which farmers can expand their farm.<sup>144</sup> Chili has a vast, if not the greatest, demand on livelihood assets, but fewer attainable outcomes for the majority of people (see Figure 48).

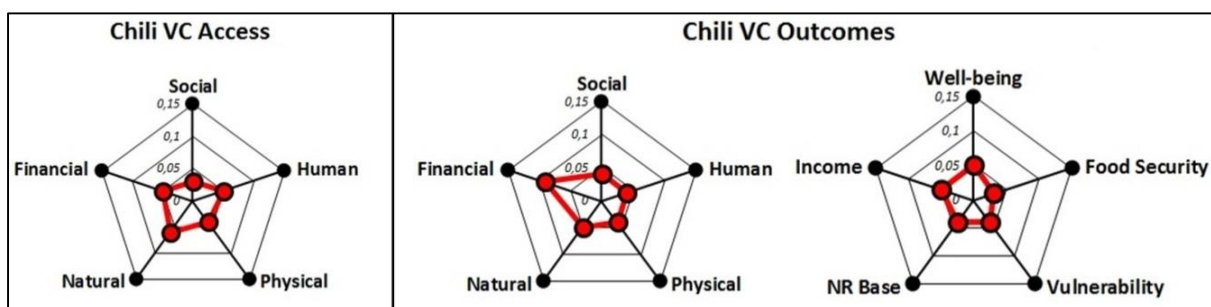


Figure 48: Intensity of associations made between chili chain access and assets required (left) and chain outcomes for farmers' assets and livelihood outcomes (right) (own figure, 2015, according to co-occurrence coefficients, own interviews and FGDs, 2012/'13 n=150 h).

<sup>141</sup> FGD with chili farmers from Biu, February, 2013, Biu, Ghana.

<sup>142</sup> Interview with a female MOFA extension officer responsible for Biu, 03.02.2013, Navrongo, Ghana.

<sup>143</sup> FGD with chili farmers from Biu, February, 2013, Biu, Ghana.

<sup>144</sup> Interview with a teacher from Biu, 04.05.2013, Biu, Ghana.

For those able to produce chili, land access, soil properties and labour in combination with agro-inputs determine the primary outcomes of value chain access. As with tomato, resulting yield and quality is higher in Mirigu than Biu, as are farm gate prices. At the time of data collection, irrigation costs were drastically higher in Mirigu, but these are now seemingly similar in Biu, as access to irrigation is often not a given and because locals have to clear lands to irrigate by bucket or pumping machine. The numbers for production costs in Biu in Figure 49 are potentials. However, additional labour or money input pays well for an already high valued crop, as is seemingly the case in Mirigu.

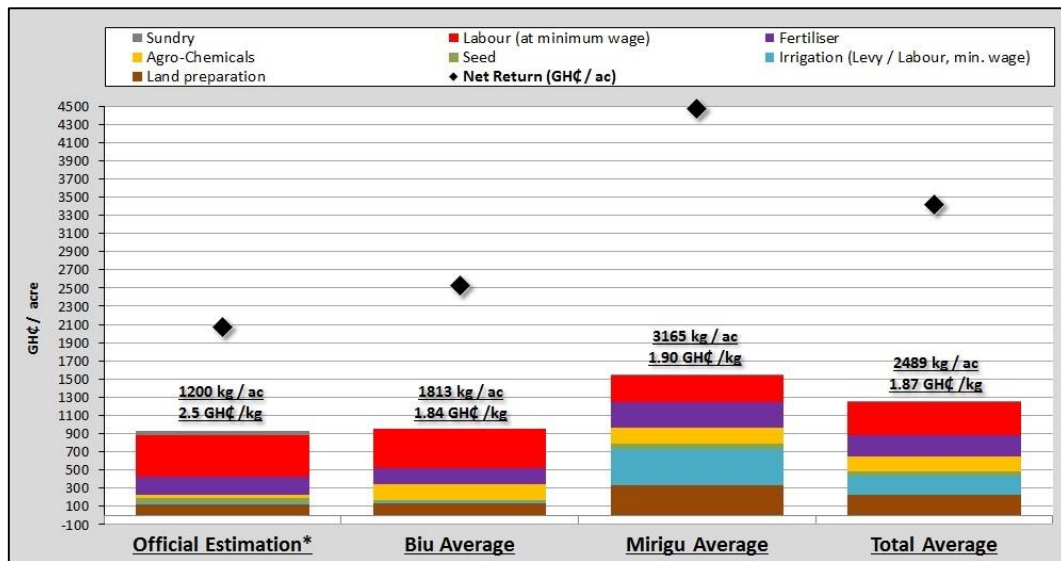


Figure 49: Illustration of chili costs, expected yields, prices (2012) and net returns per acre at minimum wage of 4.8 GHC/man-day (own figure 2014, own survey, 2013, n=8 and \*based on ICOUR and MOFA data, 2013).

From a purely economic standpoint, there is room to further increase investments in chili. Local production is always sold during times of high prices, so local farmers could venture into more sophisticated forms of production (see ICOUR 2013: 101). For those able to produce chili, access to the chili chain is at present comparatively easy, because imports are not yet attractive to traders. Merchants express that they can obtain chili at a lower farm gate price in Burkina Faso, but that extra expenses for transport outweigh the benefits, at least while the crop is in season in the study area. Those growing chili in Burkina Faso mostly produce old varieties that are not attractive to the fresh market. Thereby locals in northern Ghana are able to achieve higher incomes than with other crops. Moreover, they attract the greatest share of profits accruing within the chili chain, which may express the market power farmers have due to their current monopoly on domestic markets (see Figure 50).



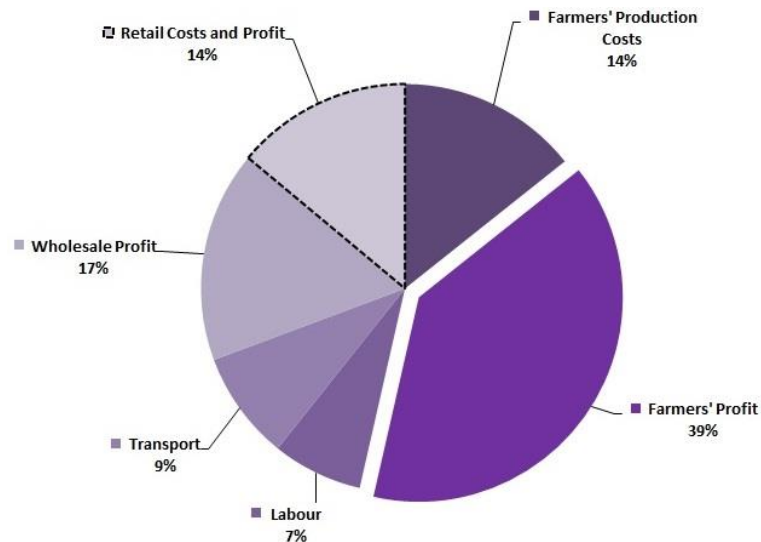


Figure 50: Estimated average composition of the kilogram retail price of chili from Northern Ghana, sold in Accra during the 1st quarter of 2012 (own figure, 2015, based on own calculations, own trader FGDs, 2013, ESOKO data, 2013).

Farmers' highly profitable value chain access is threatened by intermediaries and wholesalers who are becoming increasingly quality conscious. Farmers may have learned their lesson from trends in tomato however, such that they realise that they can improve chain relations by having an attractive product:

*'It is now the same [as with tomato]! [...] It is only the quality of pepper that can let you come closer to the women. All the buyers will rush to you. [...] But, if your pepper is not quality, you may suffer. [...] They have now prepared for getting quality [...] such that they can also get the best out of that pepper. [...] With them it's now quality first, price second!'*<sup>145</sup>

Quality is determined by the ability to attain sufficient inputs, especially fertilisers and agro-chemicals, soil attributes and further influenced by watering practices. Especially the last two factors are believed to be decisive and more favourable in Mirigu and Burkina Faso than in Biu. Soil quality is higher, often improved by manuring, and water is fetched by hand, which is why fields are not as heavily flooded as in Biu and can thereby yield harder, more durable chili. Quality is such an issue, because it defines shelf-life and thus post-harvest losses encountered during transport by traders, which makes quality a major determinant of profitability for them. So, traders increasingly make quality a precondition for farmers' market access and have therefore started to patronise (fertile) SGI farms in places like Mirigu, but also in Burkina Faso, since cost of sourcing is somewhat the same, while shelf-life is about twice as high – about a week – for the Burkinabe product, when compared to the Ghanaian version.<sup>146</sup> Accordingly, some farmers,

<sup>145</sup> FGD with chili farmers from Mirigu, January, 2013, Mirigu, Ghana.

<sup>146</sup> FGDs with chili intermediaries from Navrongo, March, 2013, Navrongo, Ghana.

especially those in Bui, have reported that they have actively tried to improve product quality through soil attributes, specifically by adding organic material.

Aside from lacking labour and agro-chemical inputs, the application of organic material to farmland constitutes a further basis for favourable value chain access. As farmers state, it pays to do composting and manuring in combination with inorganic fertilisation – somewhat integrated farming – because farmers are thereby able to produce a highly attractive produce in large quantities. Farmers acknowledge the influence of product quality on losses encountered on the side of traders. Chili must not be overripe, i.e. too soft, for it to travel to southern Ghana without spoilage, especially when trucks can break down due to the bad conditions faced on Ghanaian roads. Quality is a precondition for market access, because it assures fewer post-harvest losses.<sup>147</sup>

Yet, while quality is becoming an issue, quantities remain less problematic. It currently even pays for intermediaries and sometimes wholesalers to send chili to southern market centres by taxis or by public buses.<sup>148</sup> In fact, at the time of research, there were no traders to be found that came with trucks, though farmers mentioned that these exist. The minimum quantities required to satisfy the needs of each individual trader are often rather small, which makes chain access easier for local farmers, at least towards intermediaries. As farmers frequently state, demand is currently so high that they experience almost no issues in market access, the primary danger for any tomato farmer since the breakdown of favourable business relations. In chili, traders currently pick up most produce right at the farm gate. Chilies are easy to transport, because they are lightweight and have a higher price per kilo, which increases market accessibility for farmers greatly. Chilies remaining at the farm, when only parts of a harvest are transported to the market place due to a lack of finance, will not spoil in the meantime.<sup>149</sup>

Quantity is thus a problem to solve by intermediaries. If large-scale wholesalers come with their own trucks, intermediaries must then source sufficient produce within the shortest time period possible. Chili is simply less perishable, making post-harvest losses and thereby risks significantly smaller for wholesalers and intermediaries. Thus less strict forms of governance are required within the chain, though stricter ones can be expected in future. As reflected in the composition of retailer prices, significant power within the chili value chain currently resides with producers.

#### **6.2.4. Governance Dynamics**

Demand for fresh chili is currently high, thus the product's value chain is far more producer driven than that of any other locally produced commodity. Because of this and the way transport

---

<sup>147</sup> FGD with chili farmers from Bui, February, 2013, Bui, Ghana.

<sup>148</sup> FGDs with chili intermediaries and wholesalers, March, 2013, Navrongo, Ghana.

<sup>149</sup> FGD with chili farmers from Mirigu, January, 2013, Mirigu, Ghana.

is organised among traders, farmers can produce individually. The issues faced in production by one farmer do not become the problem of another, as is the case in tomato, where farmers had to team up to fill a whole tomato truck. Though this may increase individualisation tendencies, it also alleviates organisational, horizontal contractualisation, issues among farmers.<sup>150</sup> Chili producers have thereby overcome the severe constraints imposed upon them by FBO and union leaders in the local governance of tomato chains. As much as this may benefit others along the chain in the future, at present farmers face an equally, rather decentralised form of governance among chili traders.

Associations, thus attempts to form a cartel amid wholesalers, exist only at individual chili market levels, but not at regional or national ones. Traders are very much interested in mutual cooperation, knowing of the benefits that horizontal contractualisation at the wholesale level has brought to their colleagues in tomato chains.<sup>151</sup> Because most business is conducted informally, there are already basic barriers to overcome in market access for merchants. Intermediaries express that they live off the fact that many wholesalers do not know producers, and so cannot reach farms to buy directly. Chili production for the fresh market started to take off only since 2009/2010 in the study areas, so there may simply have been insufficient time to establish closer relations, aside from the fact that the intermediaries are not interested to hand over their business secrets (contacts to farmers) to others following them in the chain. Aside from finance and a trustworthy network required to conduct business, there have been hardly any reports on barriers to market entry.<sup>152</sup> Yet for some years already, wholesalers try to 'frustrate new entrants' by inhibiting them from getting a space in the market, or by refusing to share information (CSIR SARI 2008: 13-14).

Governance is thus becoming stricter with the aim of shifting powers within the chain towards wholesale. For example, to outweigh the extra expenses required to obtain chili via intermediaries, wholesalers have outsourced and spread responsibility and thereby risks to a net of intermediaries, through which they try to exploit their value shares within the chain. As the number of local intermediaries has increased over the last years, their individual profits have often shrunk. Whereas intermediaries claim to have been able to '*dictate*' to wholesalers the price of chili, it is now said to be the other way around. Nowadays, wholesalers supposedly change prices within days, sometimes after harvesting has begun at an already agreed upon price. Intermediaries

---

<sup>150</sup> FGD participant, February 2013, Mirigu, Ghana.

<sup>151</sup> FGDs with chilie wholesalers from Accra, March, 2013, Navrongo, Ghana.

<sup>152</sup> FGDs with chilie intermediaries from Navrongo, March, 2013, Navrongo, Ghana.

may act as conduits of this exploitation by wholesalers, which can create tensions in commerce at the farm gate level.<sup>153</sup>

Beyond this, farmers and union representatives frequently state that intermediaries try to lower farm gate prices to not only receive commission from wholesalers, but to also make extra profits by exploiting the fact that wholesalers have no direct contact to farmers. Moreover, farmers attest that intermediaries are the ones effectively establishing a more buyer driven form of governance at the local level, because from time to time they collectively stop buying local produce at lower prices. Farmers perceive the chili market to be ‘dictated’ by intermediaries and believe that they themselves could handle the market, if intermediaries were cut out.<sup>154</sup> So, chain governance is often characterised by an intermediate form of contractual farming, whereby intermediaries try to have the upper hand in negotiations with farmers, mainly because farmers are insufficiently organised.

Direct relations between farmers and wholesalers in northern Ghana are rather rare, unlike in southern production areas where local farmers have even turned into genuine out-growers of wholesalers. In the south farmers are supplied with inputs on credit (ADDAQUAY 2004: 15; AWO 2010: 97), and relationships between farmers and wholesalers are based on ‘mutual trust that enables the actors to grant one another credit in times of need’ through ‘input credit schemes to be repaid in-kind’ (CSIR SARI 2008: 14). Consequently, there is reason to believe that farmers in the study areas could be capable of attaining better deals through wholesalers, if intermediaries could be excluded from chain participation. This is possible for those situated in a more buyer-driven market, characterised by harvest gluts during nationwide wet seasons.

Farmers report that relations with intermediaries have become closer in recent years. Similarly, intermediaries have reported that chili farmers are trustworthy, as they have learned their lessons from their opportunistic behaviour in tomato. The share of intermediaries coming to buy directly at the farm gate is also said to have increased, which saves farmers costs on transport, effectively increases farmers’ incomes, or is at least helpful at a time when farmers otherwise lack liquid funds. Intermediaries commonly try to motivate farmers to establish closer relations with them. For farmers, this is a strategy to reduce farm gate prices:

*‘They will start with the motivation first. [...] Sometimes they’ll give food. Sometimes, some of the women treat us like their husbands. They act to us as if we have no wives at home [they offer sex] to convince us to give our pepper to them. You will just wonder why they even treat you like that.*

---

<sup>153</sup> FGDs with several chili intermediaries from Navrongo, March, 2013, Navrongo, Ghana.

<sup>154</sup> FGD with chili farmers from Mirigu, January, 2013, Mirigu, Ghana.

*[...] Then you will foolishly think that the woman is a good woman, not knowing that she wants to use that to take advantage of you. Afterwards she will slaughter you like a fowl [...]'<sup>155</sup>*

Farmers also state that for about three to four years now, since 2009, intermediaries have started to organise with farmers in terms of the quantities produced. Farmers are frequently contacted throughout the production period, to check they are able to stick with arrangements. This is a necessity for intermediaries, who must assure sufficient amounts for wholesalers. Greater assurance for local farmers is a positive side effect of this. Gratifications given to producers are limited by the size and range of intermediaries' businesses and the fact that they monopolise access to farmers. Chili farmers, unlike tomato farmers, did not report merchants having supported them with cheap southern roofing materials or agro-inputs.<sup>156</sup>

Yet chili intermediaries occasionally claim to have sponsored farmers when sufficiently good relations based on trust and product quality have been established. Such cases are, however, the exception or could simply be a white lie on the side of intermediaries, because they equally claim to have insufficient means to conduct business. One wholesaler was found who did sponsor farmers in the area, though not in Biu or Mirigu. Such merchants take substantial risks in doing so, but hope to thereby acquire sufficient produce, possibly at a pre-fixed price. Sponsors face similar problems in chili as they do in tomato: opportunistic behaviour by local farmers. The poor cherish sponsoring and are therefore more likely to stick to arrangements. Though wholesalers are likely to exploit their weaker position in an aim to establish captive relations by sponsoring, it could be that the pure economic interest of wholesalers has pro-poor effects:

*'We go to the farmer and give them a little money [...] But then, at harvesting time, some will rather sell the pepper to others and want to give us money back. That is not good, because we want their pepper. [...] Some even tell us that all their pepper has spoiled, while really they have sold it to someone else. [...] But, especially the gardeners [SGI farmers] [...], the poor and small farmers will rather pay back [loans] than the big ones. [...] So that next time you will help them again.'*<sup>157</sup>

Intermediaries not only limit the profits of farmers and wholesalers, they also block further, potentially advantageous contract farming arrangements. The intermediaries are actually safeguarding their access to farmers, though both sides desire direct sales. When farmers try to approach southern wholesalers directly, intermediaries threaten them by claiming to withdraw from all future sales.<sup>158</sup> Intermediaries hope to thereby cement their standing within the chili value

---

<sup>155</sup> FGD with chili farmers from Biu, February, 2013, Biu, Ghana.

<sup>156</sup> Ibid.

<sup>157</sup> FGDs with chili wholesalers from Accra, March, 2013, Navrongo, Ghana.

<sup>158</sup> FGD with chili farmers from Biu, February, 2013, Biu, Ghana.

chain. In fact, they have meanwhile managed to establish a formal, regional association that caters for its members in cases of emergencies. Intermediaries report that they are increasingly linking up with a wholesale association from southern Ghana. In the south, wholesale associations already try to control prices, by controlling quantities arriving at the market. Initial trials in limiting quantities in cooperation with their northern intermediaries have been successful. Yet, chili associations have yet to come as far as the NTTA. For example, they do not issue identity cards and are not united at the nationwide scale, but clearly try to establish similar, cartel-like structures as prevail in tomato markets. Farmers can only prepare for such cartel-like structures by a higher degree of coordination among one another, which they lack at present:

*'With the way they [the intermediaries] are now uniting, we have to come together more in pepper also. We have to be better organised. To be well organised means to influence these buyers. [...] If we are only organised halfway, like now, and somebody says this and another fellow stands elsewhere and says that, it means our organisation does not hold. And if our organisation does not hold, we can never influence any decision in the future.'*<sup>159</sup>

#### **6.2.5. Conclusion**

Chili holds great potential and actually serves as an 'alternative crop' for northern Ghanaian tomato farmers (see also ICOUR 2013: 37). Thus it could be of major importance for poverty alleviation. However, a lack of data means that more research is needed on chili, its markets and producers, in the form of local studies and basic quantitative and qualitative assessments of market extents and structures, as well as the temporal dynamics shaping economic interactions. This study has provided first insights at the local level, by taking a look at the livelihood embeddedness of chili markets using a livelihood lens in combination with commodity and value chain analysis.

It is clear that the dominant dynamics encountered in the chili market, with relevance for livelihoods, are characterised by a change in production among farmers, which was accompanied by various difficulties. Aside from the fact that most chili farmers are former tomato producers, a change from traditional, dryable chilies to freshly sold ones is evident and thereby changes of and in respective value chains. This worsens the attainable outcomes for the majority of locals and especially the accessibility of new chili chains, causing further socio-economic differentiation, which already stands at a high level. The changes have been facilitated by a vast increase in financial input. Only well situated farmers are able to venture into new chili varieties, to undergo 'chain upgrading' (ROSSI 2013: 223) or 'inter-sectoral upgrading' (HUMPHREY & SCHMITZ 2002: 1020, 1025; NAVAS-ALEMÁN 2011: 1395), and for them outcomes are impressive.

---

<sup>159</sup> Ibid.

Coordination and governance of chili chains is currently characterised as favourable for farmers, rewarding functional positions with high value added and growing returns. Thus there is a general trend towards economic upgrading, and thereby chili stands as a possible example of economic prosperity following structural adjustments in the domestic economy and also for northern producers. As previously indicated, external social vulnerability in terms of markets can be positive. Present chain setup really provides great opportunities for value addition, capacity building and independent development to producers. Current domestic chili market access, even without considering the potential of export, can be very favourable, judging by the great demand that exists for the crop and the degree to which the value chain is thereby producer driven. However, one should not forget that this is only the contemporary state of the market set-up. Though chain governance through farmers is characterised by relatively high technological competency, trends in the value chain are much supported by the fact that farmers currently hold a seasonal producer monopoly, as used to be the case with tomato. Producers will venture into chili in northern Ghana and, together with growing competition from other ECOWAS markets specifically Burkina Faso, will make the chain increasingly buyer-driven. As with tomato, ‘territoriality’ of the chain may have to be expanded from a trader’s point of view under prevailing policy and thereby ‘institutional structures’, trade liberalisation (in reference to theory laid out by GEREFFI 1995; 1994).

The quality of locally produced chili has already going down and if it further decreases, post-harvest losses encountered by travelling merchants could soon prevail over transport costs, as is the case in tomato. This would make locals lose market access. Findings from studies declaring quality and not pricing as the major determinant of potential for export (JAEGER 2008: 29, 37) may also apply for domestic market access (as was also indicated with reference to tomato by GHANAVEG 2014: 37; MOFA 2009: 1; VENUS et al. 2013: 33). These findings as well as the generally positive dynamics encountered during field research contrast with the findings of other local studies concerned with local market development and livelihood sustainability/poverty (AWO 2010, 2007; LAUBE et al. 2008; LAUBE et al. 2013, 2011; PAASCH 2008; SEND FOUNDATION 2008; SONGSORE 2011: 263). Quality is still the major factor, because it alters transaction costs, a major determinant of chain governance (HUMPHREY & SCHMITZ 2002: 1021; TRIENEKENS 2012: 54). This is seemingly the case for most fragile vegetables, though of course chilies are more robust than tomato, and so changes in chain governance may be less pronounced.

The relatively linear, sequential, dichotomist perspective provided by the Global Commodity Chain (GCC) perspective was, to a largely extent, already able to derive these findings (BRAUN & SCHULZ 2012: 210-211; DIETSCH 2011: 29). Yet the Global Value Chain (GVC) perspective (GEREFFI et al. 2005) added aspects of variations in governance and

power according to product quality and with significance for value chain integration. A perspective beyond that was not always required. As a result of a lack of a wider set of non-commercial actors and institutions altering governance and coordination, an additional Global Production Network (GPN) perspective mostly contributed to analysis as far as it demanded a contextual look at livelihood systems. The influence of non-economic actors can thus, at times, be neglected, yet not a livelihood/bottom-up perspective that contexts ‘on the ground’ within which production processes’ of the ‘most powerless’ are embedded in (DARBY 2013: 45). The latter angle underlined the need to upgrade farmer in various ways, to help them keep pace in the onset of greater local and international competition.

### **Avenues for Upgrading**

The livelihood analysis in combination with chain approaches revealed that farmers need support in terms of fertilisers and agro-chemicals to be able to go into chili production, more so than for the production of any other crop locally produced. Shifts to chili can be understood as ‘inter-sectoral upgrading’, whereby farmers moved into a related product, chili, applying the knowledge and capabilities acquired in tomato production (HUMPHREY & SCHMITZ 2002: 1020, 1025; NAVAS-ALEMÁN 2011: 1395), through unplanned (thus free) spill-over effects and imitation (SCHAMP 2008: 10). But, competency to upgrade (into new chili) chains (DIETSCHE 2011: 31; ROSSI 2013: 223; SCHAMP 2008: 8) is limited by the financial endowment of locals, whereas local levels of knowledge and further capabilities, as well as governance structures and power allocation in the chain (COE & HESS 2008: 268), are favourable to producers. This limits the practical scope of broad-based development through chili, and puts a damper on possibilities of pro-poor, social and livelihood upgrading.

For chili farmers, a fundamental condition for favourable chain relations in the future is the production of sufficiently good quality chili (NAVAS-ALEMÁN 2011: 1388; ROSSI 2013: 223). Aside from the question of input access, this points at the quality of the local natural resource base, which is evermore undermined by a trend toward chili, even more than was the case for tomato. Chili has more potential than any other crop to allow farmers to do more expensive and sophisticated production, because it pays best and thereby gives far more room for environmental concerns. Because of the experiences made with environmentally, thereby economically and socially unsustainable tomato production, it is likely that sophisticated farmers in the study areas now producing chili will recognise the value of paying for manuring or composting. To locals, it may be cheaper to setup a more sustainable form of land use, than for farmers to be on the search virgin lands to clear. Moreover, it may pay-off well within a few years and seems essential to uphold developments. For chili production, environmental upgrading is most compatible with economic advances.



The government must set appropriate avenues to allow for routes fostering such upgrading (GIBBON 2004: 26-30), to help locals in organisation, in accessing production – possibly also through private institutions – and to assure a form of chili farming that can be (ecologically) sustained. It is unlikely that locals will do so by themselves. The government did well, until now, in withholding from interference in the chili chain. Favourable chain integration was possible without government interference, though not for the majority of farmers in northern Ghana. Under the trade liberalisation efforts pursued, the government is required to maintain the competitiveness of local farmers, and to uphold competition among merchants. So intermediaries and wholesalers must be hindered from forming cartels.

Suitable support must be given to producers and their associations, possibly through strengthened government entities. Against this background, farmers' lack of horizontal contractualisation and organisation, or 'collective power' (BRAUN & SCHULZ 2012: 216-216; KULKE 2013: 146), may become an issue again, because institutional power is low while chili wholesalers and intermediaries have seemingly managed to capitalise on the weaknesses of farmer organisations. The NTTA tomato cartel apparently serves as a role model for future development of the still-fragmented chili chain. Farmers, however, are rather badly organised. Intermediaries were in recent years able to attain more power in the chain, by forming a united front at the regional level, while wholesalers have allied at major southern markets that grant access to consumers. Each party, apart from the farmers, monopolises its share of the chain. When having in mind that value shares in the sister, tomato chain are allocated almost entirely to the advantage of wholesalers, it is questionable for how long these southern buyers will want to live with a setup in the chili chain that favours farmers and allows intermediaries to partake.

It is likely that comparatively powerful wholesalers will try to cut intermediaries from the chain, so that they themselves, as a strong association, can face rather poorly organised farmers. Further power may be shifted within the chain towards wholesalers, but this could potentially benefit poor farmers who could enter higher levels of vertical contractualisation with wholesalers (as was indicated by ADDAQUAY 2004; CSIR SARI 2008: 1, 3, 9, 10, 13). Yet it would then be questionable if farmers could profit from rising farm gate prices. If wholesalers manage to form a cartel they are likely to exploit their resulting bottleneck position, previously held by intermediaries. Moreover, if they or anybody else would simply introduce the right varieties in neighbouring countries like in Burkina Faso, chili farmers in Ghana's Upper East Region could soon face similar mal-developments, as were encountered in tomato. There is little to keep merchants from introducing new chili varieties in the neighbouring country, as it is in their interests to do so. If further advances are made in production abroad, allowing foreign farmers to decrease prices, then there will be no more reasons to patronise farmers in the study areas. This would alleviate all potential advances through greater horizontal or vertical contractualisation.

One hopes that farmers in northern Ghana have learned their lessons when it comes to attempting fraud on traders, thus misusing their monopolistic market position. Farmers increasingly see the benefits integrity brings. To keep a favourable market position, farmers would be wise to organise themselves, to form a working association whose administration could overtake the logistically important position currently held by intermediaries within the chain. Wholesalers need contact persons at the local level who are able and willing to take responsibility because of the great distance between the parties involved. Attempts to formalise relations could help, which farmers unions and FBOs could capitalise upon. This could be beneficial to the majority of locals and at the same time be an effective way to support farmers in production while withholding them from. Farmers could use this window of opportunity to establish good, trustful and reciprocal relations with traders, to not give them further reason to seek producers elsewhere. To counter a possibly unfavourable incorporation into markets in the future (CHOUDHARY et al. 2014: 1059), ‘horizontal contractualisation’ amongst farmers must improve to increase revenues, reduce costs, reduce individual risks through cooperation, and allow for better vertical forms of contractualisation (BOLWIG et al. 2008: 13).

### ***6.3. The Rice Market***

Rice is a popular cash and staple crop in Ghana, on local irrigation projects and partly also outside of these too, but its markets are shaped by great global competition. In recent years markets have become more favourable for domestic production, due to government and development assistance in rice value chains. These initiatives, however, have suffered from trade-offs at the local level. Pro-poor outcomes of the rice value chain and support by entities like MOFA, ICOUR and USAID have been below potential, as explained in this section.

#### ***6.3.1. General Overview***

Rice is currently one of the most important cereals in Ghana, after maize and millet, produced on about 11.4 percent of the nation’s agricultural area in 2010 (FAOSTAT 2014; see also GHANA STATISTICAL SERVICE 2013: 212, 298). Its production is of similar importance to the north of Ghana, where rice has been popular for a long time.

In the study area, rice was widely introduced with the onset of British agricultural services, initially pursued through the establishment of a nearby government demonstration farm that was partly concerned with rice production (ADU 1963: 1). After independence, rice production was further expanded in the area, to make use of a shift in southern consumer preferences for the crop, which had taken place as a result of the government’s control and protection of agricultural markets due to import substitution policies. Over time, irrigation projects such as the ‘Vea’ or later the ‘Tono’ irrigation scheme, accompanied by the construction of rice mills and silos, supported large-scale production of the crop. A wider, though often exclusive, share of local

farmers were integrated into the southern dominated, domestic economy (ADU 1969: 17-18; ANTWI-ASARE 2009; FAO 1970: iii, 1; LAUBE 2007: 89, 92; LAUBE 2009: 2; OTENG 1997: 38; SOIL RESEARCH INSTITUTE 1977: 1; TONAH 2008: 113; YARO 2013: 6-11).

Massive efforts made by subsidy provision under military rule in the 1970s further boosted rice production and integrated the north further into the demand structure of the south (SONGSORE 2011: 130; YARO 2013: 8). Alongside subsidies, the government made use of high tariff walls that protected farmers from international competition (AHOI 2010: 9-10; LARYEA & AKUONI 2012: 10-12; SONGSORE 2011: 102). However, structural adjustments and economic reforms, the result of previous public overspending and control, exposed local rice producers to world markets through reduced tariffs and left them without further support. This caused an uproar by scientists concerned for the livelihoods of northern Ghanaian farmers (AHOI 2010: 9-10; FAOSTAT 2011; ROBINSON & KOLAVALLI 2010: 2; SEND FOUNDATION 2008; SONGSORE 2011: 167; YARO 2013: 10-11).

Since the mid-2000s the government became somewhat active again in the agricultural sector of the north, though with no significant effect. A major turn in politics followed, in an attempt to meet targets in poverty reduction. A fertiliser subsidy for the major farming season was introduced in 2008, and tariffs on rice were reinstated in 2010 and raised to 35 percent in 2011. Drawing on the fertiliser subsidy, rice is now supported in 'Block Farming' under the 'Youth in Agriculture Programme'. Support also comes from donor interventions in the north of Ghana, mostly the USAID ADVANCE programme (BANFUL 2009: 1; OUMA et al. 2012: 227-228; PWC GHANA 2013: 5, 27; UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT 2009: 103; WHITFIELD 2011b: 34).

These historical trends in agricultural development policies partly reflect in national trends of rice production, in its imports and exports. Production of rice was done on a rather insignificant scale throughout the 1960s and 1970s, but then grew constantly. Similar to a number of other crops, the amount of rice domestically produced tended to develop along government spending. This is, for example, reflected in a rise in rice production from the late 1970s to the early 1980s, a time of vast government investment, much of it in rice. This investment brought benefits to some farmers in northern Ghana, but when government support collapsed years later, production levels went back to those of previous decades (FAOSTAT 2014; see also GHANA STATISTICAL SERVICE 2013: 212, 298). Since the completion of the North's major irrigation scheme (Tono), rice production rose again until about 2001, irrespective of the following government withdrawal. As indicated by Ghana's rice imports, however, Ghana was never self-sufficient in rice production with the exception being a few years in the 1970s (see Figure 51).

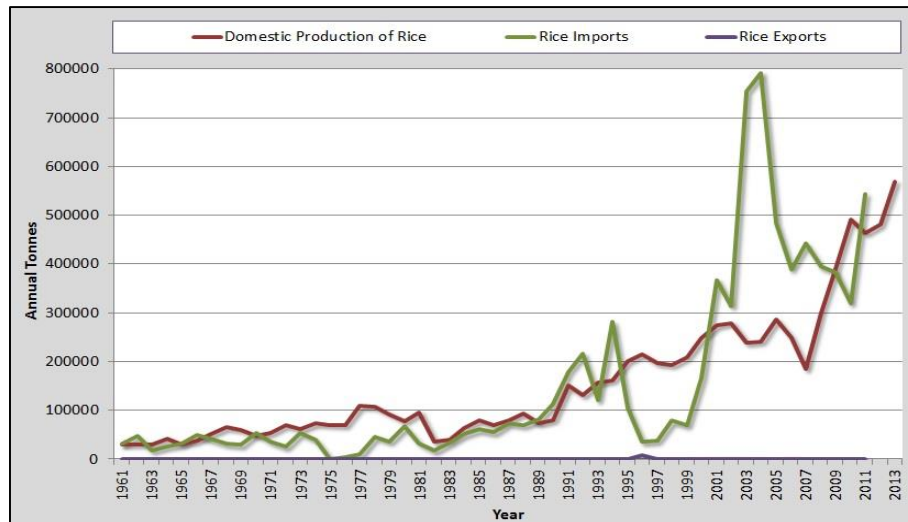


Figure 51: Production and major imports and exports of milled rice in Ghana (own figure, 2015, based on FAOSTAT 2014)

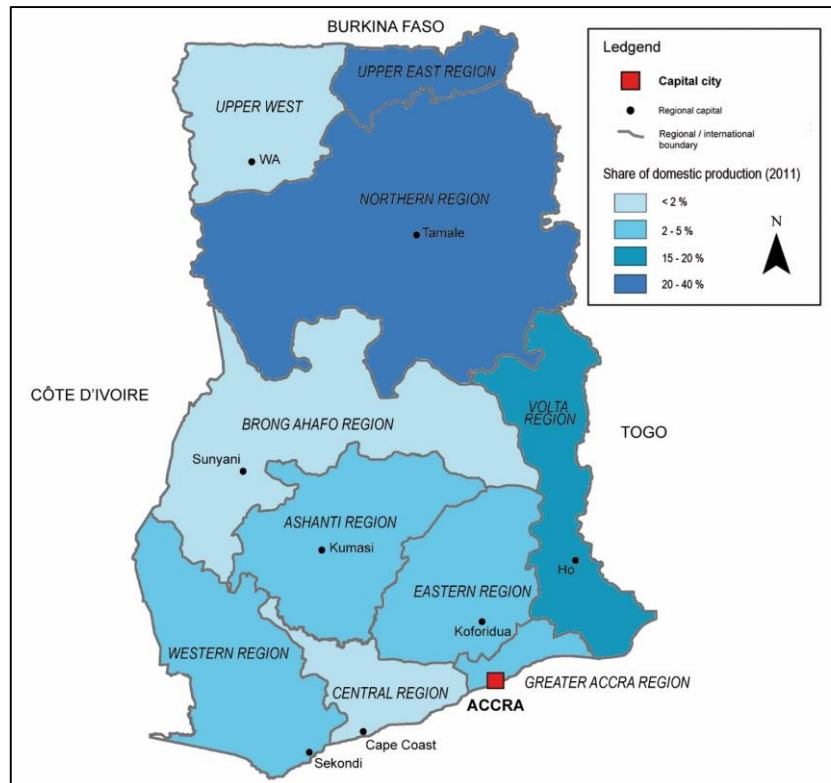
Imports grew constantly since government reforms – SAPs and ERPs – as they also went along with efforts to liberalise trade in the form of lowered tariffs and reduced or abolished import quotas. Rice markets have since been shaped by global economic dynamics. From the late 1980s until about the middle of the 1990s, imports of rice overtook domestic production. Ghana had increasingly relied on cheap imports when world market prices had been rather low in the 1980s and early 1990s. But, when more West African countries started to privatise rice imports and withdraw from import control measures, by the middle of the 1990s, rice imports rose and so did global prices. Rice imports to countries like Bangladesh, China or Indonesia, which already accounted for over 30 percent of total world imports in 1995, keep increasing, which pushed prices higher. Therefore, international prices for rice were stable from about 1990 to 1994, but increased by 1996. Ghanaian rice imports dropped heavily, but soon recovered as world market prices went down again. By 2004, imports were three times as high as domestic production. Imported, milled, white, polished rice became ever more attractive and common to Ghanaian consumers. They started to prefer its taste, aroma and general quality to locally produced rice. Domestic production stagnated, even decreased. Yet further price peaks on world markets occurred between 2007 and 2008 – the global food and financial crisis – which led imports to go down again (ACKAH, ARYEETAY, BOTCHIE, et al. 2012: 228-229; FAOSTAT 2014; YAP 1997). Countries like China, India, Vietnam and Egypt prohibited exports of rice through partial bans on new sales, by imposing minimum export prices or through taxes on rice exports (GULATI & DUTTA 2010: 289).

Partly as a result of foreign policies that influenced world markets, imports of rice into Ghana shrunk drastically and domestic production was able to double within only four years. As previously indicated, this trend was supported by domestic efforts since 2008. A stiff rise in import tariffs increased prices for imported rice, and farmers were relieved of financial burdens

through fertiliser subsidies and additional government programmes. In combination, world market prices have generally been favourable for Ghanaian farmers, often 50 percent above that of local produce (AKRAMOV & MALEK 2012: 26). Thus, Ghanaian farmers now find themselves in a situation where they seem to be able to compete on domestic rice markets, at least in terms of price. Potential to make use of these trends is great, as domestic demand for rice is high and projected to grow by 11.8 percent per annum (MIDA 2010: 2). For both consumers and producers, rice thereby became ‘at the national level, the commodity that had the highest impact on poverty as a result of increases of its prices on the international market’. It began to favour northern, rural producers over urban consumers situated in southern Ghana (ACKAH & ARYEETAY 2012b: 8). Despite advances made in domestic production, these trends underline the need to further improve domestic production in terms of quantity and quality. Southern consumers, increasingly able and willing to pay for the right product, demand sufficient quality rice, which first suits their taste and then their pocket.

Consumers buy different varieties and qualities of rice, each with a specific value chain. The rice market is actually heavily segmented by such attributes. All rice consumers want the produce to be free from stones and other debris in order for it to be attractive. Aside from their preference for imported over local rice, consumers prefer white, milled over brown, parboiled rice, and aromatic to non-aromatic rice. Consumer and trader willingness to pay varies accordingly. Domestic rice that meets consumer preferences could thus be a real alternative to rice imports and would also target the upper end of domestic markets, which offers higher prices and a less elastic demand (GAGE et al. 2012: 15-16, 18). The domestic and international competitiveness of Ghanaian rice production should thus be enhanced, as the country is otherwise likely to encounter further increases in imports (BREISINGER et al. 2011: 52).

Competition in rice stems from countries where production is often subsidised, especially Thailand, China, the USA as well as Côte d'Ivoire and Burkina Faso among others (FAOSTAT 2014). The need to compete with these countries by improved rice production is largest in northern Ghana, because imports affect the mostly poor farmers living there, who are by far the largest suppliers of rice to domestic markets. While the Northern Region has contributed the largest share of domestic production, the Upper East Region is also among the largest producers aside from areas in the Volta Region and more minor ones throughout the country. According to MOFA data, about 40 percent of all locally produced rice comes from the districts where Biu and Mirigu are located, though mostly from Biu's irrigation scheme (see Map 11). Biu is thus located at the very heart of the Ghanaian rice sector and is examined more closely here, though enriched with encounters from Mirigu.



Map 11: Major regions of rice production in Ghana, according to their contribution to total domestic production in 2011 (own map, 2014, based on MOFA data, 2012).

### 6.3.2. Local Structure and Geography

There are many parallels between production trends at the national and local levels. However, in the more recent past, these have sometimes contradicted each other. After some initial success in increasing the local area under rice cultivation in the late 1980s, production dropped severely. The initial decrease, in 1989, may have been a result of subsidy withdrawal for land preparation and fertilisers (LAUBE 2007: 96), while the continuous shrinkage over the 1990s may have resulted from growing rice imports. At that time, as local farmers explain, they instead ventured into soya production and started to cultivate tomato. But, unlike at the national level, local production recovered through the 1990s and continued to grow, irrespective of all-time records in nationwide imports by 2004 and a resulting decline in production at the domestic level. In fact, by 2004 the local area under rice cultivation managed to climb back to levels encountered 16 to 17 years before. Since 2004, production could have remained at a high level, as local monitoring officers assume, but the irrigation project started suffering from a breakdown of its infrastructure. Attempts were made to rehabilitate the irrigation canals in 1997 and again in the mid to late 2000s, most significantly in 2008 explaining why in that year only a little production took place. After refurbishment and with the return of subsidies and duties on rice, the area under cultivation reached its highest in at least 20 years (see Figure 52).

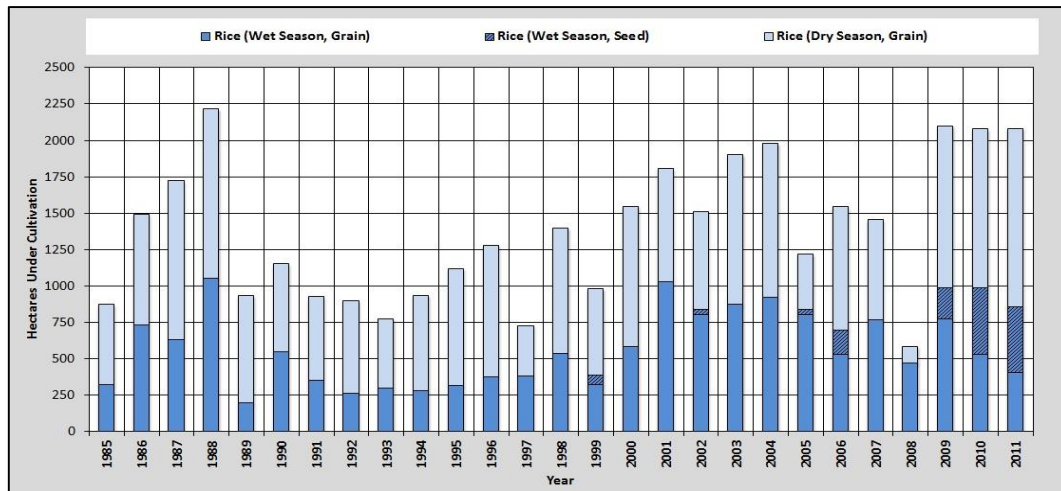


Figure 52: Hectares under rice cultivation at the Tono Irrigation Project from 1985 to 2011 according to season and usage (own figure, 2014, based on data attained from ICOUR, 2012).

Production of rice seed began under the irrigation scheme in recent years. With a maximum of about 2000 ha available at the Tono Irrigation Scheme, rice was the most popular crop, often covering more than 50 percent of the command area, and particularly popular in the dry season. This latter fact may be the key to understanding why trends at the local level were able to counter those at the national level, because when locals produce during the dry season – through irrigation – they get an advantage in market access, as they are able to sell their rice during the off-season. Thus, trends in local rice production have the potential to develop independently and more favourably as compared to other areas in Ghana. Significant steps were made in recent years, but what facilitated these advancements?<sup>160</sup>

The rice market is quite segmented, even in northern Ghana. In the Upper East Region most farmers produce rice for parboiling, which falls at the lower end of domestic markets, serves about one-fifth of domestic consumption, and lower price segments (GAGE et al. 2012: 17). Northerners are often content with growing a brown, traditional variety, while farmers from the south (like those from the Volta Region) produced milled, white, perfumed rice for the most favourable (southern) markets. In the past, northern Ghanaian rice farmers hardly served the demand of wealthy consumers in urban centres of the south, but mainly those living in or originating from northern parts of the country, where such traditional rice is popular. That limited the extent to which locals were exposed to international competition. At the same time it also narrowed potential incomes for northern rice producers. But since 2008, endeavours by the government as well as USAID interventions have aimed at the inclusion of northern farmers into southern, possibly global markets, or at least at import substitution, by introducing and supporting rice varieties like white, perfumed, Jasmine rice for milling. These activities have concentrated on major rice growing areas, such as the Tono irrigation project and valleys suitable for rice

<sup>160</sup> Interview with and data obtained from ICOUR monitoring unit, July, 2012, Navrongo, Ghana.

production. Mirigu has hardly benefited from this support, as it fulfils neither condition. Government and USAID interventions in Mirigu have instead aimed at maize. As a result, new rice varieties are far less common in Mirigu.<sup>161</sup>

Interventions in Jasmine rice chains started at the farm level. The Youth in Agriculture Programme – a.k.a. Block Farming (BF) – was conducted solely under the irrigation project and covered roughly a quarter of Biu’s inhabitants. The programme is partly handled by ICOUR and partly by the MOFA. Under ICOUR, Block Farming is content with producing Jasmine seed on irrigated uplands. These seeds are then used for rice grain production in other irrigated areas, especially lowlands, where BF is organised under MOFA. Farmers producing grain under BF receive subsidised fertilisers from MOFA and sometimes support for seed and land preparation, formally, on credit through these government entities. BF seed production additionally includes training for certification, but only for those farmers that have uplands under irrigation. BF subsidies overlap broadly with the general fertiliser subsidies, but BF also tried to improve market access through (more valuable) seed production as well as by forming a multipartite model of contractual farming. The latter was done, by organising seed sales to the government owned, National Food Buffer Stock Company (NAFCO). The BF programme in seed guarantees sales for farmers, as that seed is used for grain production under MOFA. However, seed produced within the programme can also be, and is often, sold as grain. For the majority of rice producers, namely those producing grain, BF represents a way of helping locals attain fertiliser and seed on credit, with sales depending on the open market.

Government support is limited to the wet season, though minor support is occasionally provided during the dry season. But initiatives often suffer from the fact that locals find it hard to actually attain the subsidies<sup>162</sup>, which is explained later. During the dry season, only those situated at irrigation schemes and included in USAID programmes can count on assistance. Support by USAID is concerned with training farmers and providing subsidised fertilisers (sometimes indirectly attained through MOFA), land preparation and seed, mostly to produce grain. These programmes are coordinated with ICOUR. Much more than BF, the USAID initiative further focuses on attracting large-scale, private wholesalers and processors, called ‘*aggregators*’. 40 percent of female-headed and 50 percent of male-headed households from Biu are thereby currently able to sell their rice. Significantly fewer are also able to attain inputs in credits, machinery, other equipment or training.

---

<sup>161</sup> Interviews with two technical associates at ACIDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

<sup>162</sup> Interviews with MOFA extension officers, February, 2013, Navrongo, Ghana; and Interviews with two technical associates at ACIDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.



To provide support, organise repayment and possibly make contractual arrangements between farmers and large-scale buyers, BF (thereby ICOUR and MOFA) and USAID interventions rely and build upon existing farmer based organisations (FBOs), each with individual leaders, and the local farmers' union. These groups are supposed to assure the effective allocation of help, at a ratio of 2500 farmers to one extension officer in MOFA programmes. Groups are also to provide collateral and assure the willingness to repay for credits given out in the form of inputs. The numerous FBOs consist of small groups of farmers, often headed by more commercially-orientated, large-scale farmers, and are used by BF in seed and grain production. The Tono Irrigation Cooperative Farmers' Union (TICFU) is headed by local, large-scale farmers, the union's president and the chief of Kodima from Biu, and is used by USAID to oversee its assistance. At the farmer level, the TICFU and through it the USAID programme again draws on FBOs. In USAID programmes the FBOs are termed '*nucleus outgrowers*', emphasising the responsibility of those heading the FBOs. Organisations and forms of support thus overlap. Union members are also organised into FBOs, but not all FBO members are part of the union. Only those farmers that are in both may benefit from the two forms of external support, aside from fertiliser discounts.

In USAID interventions, these administrative structures are used to organise production among farmers, via union representatives, nucleus farmers and their outgrowers. Union representatives act as buying agents, or intermediaries, since they are equipped with finances from wholesalers, negotiate prices with wholesalers and farmers, and assure timely conduct of business. As a result, in this chain set-up, the chief from Biu who is also the union's secretary, sources rice on behalf of wholesalers from farmers within the union. In other villages under the irrigation scheme, this is done by local rice intermediary traders, long established in local business and now also included in USAID programmes. The union's president, who is at the same time the owner of several trucks and also president of the local transport union, organises transport to southern Ghana. For the majority of farmers, however, Jasmine rice is produced without any support, often even without fertiliser subsidies. Merchants can occasionally take over parts of the harvesting, especially threshing labour for farmers. Business is normally conducted with numerous local intermediaries and sometimes larger, travelling wholesalers. Wholesalers then supply larger wholesalers, who mill the grain and distribute the produce to retailers in southern Ghana, parallel to importers (see Figure 53).<sup>163</sup>

---

<sup>163</sup> Ibid. and interview with ICOUR staff, local farmers and USAID intermediaries, wholesalers and company representatives August to December 2012, Navrongo, Ghana.

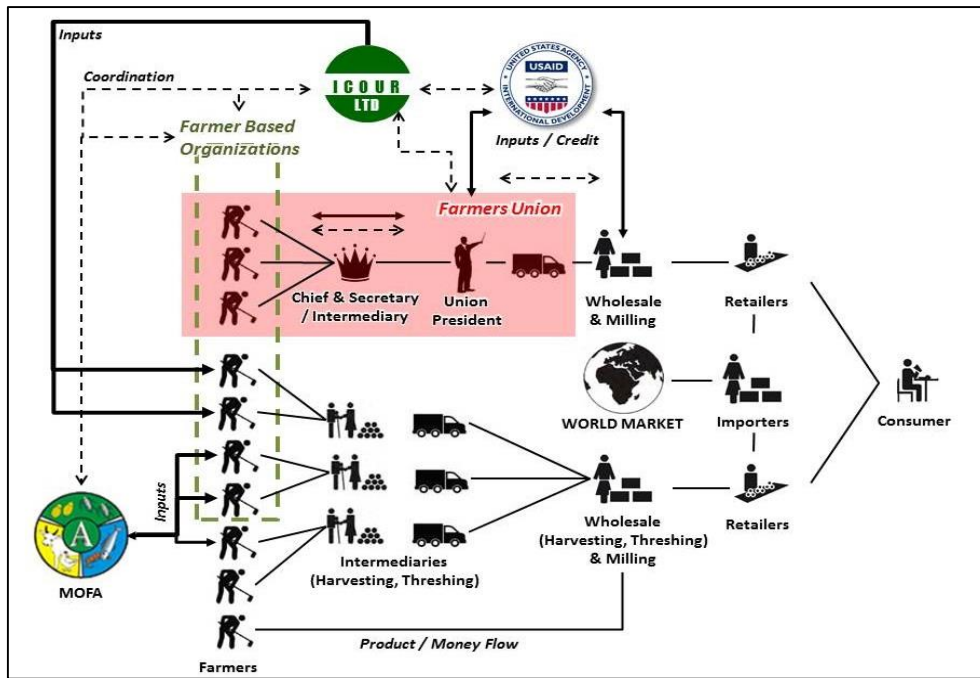


Figure 53: The northern Jasmine rice value chain (own figure, 2015, own trader FDGs, expert interviews, 2013, and AMAKYE et al. 2008; GAGE et al. 2012).

### 6.3.3. Access, Inputs and Outputs

Farmers' entrance to Jasmine rice value chains is primarily defined by the ability to acquire the right seed. The only local source of Jasmine seed is currently either ICOUR or MOFA, unless one is willing and able to travel to the regional capital, Bolgatanga, which is long costly undertaking for many of the poor. With the new Jasmine seed, farmers then venture into a new type of rice, which they characterise as less tasty, less nutritious, less tolerant to drought and flooding and more demanding in terms of inputs, such as fertilisers, agro-chemicals, aside labour and thereby sophistication.<sup>164</sup> Farmers need to take a higher risk. But, much more than pointing at disadvantages, farmers praise the seed's high yields and the high market demand. As USAID experts explained, older varieties, though far more drought resistant, able to grow with only manure, more nutritious and with higher shelf-life, are almost extinct because consumers do not want them and because they have a lower yield and do not pay well.<sup>165</sup> Yet, it is important to note that the ordinary Jasmine rice farmer still faces comparatively low financial requirements at potentially good yields and little risks in general, when compared to chili or tomato farmers. Rice can serve as a staple for up to a year. So, motivation to enter the rice chain and to specialise in its production is high. Male and female farmers in Biu constantly talked of a genuine 'rice boom', which started in 2008:

<sup>164</sup> Farmer rice FDGs, October 2013, Biu, Ghana.

<sup>165</sup> Interviews with two technical associates at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

*'The reason why everybody here – including me, my wife and my children – now farms that rice, is that it has now become an economical crop that can give us both money and a lot of food. That makes it the most cherished crop of all! That is what we demand and what we need today. Everybody has seen the importance of rice and so we don't joke with it! Everybody likes to take [eat] rice and that is why we keep on farming it!'*<sup>166</sup>

Access restraints based on gender are not evident in rice, though of course females own fewer lands and are generally worse equipped asset-wise. The basic input needed is suitable, irrigated land that allows the production of sufficiently good quality rice, however, this is especially scarce among women. Suitable land is furthermore a matter of geography. Generally SGI farmers cannot grow rice, because the labour costs for watering are too high. Production of Jasmine rice is thus limited to half a year, to the wet season at best, and can only take place in few valleys neither too close to flooded areas nor at too high an altitude where droughts are likely to occur. In places like Mirigu, there are too few suitable plots:

*'The rice valleys are not enough, because that rice does not grow well on any other land apart from very swampy areas and some of those can flood. [...] So, we grow [rice] mainly to eat, whereas you people [from Biu] grow mainly to sell. [...] You farm on large scale and we farm on small scale. In Biu you have a lot of land lying down at the irrigation but we have mostly uplands. [...] We just do not have access to irrigation. [...] The reason why we don't farm on commercial basis, is that the right land is not enough in Mirigu, here.'*<sup>167</sup>

Jasmine rice will do best only when irrigated, and where water supplies can be controlled. Water supplies are less controllable under rainfed production in low-land/valley areas and even worse on rainfed uplands. The water demands of Jasmine rice are much more pronounced than for the older varieties. The disadvantages of rainfed production include limited yields or possibly a total failure of crops. Furthermore quality of the product alters according to water provision, which determines the percentage of grain breakage after harvest, which in turn significantly influences post-harvest losses encountered by wholesalers and processors.

Rice generally has to be harvested at a point in time when grains are neither too wet nor too dry (of 14-15 percent water content is optimal). Higher wetness will lead to rotting after harvests, while higher dryness will cause grains to crack or even pulverise in the course of milling. Both constrain sales, but especially dryness, which makes rice unattractive to traders especially from southern Ghana. Over-drying is a major issue, because it renders produce fit solely for parboiling, which can reduce the breakage of grains. All the same, it also limits the market range of northern

---

<sup>166</sup> FGD Participant, October 2013, Biu, Ghana.

<sup>167</sup> FGD participant, March, 2013, Mirigu, Ghana.

rice, as parboiled rice is only sold at regional markets. In fact, non-quality rice and specifically heavily broken rice, which is often used for parboiling, achieves a farm gate price estimated to be at least 20 percent below that of good quality produce for milling. To avoid breakage, timely harvests are essential. But, over-drying is hard to come by, if Jasmine is cultivated in areas generally too dry or where water logging or flooding blocks timely harvests, where the produce can thus not be reaped in time. Often fields are too small to be harvested by machines. So, the risk of spoilage is highest when production takes place on small, rainfed uplands, followed by valleys and then irrigation projects. The rice most attractive to southern wholesalers comes from irrigation projects, which excludes the majority of farmers in northern Ghana from the market.<sup>168</sup>

Moreover, a significant number of farmers having access to irrigation could be excluded, because delays in production are frequent. These arise from a lack of financial credit/capital and work overload specifically at the start and end of wet season activities – when it would be best to start working on the next season’s rice – even though the poorest farmer will do his/her best to give priority to its production. Because it is mostly small-scale farmers that produce on irrigated lowlands liable to flooding, the poor generally face higher risks in production and in quality standards imposed by new rice markets. At the irrigation project, unequal allocation of land and spatial marginalisation are further consolidated by the trend towards more Jasmine rice. Many farmers have tried to enlarge their production, as markets were so attractive over recent years.

Access to the Jasmine rice value chain is thereby defined by access to external support and natural capital in combination with irrigation. Social allocation mechanisms play a crucial role and work to the disadvantage of the lower strata of society. But, farmers believe that dynamics encountered in rice value chains could help to overcome socio-economic polarisation in the community. Rice is an inclusive crop and it may improve well-being, if suitable land is accessible:

*‘Rice is bridging the gap. [...] Somebody who was very poor some years back [...] is now better off, because he will [...] rather be working on his rice. But [...], those that were already rich profited more from the trends of events, because they already had the money, [...] had more farmlands [...]. Some of the poor used to give up [irrigated] lands to the rich, for money, and so they can’t work on them now and keep on begging’<sup>169</sup>*

If irrigated land can be accessed, the financial threshold is comparatively low when compared to other cash crops. Jasmine rice thereby holds potential for livelihood development of the poor. Jasmine rice is popular among most farmers and especially among the poor that cannot go for more expensive and riskier cash crops. Farmers growing Jasmine constantly emphasise that

---

<sup>168</sup> Interviews with two technical associates at ACIDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

<sup>169</sup> Interview with a teacher from Biu, 04.05.2013, Biu, Ghana.

financial constraints would not allow them to buy all the required fertilisers and chemicals. In order to produce rice that is free of stones, locals require tarpaulins, which hardly anybody can afford. This further limits access to the value chain and is the reason why they stress that financial capital at hand is the primary asset required for chain access.<sup>170</sup> But rice is otherwise not too demanding. With regards to social capital, generally a crucial asset among the poor, rice has partly been incorporated into local belief systems, as it can formally serve as a staple:

*'Everybody is looking for rice now, more than for any other type of food. We also make sacrifices to the gods, not to allow the rice to spoil, although it is not a traditional crop. [...]. We are leading the whole of the Upper East in terms of rice production, and everybody knows that it is because the gods are behind us. They [the gods] cannot refuse our foodstuffs and that is why they allow rice [...]. The gods accept the rice and the people also like it.'*<sup>171</sup>

Yet rice production takes time, which in turn can cause conflicts with traditionalists in households that insist on the production of crops like millet to suit local belief systems. Incomes generated by successful participation in the rice value chain increase social capital, as income is invested in schooling of children (human capital) and allows the erection of permanent housing structures (physical capital). Such abilities are regarded as highly prestigious, but understood as impossible with traditional staple crops only:

*'When I was still a boy, everybody lived in a mud house and we farmed millet, but today I am old. All the big, strong houses you are seeing here are rice-homes. Millet can never build such a house! If we were to farm only millet, then we can't put up any block [concrete] house. So, why should we want to waste time? That's why the people have migrated to rice.'*<sup>172</sup>

Emphasis on the livelihood outcome generating abilities of Jasmine rice through income earned is so strong, because the real poor currently have no alternative form of cash cropping, with the exception of maize. As was frequently expressed in FGDs and individual interviews, success in rice markets has enabled farmers to acquire higher well-being and to reduce overall vulnerability. Vulnerability is also reduced by rice production because food security throughout the year is assured (without prior sales). Yields are often higher than before, and even if the produce does not suit quality requirements, it can be stored for a long time (about one year) and feed entire households. Another advantage of rice in terms of livelihood outcomes is that production is relatively environmentally sustainable. Farmers do not report of environmental degradation that would undermine production (see also Figure 54).

---

<sup>170</sup> Farmer rice FGDs, October, 2013, Biu, Ghana.

<sup>171</sup> Interview with the chief of Kodima, 24.02.2012, Biu, Ghana.

<sup>172</sup> Interview with an elderly farmer, 26.03.2012, Biu, Ghana.

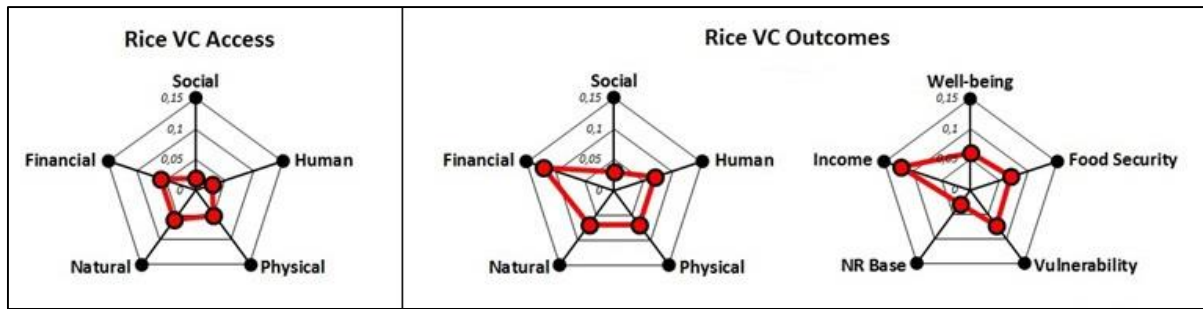


Figure 54: Intensity of associations made between rice chain access and assets required (left) and chain outcomes for farmers' assets and livelihood outcomes (right) (own figure, 2015, according to co-occurrence coefficients, own FGDs and Interviews, 2012/'13, n=150 h).

Rice farmers can easily pay themselves or their workers the minimum wage and often make significant profit, if they are able to access the chain. Government estimates, however, seem slightly over-optimistic. USAID estimates state the opposite and assume higher inputs. Data collected during field research suggest that the average farmer in Biu is able to achieve a profit margin of about 44 percent on an acre of Jasmine rice, thus less than what government entities estimate but more than what USAID suggests. This is due to variance in yield and farm gate price. The average calculated below is thus a rough figure (see Figure 55).

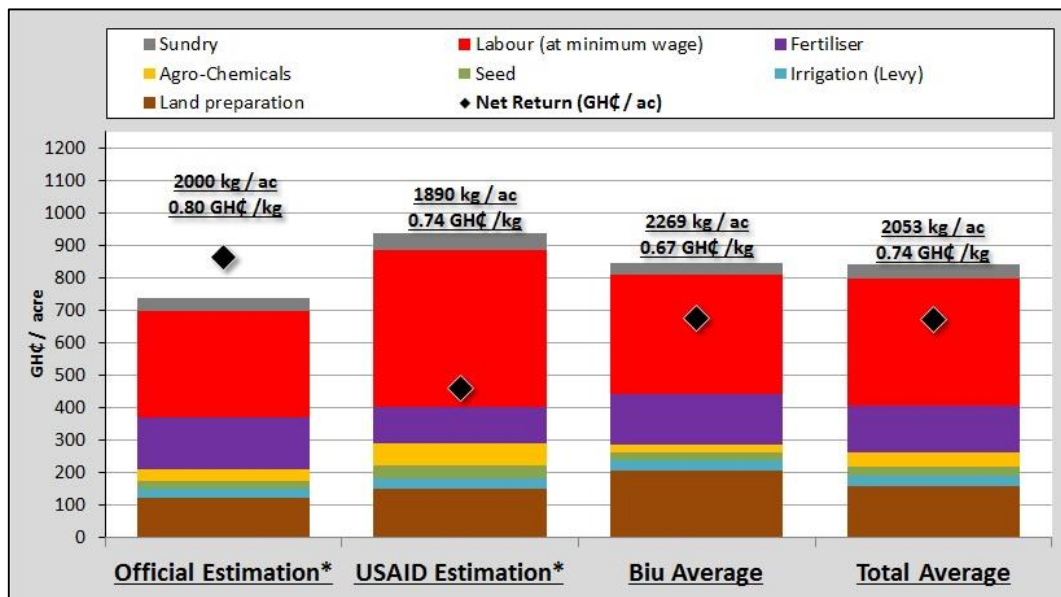


Figure 55: Estimates of paddy Jasmine rice production costs, expected yields, average prices (June – July 2012) and net returns per acre at minimum wage of 4.8 GHC/man-day (own figure, 2014, own survey, 2013, n=6 and \*based on ICOUR, MOFA and USAID data, 2013).

Regarding market access, farm gate prices were favourable. Farmers at the Tono irrigation project were able to undercut the average world market price of 1.125 GHC/kg in June/July 2012 for imported, Thai/Jasmine rice (5 percent broken) by about 34 percent.<sup>173</sup> But, that is only a temporal and incomplete sketch. From early 2009 onwards, world market prices have been below

<sup>173</sup> Exchange rates from www.oanda.com and world market prices from WORLD BANK 2014.

those of local farm gate prices. Moreover, it is important to add that local farm gate prices collected by the government actually refer to un-milled rice, known as paddy. Its milled equivalent/‘processing yield’ is just 60 to 70 percent of farm gate weight (data obtained from USAID and ICOUR 2013: 98).

Additional costs and nominal losses arise for wholesalers and processors of local produce, while world market prices refer to already milled rice. The difference between world market prices and wholesale prices for (milled) imported rice, indicate that importers are able to make vast profits, at least when compared to profits in domestic trade. Differences between retail and wholesale prices for imported rice are larger than for local produce. More value is seemingly generated in import value chains. These are more beneficial to importers and retailers within the chain, but less so to wholesalers and retailers active on domestic markets. In comparison, domestic merchants compromise on profits, because farm gate prices are higher than world market prices. Additionally, losses during processing are greatly limited. Wholesalers have to convince retailers of selling their product, as retailers’ margins are then rather smaller. Though retailer margins were often higher when dealing in local rice throughout 2009, they fluctuated more than margins of imported rice. Since 2010 imported rice has allowed them larger incomes.

On the side of consumers, however, locally produced milled Jasmine rice, still has great potential, because market prices could be lower if local produce would show similar qualities as imported rice. The latter is of special significance. This is so, because retailer prices on major Ghanaian markets have eventually been lower for local than for imported rice. Prices have started to align in recent times. To convince retailers of selling local produce, consumers’ will to pay needs to be increased by higher quality (see Figure 56).

Within the domestic rice value chain, retailers are somewhat underprivileged. The lion’s share of the final retailer price consists only of wholesale profit. Additional costs for intermediaries are negligible, as they make up less than 0.5 percent of retailer prices. Proportionally to the profits generated by wholesalers, the investments required for aggregation – being sacks, loading and handling, tax, transportation – aside from farm gate prices, are insignificant. Costs encountered for processing, milling and further handling, are even smaller. While farmers are comparatively privileged in profit allocation, the profits and costs encountered by retailers are marginal (see Figure 57). Seemingly, profit and therefore power is concentrated mostly at the wholesale level.

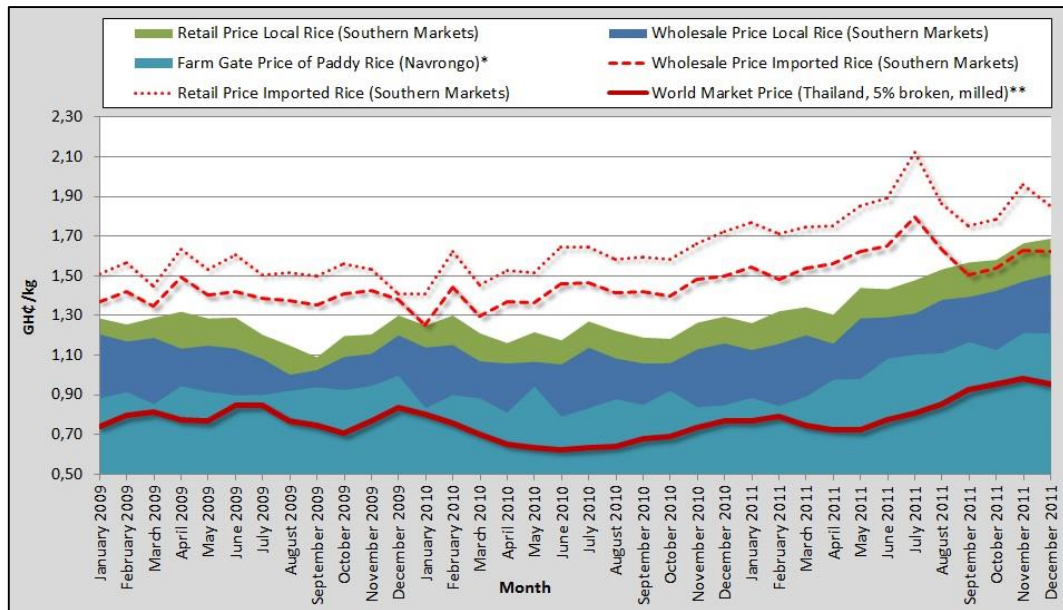


Figure 56: Prices of rice at district, southern Ghanaian and world level from 2009 to 2012 (own figure, 2014, based on data obtained from ESOKO, 2013, \*based on data obtained from MOFA, 2013, and \*\*based on exchange rates from www.oanda.com, prices from WORLD BANK 2014).

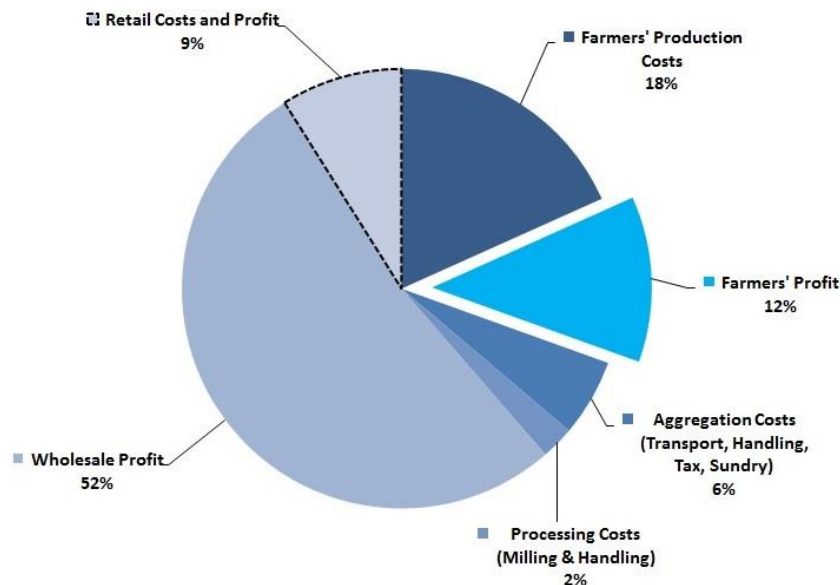


Figure 57: Estimated average composition of the kilogram retail price of milled Jasmine rice grain from irrigation projects in Northern Ghana, sold in Accra in June – July 2012 (own figure, 2015, based on own calculations, trader FGDs, 2013, USAID and ESOKO data, 2013).

For wholesalers, the profits accruing at farmer level are thus crucial. Wholesalers will likely attempt to lower these. The rice chain currently compromises between extremes, but has the potential to become increasingly buyer- or wholesaler-driven.<sup>174</sup> When more farmers enter into Jasmine production, competition for their rice is likely to decrease. The calculated shares in the chain refer to dry-season production, a time of rice scarcity on markets. Most likely, the chain will

<sup>174</sup> Interviews with two technical associates at ACIDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.



already be more buyer-driven during the other half of the year, when harvests coincide with the rest of the country. At present demand is so high that farmers report '*violent competition*' for their produce, which explains why farmers were able to access large shares of profit.<sup>175</sup> Yet, from a farmer's point of view, there are limitations to these numbers, going far beyond seasonality.

Farmers' margins and shares in the chain depend on the extent to which they comply to good agricultural practices, as these affect variable costs and determine yields. Rice is most often produced under sub-optimal conditions, partly because it is so popular among poor farmers. During FGDs, farmers constantly emphasised that if they lack inputs like sufficient fertilisers, production of rice will not be economically sound but only good to attain food security. According to farm budgets collected in Bui, a lack of fertilisers can lower yields, product quality and thereby farm gate prices to the extent that it is simply not worth selling. Farmers' shares in the chain then drop severely. Only those locally understood as being '*commercial*', thus big-time farmers (local elite), have the possibility to sell their rice as seed because they are highly sophisticated, certified farmers on uplands. Alternatively they can simply wait for better prices, or receive much better farm gate prices by being able to access trade with wholesalers attracted by USAID. Especially the latter can be of major advantage, because farm gate prices may increase up to 19 percent above what others encountered as '*average*'. '*Poor*' farmers, on the other hand, rather produce grain, have worse quality, low yields, sell fast during low price (harvest) periods, and may run at a loss. Diverse factors are at play. Finances for inputs, especially fertilisers, and support through USAID or BF are important for market-orientation (see Figure 58).<sup>176</sup>

It can be deducted that access to external support programmes – government seed production in BF, fertiliser subsidies and USAID enabled sponsoring and selling – and the ability to produce high quality rice plays a key role in livelihood development of local smallholder producers. When able to combine all forms of support currently available for production – for land preparation, fertilisers and seed – subsidy relief of up to 30 percent of total production costs can be received. Assuming that rice produced under '*commercial*' conditions generates higher farm gate prices (possibly even those of seed or under USAID support), margins and farmers' incomes, food security and socio-economic development will differ even more. Most often '*commercial farmers*' seemed able to attain these subsidies and access better paying wholesalers attracted by USAID. In contrast the '*poor*' did not enjoy most of these advantages.<sup>177</sup>

---

<sup>175</sup> Female FGD participant, October 2013, Bui, Ghana.

<sup>176</sup> Farmer rice FGDs, October 2013, Bui, Ghana.

<sup>177</sup> Farmer rice FGDs, October 2013, Bui, Ghana.

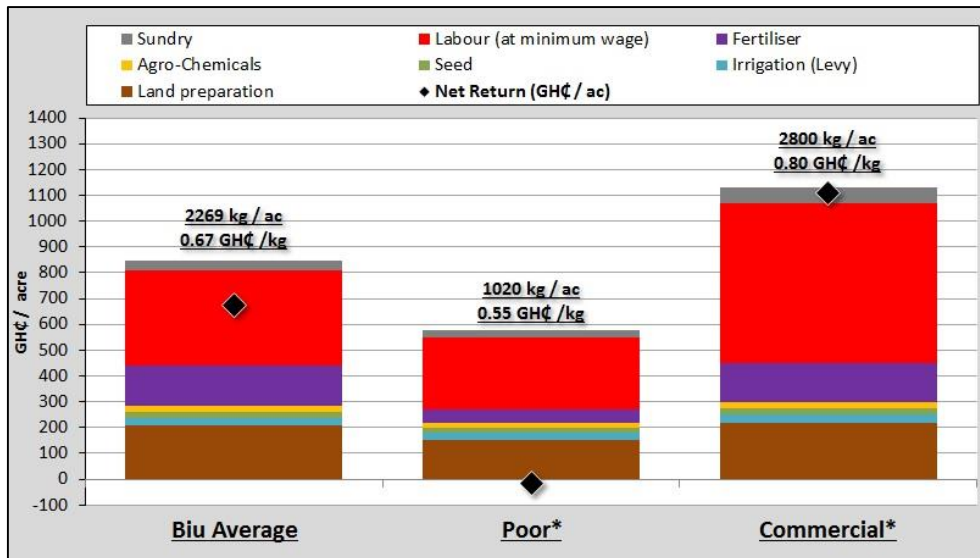


Figure 58: Illustrations of paddy Jasmine rice production costs, yields, average prices (June – July 2012) and net returns per acre at minimum wage of 4.8 GHC/man-day, according to socio-economic stand (own figure 2014, own survey, 2013, n=6 and \*based on two FGDs).

As ‘commercial farmers’ already produce at a sophisticated level, their incremental gains attained through subsidies are marginal, as dictated by the principle of diminishing returns. ‘Poor’ farmers taking great leaps forward are able to use rice as a valuable cash crop. This holds true even without any further advancements, no seed certification, and no higher farm gate price. Simply lowering the cost of contemporary production would allow the poor to generate incomes. Lowering costs and heightening farm gate prices via external support is not a necessity for commercial farmers, unlike for the poor (see Figure 59).

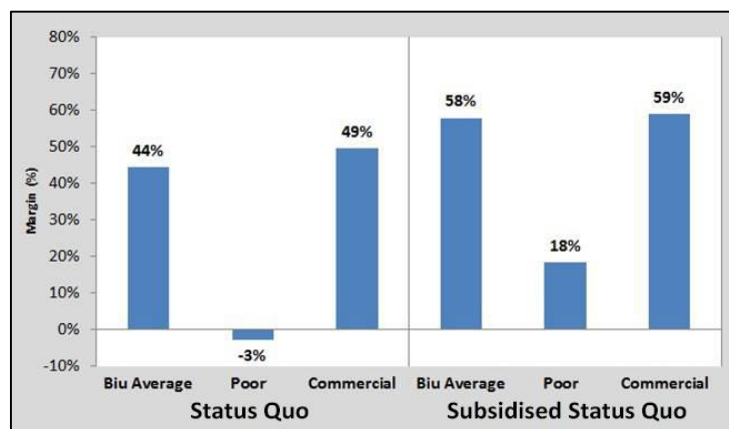


Figure 59: Illustration of margins per acre according to socio-economic stand of producer (own calculation and figure, 2014, own survey, 2013, n=6 and based on FGDs).

Subsidies and external support and the decision over which value chain to enter (seed or grain) show the potential to turn subsistence farmers into more commercially-orientated ones and, moreover, to drastically increase all outcomes generated by the Jasmine rice value chain. Well-being as well as food and income security may benefit, though subsidies are often a prerequisite. The majority of local farmers are likely to be dependent on external support to make production

economically sound. According to household survey data, the average farmer in Biu produces about 1.35 tonnes of rice on one acre per season. Such farmers sell about three-quarters of their produce, most likely at equally precarious margins (survey, 2013, n=177). Only poor farmers desperate for incomes will try to use rice as a cash crop when they are not externally supported. Such farmers remain excluded from the current market boom and the most favourable forms of value chain access. As farmers explicitly asked during FGDs, it is essential to examine the wider production network of rice, which alters the basic accessibility, outcome and governance of the rice market through the local chain.

#### **6.3.4. Governance Dynamics**

The governance of rice production can be separated into three major parts, the dynamics of which are explored in this sub-section. Firstly there is general trade, without much external interference and provided immediately by merchants. Secondly are public programmes, such as the fertiliser subsidy and the Block Farming initiative provided by entities like MOFA and ICOUR. Thirdly, these efforts are accompanied by the USAID ADVANCE programme.

##### **6.3.4.1. Governance Dynamics in General Rice Trade**

Access to Jasmine rice markets by acquiring seed is exclusive, because MOFA and ICOUR hold a monopoly on the seed.<sup>178</sup> Farmers mobilise social relationships to compensate for a lack of knowledge on improved seed varieties and to deal with their lack of connections to these public entities. Insufficient vertical embeddedness seemingly derives from discrepancies in the level of pro-poor engagement of government entities and a lack of grass-roots' monitoring. Indeed most farmers have probably acquired seed informally, using "weapons of the weak" to steal seed from commercial farmers:

*'You see, they [MOFA/ICOUR] bring it [the seed] only to the commercial farmers, [...] but we work for them [...] When you observe that this fellow's rice does well, you will be interested to go and help with harvest and get the variety for yourself. [...] They [commercial farmers] will not even like you to be informed about these things and we can't get it directly.'*<sup>179</sup>

Once in production, farmers describe the governance of rice value chains by merchants – mostly intermediaries and seldom wholesalers – as fully informal and spontaneous, as a spot market on which a large number of individual producers and buyers meet with little to no exchange beyond monetary terms. To farmers, this is partly a result of a lack of vertical contractualisation or cooperation among them.<sup>180</sup> Farmers are organised in a union as well as in

---

<sup>178</sup> Interview with a KNE MOFA officer, October 2012, Navrongo Ghana.

<sup>179</sup> FGD participant, 22.01.2013, Biu, Ghana.

<sup>180</sup> Farmer rice FGDs, October 2013, Biu, Ghana.

FBOs, but these do not act as unified entities. Farmers regret that they are divided over selling as a result of poverty, which reduces their bargaining power. Whenever farmers try to agree upon a certain price amongst them, to thereby have a bigger say in relations to rice traders, the poor that cannot wait for better prices break away from arrangements and soon everybody sells at lower prices than agreed upon. Farmers believe that they require a united front to improve their situation, but attest that poverty makes it harder for them to unite.<sup>181</sup>

Intermediaries and wholesalers, on the other hand, act comparatively independently as they are not organised into any local, regional or national associations that control qualities supplied to markets and thereby prices. The basic governance of domestic rice chains is thus quite unrestricted, with few barriers to entry.<sup>182</sup> In fact, some farmers from Bui have sent rice to southern Ghana and sold to wholesalers directly, though that is an exception because it requires investment in transport. But, direct sales are principally possible.<sup>183</sup> Nevertheless, traders possess vast purchasing power, specifically wholesalers that drive the chain, as was shown in the composition of retailer prices. Until recently, dominance of wholesalers allowed them to act as purebred brokers. It was common that farmers would have to pay to transport their rice to Bui, if not Navrongo, where they credited it to intermediaries. The intermediaries passed it on to wholesalers, against commission, but again on credit. Wholesalers would give rice to retailers on credit and later collect repayments after everything was sold. This is how wholesalers reduced their risks encountered in price fluctuations.<sup>184</sup> However, it took months before payments reached farmers, whereas payment is now higher and instant.<sup>185</sup> The high demand for locally produced Jasmine rice has helped farmers to have a greater share of profit and better terms of exchange. Farmers thus profit from recent policy trends, especially during the dry season, when food and income security become critical.

Intermediaries and retailers have remained in fully captive relations with wholesalers. These upstream and downstream partners in the chain continue to depend entirely on wholesalers' market access and especially on their finances to conduct business. Wholesalers' money channelled through bank accounts is used by intermediaries to buy and accumulate rice. Rice is then transported by wholesalers to southern Ghana, where it is given to retailers, on credit. Direct contact between farmers or intermediaries and retailers is not common. Thus, major barriers to the rice market exist. Wholesalers have continued to control most of the value chain, though they are

---

<sup>181</sup> Participant of farmer rice FGD, October 2013, Bui, Ghana.

<sup>182</sup> Interviews with two technical associates at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Bui, Ghana.

<sup>183</sup> Farmer rice FGDs, October 2013, Bui, Ghana.

<sup>184</sup> Interview with a local, big-time intermediary, March 2013, Navrongo, Ghana.

<sup>185</sup> Participant of farmer rice FGD, October 2013, Bui, Ghana.

not organised and still compete among each other. As a result, intermediaries try to capitalise on the monopoly they have in terms of contact to farmers.<sup>186</sup>

Intermediaries make use of the fact that there is no trust between farmers and wholesalers, which, first of all, allows them to charge commission. Trade with intermediaries are not transparent in terms of quantities and qualities. Therefore, the positive impressions of trends gained by farmers must be treated with some caution. While one can assume that rice market/value chain trends are positive for farmers, estimates of the quantitative effects they attest are often vague, mainly because units of sale vary heavily. Traders often insist on measurement done by sense of proportion not weight, leaving much room to manoeuvre in terms of kilogram pricing, and therefore mistrust between the parties involved. Exercises performed during FGDs, whereby farmers were asked to estimate the weight of Jasmine paddy rice by filling sacks with equal loads as demanded by traders, revealed deviations in the weight of units of sale by about 10 to 20 percent. Furthermore a broad variety of units is used for measurement, mostly differently sized rice sacks or basins that are then also filled at varying levels. There is thus some standardisation in measurement, yet so opaque that even locals will not master it. It causes confusion and argumentation between the parties involved. Also, when measurement is based on volume and not weight, farmers are less interested in threshing their rice too well, as chaff increases volume. This decreases quality and raises economic concerns by traders. Especially in the wet season, merchants permanently make use of weak standards by increasing the size of units of sale at fixed prices, up to a point where farmers' profits can fall too low for meaningful production. Such conduct of business can easily make a difference of another 10 percent in weight and thereby farm gate price.<sup>187</sup> Farmers were well aware of these deviations, and complain of a lack of transparency in the rice sales, but are not in a position to argue for higher prices, because (they believe) it would otherwise be cheaper for traders to buy in southern parts of Ghana.<sup>188</sup>

Further room to alter prices arises from the fact that intermediaries subjectively measure moisture content, considered an indicator of quality. Farmers frequently state that intermediaries unwarrantedly use moisture content and other quality concerns to argue for lower prices. As a response, farmers team up to mix non-quality, over-dry or rotting rice with that of others able to fulfil requirements. Locals feel obliged to risk rice market access and incomes for solidarity.<sup>189</sup> Of further concern to farmers, is that local intermediaries take advantage of seasonal poverty in the

---

<sup>186</sup> Interview with a local, big-time intermediary, March 2013, Navrongo, Ghana; and two technical associates at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

<sup>187</sup> Household survey and FGDs, 2013, and interviews with two technical associates at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

<sup>188</sup> Participant of farmer rice FGD, October 2013, Biu, Ghana.

<sup>189</sup> Interview with a teacher from Biu, 04.05.2013, Biu, Ghana.

area, during dry season harvests, when value chain integration and thereby prices could be most favourable. Knowing of the hardship locals face at that time of year, intermediaries regularly offer to buy rice that is still standing on farmers' fields, meaning that intermediaries (and sometimes wholesalers) themselves will take over harvesting and especially threshing labour, but in turn attempt to buy at cut-throat prices, in order to increase their profits. Especially poor rice farmers, the majority of locals, are greatly tempted by quick money, as they suffer from a lack of income and food at the time prior to dry season harvests, have no means of storage, and need money for investment into the next season, though they could be sure to sell the rice at a later time for a better price. So, seasonal poverty is used by intermediaries to counter farmers' market advantages:

*'Those traders, I call predators. [...] A predator will try and kill you when you are unaware [...]. They don't have any consideration for the farmer [...]. Because the farmer may not have certainty as to when he is going to sell or who is going to buy from him, they feel that if there is money available right now, they are better off taking that little money, than selling tomorrow. [...] Sometimes the farmer has not even harvested to know the quantity but they just want to buy everything and the farmer – depending on his economic or financial status – might say ok.'*<sup>190</sup>

Farmers in northern Ghana supply markets during periods of low price, at the end of the wet season, when the chain becomes increasingly buyer-driven. Intermediaries may try to actively dominate their part of the chain, which decreases profitability for farmers far beyond the commission intermediary's charge. It is thus questionable to what extent farmers are still favourably incorporated into the chain, especially the poor, if their shares of profits in retailer prices are occasionally far lower than previously estimated when intermediaries try to lower farm gate prices to increase their own margins.<sup>191</sup> Yet, farmers are generally thrilled by the fact that markets have moved closer to them, since about 2008. They say that solely intermediaries from the village itself bought their rice in the past, whereas nowadays many intermediaries come from the district centre, Navrongo, to conduct business. A few wholesalers from southern Ghana have also started to source rice directly from farmers:

*'Before, we were left in the house of the local market women [mostly intermediaries], who would just treat us so badly. [...] But it was then, when the Twi-speaking people [speaking a language of southern Ghana] came for the Jasmine rice. It was this particular seed [...] that then attracted the*

---

<sup>190</sup> Interview with a technical associate at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

<sup>191</sup> Interview with a local, big-time intermediary, March 2013, Navrongo, Ghana, and two technical associates at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

*Ashanti traders [traders from southern Ghana], that normally aggregated only from the south. [...] So now, we are making money! [...] It [rice] should be cultivated everywhere!'*<sup>192</sup>

For farmers, the increased competition among buyers led traders to begin visiting them on their fields, and wholesalers to be referred to as *'friends'*. Relationships, though still based on pricing, are becoming deeper and most importantly, farmers emphasise that increases in farm gate prices outstrip those of the (unsubsidised) inputs needed for production. As a result, farmers emphasise great willingness to increase their investments in rice production, specifically in terms of producing sufficient quality, for example by threshing on costly tarpaulins to avoid contamination of rice with stones. Yet, such improvements are hard to come by, if finances are not enough even though food security may have improved. What aggravates the situation is that financially weak intermediaries cannot sponsor farmers in production, while wholesalers are not ready to do so through intermediaries, as they fear a loss of investment. Farmers now hope for explicit sponsoring, enabled through direct contact with southern-based wholesalers. Farmers have heard that this is in principle possible, and practiced south of the UER, such as in the Northern Region. However, they underline that intermediaries actively block direct contact between them and potential sponsors.<sup>193</sup> Sponsoring of farmers by traders, especially wholesalers, or any sort of contractual farming has, therefore, not yet taken place. Between farmers and wholesalers, no modular, relational or captive forms of governance exist. Relations in the value chain are purely market based, especially for traders who have little knowledge and understanding of the issues encountered in farmers' production.<sup>194</sup> Still, farmers are satisfied with contemporary trends and are willing to invest further in production because of the potential rewards:

*'Before the revolution in rice began [the market boom], or before the aggregators start coming in, we used to send our rice just to the local market [...]. Now we have some aggregators that come from Accra, but they are few. Then we have the other traders [mostly intermediaries] that now come all the way to our farms and transport for us. So, now we are all farming with the hope that these aggregators will soon also be coming [...]. With these in our mind, we use all our energy to farm very properly.'*<sup>195</sup>

Credit for inputs to farm rice is provided to farmers by roughly 15 percent of locals (2013, n=177). Contractualisation thus primarily occurs on a comparatively local, more vertical level,

---

<sup>192</sup> Participant of farmer rice FGD, October 2013, Biu, Ghana.

<sup>193</sup> Participant of farmer rice FGD, October 2013, Biu, Ghana.

<sup>194</sup> Interview with two technical associates at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

<sup>195</sup> Participant of farmer rice FGD, October 2013, Biu, Ghana.

informally and partly through social control/capital within the community.<sup>196</sup> There is potential for contractual farming, but as in other chains, a lack of direct contact, thereby mistrust, resulting default risk, legal uncertainty and ineffectiveness still withhold wholesalers from entering into more sophisticated forms of cooperation with farmers. Moreover, formal, written contracts are simply not a part of local norms and values, which is why farmers do not see the need to use them. In case of disputes local chiefs, who side with farmers, are referred to for resolution.<sup>197</sup> A more neutral entity will thus be needed to organise numerous smallholder farmers for trade with large-scale wholesalers or companies, and to assure compliance to previously made agreements. Functioning FBOs and farmer unions are needed to give farmers greater market access, power in price negotiations, and to be able to deal without intermediaries that block more favourable forms of value chain integration. The baseline for all such favourable forms of chain access is external support granted in the production and selling of rice, as strived for in public/government programmes and USAID interventions.

#### **6.3.4.2. Governance Dynamics in Public Programmes**

Major publicly funded government programmes, with relevance for rice cultivation in the study area, started out with a subsidy on fertiliser. This was later side-lined by an initially more comprehensive initiative, named Block Farming (BF) or the Youth in Agriculture Programme. Though BF intended to provide improved market access, in practical terms, it turned into a source of subsidised inputs like fertilisers and seed, at least for the majority producing rice grain at the Tono irrigation project. Initiatives thus mainly centre around providing the same subsidised, inorganic fertilisers, against cash in the prior and on credit in the latter. Both run through similar actors, public institutions like MOFA, in BF also ICOUR and NAFCO, plus private agro-input business. Government performance of each attempt as well as the interaction of both in terms governance will now be explored.

#### **The General Fertiliser Subsidy**

General fertiliser subsidies came about partly as a reaction to price developments in the market for N.P.K., the most widely used fertiliser in Ghana. As prices increased by about 30 percent between June 2007 and March 2008, the country's largest N.P.K. fertiliser importer, 'Yara Ghana Ltd.', suggested a subsidy scheme to the government. The proposal was swiftly taken up by the government in 2008, giving a 50 percent discount to beneficiaries (BANFUL 2009: 1-2, 6). Farmers were to receive the subsidy in the form of vouchers distributed by MOFA extension agents. The vouchers would allow farmers to buy discounted fertilisers, mostly N.P.K. and

---

<sup>196</sup> own observation and three seasons of own contract farming with 32 locals, 2012-2013, Biu, Ghana.

<sup>197</sup> Interview with two technical associates at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.



sulphate of ammonia, from private dealers. In the Upper East the fertilisers were solely provided by Yara through its major distributor 'Iddisal Company Ltd.' under the supervision of MOFA. After farmers had bought fertilisers, their dealers were supposed to hand the receipts back to the MOFA district directors, who registered and approved the sales, before passing the vouchers on to the regional and national administrative level, where they were checked again to assure the repayment of fertiliser vendors.<sup>198</sup>

Substantial problems were encountered with the subsidy. Enquiries by the SEND Foundation suggest<sup>199</sup> that not many farmers were even aware of this form of support. Information dissemination is often quite poor and hardly reaches the grass-roots level. The illiterate and uneducated, in particular, were practically cut off from receiving the subsidy as they simply did not know about it. They were dependent on others that were able to attain the subsidy. As reported by farmers in Biu and Mirigu, access to vouchers was even not granted to people aware of the scheme. Farmers participating in interviews and FGDs strongly emphasised that subsidised fertilisers arrived too late to be used meaningfully in wet season production (mostly in June, July, August), and that they were not able to access these anyhow, because they would not be able to 'pay', thus bribe, MOFA extension officers to acquire vouchers. As the head of the regional agricultural workers union stated:

*'The problem was simply corruption. If you knew an extension officer well or you would pay him a bribe, instead of giving you the official number of coupons [vouchers] he will give you much more [...]. I would say not even half of the people that were supposed to benefit from the subsidy also received it. Those that did not have money became greatly disadvantaged.'*<sup>200</sup>

Vague rumours of 'the rich stealing the poor man's help' constantly characterised many farmer FGDs, specifically in the context of rice. Most participants stated that it was hard for them to acquire the subsidy. Farmers frequently said that even if they were able to acquire vouchers, most of times, stocks of subsidised fertilisers had already been given out to the 'rich'.<sup>201</sup> As their story went, elites in Navrongo, where the fertilisers initially arrive, divert such vast loads of these at night time that the whole region as much as interviewees themselves suffered from a lack throughout months.<sup>202</sup> Further inquiries made on the matter reveal that the government was aware

---

<sup>198</sup> Interview with the KNE MOFA director, 05.02.2013, Paga, Ghana and MOFA data.

<sup>199</sup> Interview with the director of the regional SEND Foundation, March 2010, Bolgatanga, Ghana.

<sup>200</sup> Interview with the regional GAWU director, 19.02.2010, Bolgatanga, Ghana.

<sup>201</sup> FGD and interviews with farmers, 2010 and 2012, Biu, Ghana.

<sup>202</sup> Participant of farmer rice FGD, October 2013, Biu, Ghana.

of this, as ministry-internal email correspondence states.<sup>203</sup> According to this, fertiliser was not distributed freely and publicly through the proclaimed voucher system, but most often disseminated at night, upon arrival. Therefore fertiliser shortages occurred with the onset of fertiliser subsidies. As scientific publications also state, the whole of northern Ghana suffered from a lack of fertiliser even though vast amounts of subsidised fertilisers had been made available (BANFUL 2009: 24). Lack of fertiliser was most severe in the Upper East Region, and wherever fertiliser was still available, it was sold at unsubsidised prices.

A closer look at what actually happened with the subsidies was taken during field research. In the course of detailed MOFA investigations, it was detected that smuggling of fertilisers to Burkina Faso and Togo was a major contributing factor in this scam.<sup>204</sup> Local MOFA management confirmed these accusations and spoke of thousands of bags given out each night, over a maximum of two to three days, not to farmers but rather to people that would then smuggle the goods to neighbouring Burkina Faso, where it could be sold at vast profits. The MOFA management added that this was large-scale fraud, made possible by close cooperation and organisation among fertiliser traders and extension officers. Local politicians such as District Chief Executives (DCEs) were also said to divert substantial amounts for political patronage, sale, and smuggling:

*'It was the [fertiliser] dealers that went to the [MOFA] extension officers and made them fill out forms with fictitious names and then shared the money after the fertiliser was sold in Burkina Faso. [...] The other people that got some [subsidised fertiliser] [...] were well linked to political actors [...] Because of the political power they have you must give them [subsidies]. It was the DCE that brought about 100 [...]. They would then smuggle it to Burkina, or they would go and sell it to people who were actually farmers. [...] That is why the system had to be stopped!'*<sup>205</sup>

Due to these problems with the subsidy and to allow for better transparency and thereby accessibility, government efforts ceased, were reformed and reintroduced by 2010.<sup>206</sup> A “way bill” system was introduced, with a passbook system added in 2012, to further improve control over subsidy allocation and especially to curb smuggling. With their voter or national health insurance card, farmers were to register freely with their community MOFA extension officers for a passbook that enabled them to buy fertiliser at the subsidised price, again through private dealers.

---

<sup>203</sup> Email from Cletus Achaab, UER MOFA director, to Kwesi Ahwoi, Minister for Food and Agriculture, with copies sent to Emmanuel Asante Krobea and Jack Vesper Suglo, MOFA Crop Services, and Maurice Tancu Abisa Seidu, MOFA chief director, 02.08.2012, Bolgatanga/Accra, Ghana.

<sup>204</sup> Internal report by Martin Aliibo, regional MOFA desk officer, 23.07.2012, Bolgatanga, Ghana.

<sup>205</sup> Interview with the KNE MOFA director, 05.02.2013, Paga, Ghana.

<sup>206</sup> Interview with the MOFA, 05.03.2010, Accra, Ghana.

A total of 56,000 passbooks were officially prepared for the whole Upper East Region (MOFA UER RADU 2013: 2-3). MOFA-internal data at the regional level, however, speaks of only 42,500, out of which only 30,992, thus 72 percent were allocated.<sup>207</sup> A maximum of 16,000 passbooks had thus vanished on their way through government departments.

The new passbooks did not bring an end to the encountered problems, especially the smuggling of fertiliser. In fact, the practice increased over 2010 to 2011 and peaked in 2012<sup>208</sup>, when fertiliser smuggling ‘boomed’ in the Upper East, leading to ‘mountains of [illegally exported] fertilisers’ in neighbouring countries like Burkina Faso. According to the regional minister, Mr. Woyongo, local farmers and their donkeys smuggled the fertiliser to the border: donkeys were ‘trained [...] to manoeuvre their way to the border’ without their owners (JALULAH 2012). A total of 315,720 bags or 15,786 tonnes of subsidised fertilizers, worth over 10 million GH¢, had been allocated for regional wet season production. But, the eventual allocation of subsidies had little in common with what had officially been planned. Districts in the eastern parts of the region, which were already greatly favoured in the planned allocation, eventually received substantially more, while others including those of the study areas got about 50 to 90 percent less than intended (see Table 15).

District	Planned (bags)	Received (bags)	Difference (%)
Bolga	45,060	23,223	- 48.4 %
Bongo	10,740	1,247	-88.3 %
Talensi Nabdam	6,540	270	-95.8 %
Garu Tempane	78,000	114,940	+47.3 %
Bawku Municipal	93,580	121,631	+29.9 %
Bawku West	23,360	32,102	+37.4 %
Kassena Nankana East	33,630	14,775	-56.0 %
Kassena Nankana West	13,100	1,860	-85.8 %
Builsa	11,720	2,490	-78.7 %
<b>TOTAL</b>	<b>315,730</b>	<b>312,538</b>	<b>-1.01 %</b>

Table 15: Planned and actual allocation of subsidised fertiliser bags (50 kg) among districts of the Upper East Region in 2012 (own Table, based on MOFA UER RADU 2013: 2-3).

The three districts that had already managed to heighten their quota (see Table 15, namely Garu Tempane, Bawku Municipal and Bawku West) then further exceeded their allocation by another 40,548 bags. In total, about 353,086 bags of fertilisers should thus have arrived in the Upper East, however, region-wide billing at the end of the 2012 period could only account for 299,231 bags of fertilisers given out on farmers’ passbooks. Thus, almost 16 percent of all government subsidies on fertilisers are unaccounted for. Just like passbooks they were ‘lost’ along the chain.<sup>209</sup> However, unlike their minister, MOFA employees in charge of subsidy allocation in the KNW attribute this massive intra-regional deviation and the encountered losses to criminal

<sup>207</sup> Data obtained from the UER MOFA, February 2013, Bolgatanga, Ghana.

<sup>208</sup> Internal report by Martin Aliibo, regional MOFA desk officer, 13.08.2012, Bolgatanga, Ghana.

<sup>209</sup> As derived from data obtained from the UER MOFA, February 2013, Bolgatanga, Ghana.

behaviour, smuggling, even though the initial displacement of fertilisers was officially branded a mistake by Yara, the main company supplying the Upper East:

*The fertiliser was collected from YARA, in Tamale. [...] The subsidised fertiliser can be sold very profitably in Burkina Faso, so it was then taken there. So that meant that we did not have enough fertiliser here at our place. [...] The sulphate of ammonia was gone completely [about a third of total, as planned]. [...] I pray hard that they will get those people [arrest them].*<sup>210</sup>

A meeting of the Municipal Assembly, held on 17<sup>th</sup> July, 2012, confirmed that the practice of smuggling continued to be a reality in all districts of the region, most notably in the Bawku Municipality, but also in the study areas where the above quote came from.<sup>211</sup> Email correspondence at the national, administrative level confirms that the well trained donkeys government officials were referring to when accusing farmers of smuggling were actually fertiliser dealers, in cooperation MOFA extension officers and security agencies from Burkina Faso and Togo. Extension officers and fertiliser dealers were using farmers' passbooks to either fake or to exaggerate quantities of fertilisers purchased by farmers, after giving these farmers a few bags freely. They then smuggled fertilisers to neighbouring countries where they could be sold at a vast profit. Those primarily in charge of stopping this, police and customs forces, were not able to do much about it. Smugglers generally travelled with armed guards and so Ghanaian authorities were afraid to arrest them. When they did they received 'calls and threats' from 'very important people in Accra'.<sup>212</sup> MOFA-internal documentation gives no more details on these important people, because if corruption is uncovered at too high a government level, those revealing misuse may have to fear for their lives.<sup>213</sup> One can safely conclude that government executives at a regional and national level benefit from smuggling, while trying to blame farmers:

*'If you look at the whole fertiliser chain, you will see that people are in it, which are also part of government. [...]. There are also other people in the chain that are just very close to the corridors of power, but I am now mainly talking of the NDC and NPP party executives [...]. They [...] go into this business [of smuggling] [...] so that they can also finance their party activities, to stay in power [...]. You will have people who are engaged in very serious smuggling of fertiliser, but they*

---

<sup>210</sup> Interview with a KNE MOFA officer, October 2012, Navrongo, Ghana.

<sup>211</sup> Internal report by Martin Aliibo, regional MOFA desk officer, 13.08.2012, Bolgatanga, Ghana.

<sup>212</sup> Email from Cletus Achaab, UER MOFA director, to Kwesi Ahwoi, Minister for Food and Agriculture, with copies sent to Emmanuel Asante Krobea and Jack Vesper Suglo, MOFA Crop Services, and Maurice Tancu Abisa Seidu, MOFA chief director, 02.08.2012, Bolgatanga/Accra, Ghana.

<sup>213</sup> Telephone calls with Transparency Internation Ghana and interview with a local priest, July-March 2012/'13, Navrongo, Ghana.

*are linked to the minister or somebody somewhere in Accra [...]. People [...] have even been arrested, but they [...] are covered by those in power.*<sup>214</sup>

As well as the national and local level big-shots making vast profits from subsidy deviation, Ghanaian security agencies bent the law rather than enforce it. During a meeting of MOFA officials with the local police commander in the course of trying to curb smuggling, it turned out that the fertilisers of those that had been arrested for illegal trafficking had been sold afterwards by police and customs to the general public, respectively the highest bidder, without the use of pass books and without MOFA supervision. The forces were unwilling to reveal what happened to the money they had made.<sup>215</sup> Attempts by the municipal director of agriculture to gather information on the seizure and sale of fertiliser proved futile.<sup>216</sup>

The fertiliser subsidies left for farmers were thus limited by corruption and misuse on the side of government entities from the national to local level. This favoured better-situated farmers, those that could pay and/or bribe, over poorer ones. Furthermore, government figures show that what was left to distribute among farmers showed significant gender bias when it came to allocation. On a regional level, only 38 percent of recipients were female and within districts of the study areas it was only about 20 percent in the KNE and 25 percent in the KNW.<sup>217</sup> General fertiliser subsidies thus hardly reach those most in need of them. This makes space for male, elite farmers, local politicians or fertiliser dealers to credit inputs to the poor at exorbitant prices. Though farmers acknowledge that these sponsors are taking further advantage of their poor production and livelihood options, these arrangements are highly popular because the poor often have no other way of attaining external support. The benefits enabled through access to such sponsoring, in the form of fertilisers, can outweigh the interest charged.<sup>218</sup>

While it may still be lucrative for locals to partake in indirect sponsoring made possible by government subsidies, it is alarming that the local elite has taken over the land of the poor, through informal contract farming/outgrower arrangements to produce rice. Overall socio-economic inequality is thus larger than formal land allocation already suggests, and will keep on growing, because the produced rice is comparatively cheap to attain for its sponsors. It allows them to dump externally produced rice on local markets together with their own subsidised production, to thereby attract wholesalers via enlarged quantities at a lower cost.<sup>219</sup> In the long run, such horizontal forms of contractual farming do not necessarily put the poor at much of an

---

<sup>214</sup> Interview with a district MOFA director, February, 2013, Upper East Region, Ghana.

<sup>215</sup> Internal report by Martin Aliibo, regional MOFA desk officer, 13.08.2012, Bolgatanga, Ghana.

<sup>216</sup> Letter from Cletus Achaab, UER MOFA director, to the regional police commander, 16.08.2012, Bolgatanga, Ghana.

<sup>217</sup> Data obtained from the UER MOFA, February, 2013, Bolgatanga, Ghana.

<sup>218</sup> own observation and three seasons of own contract farming with 32 locals, 2012-2013, Biu, Ghana.

<sup>219</sup> Farmer rice FGDs, October 2013, Biu, Ghana.

advantage. Another way to attain subsidies by interest free credit and including buyers, which allows the possibility to repay in kind, has been established over recent years: Block Farming within the Youth in Agriculture Programme.

### **The Block Farming/Youth in Agriculture Program**

Aside from the general fertiliser subsidy, public endeavours in Block Farming within the Youth in Agriculture Programme aimed at ‘mobilizing the youth to take up farming and its other related activities as [commercial] life time vocation’ (MOFA 2013b). To do so locally, initial yield trials were performed with Jasmine rice in 2009, and the first subsidies on a broader scale came in 2010,<sup>220</sup> but it took until 2012 for the programme to provide more substantial support. Prior to the introduction of Block Farming (BF), ICOUR had occasionally been tasked with distributing so called ‘rice packages’, agro-inputs on credit for grain production with guaranteed sales, however, this task had gone into the hands of the MOFA. Yet ICOUR remained responsible for BF seed production on its premises. Efforts made in the context of BF were great, at least compared to previous programmes.<sup>221</sup>

In 2012, another 38,705 bags of subsidised fertiliser were made available by the government, most of which went to those areas that were also able to acquire the largest shares of the general subsidy, Bawku and the KNE and KNW. Not only were patterns of regional allocation similar, the issues faced in BF were also identical. BF drew from the same sources of fertilisers and suffered from smuggling and misallocation. Farmers and government documents state, BF was thereby equally characterised by a lack of access for farmers.<sup>222</sup> In informal interviews, extension officers in two visited districts actually admitted that they as well as the most other MOFA employees would frequently top-up their salaries and substitute a lack of money for their services by siphoning off government funds:

*It [the deviation of inputs] may come from extension officers, the one responsible for block farming, the director or even me! Just understand that if you want to do work genuinely here, you will have a problem. The whole of this year we did not get any money for fuel, to go out into the field. The whole year! Do they think I should be running my car with my own, scanty salary? No! [...] If somebody supposes I should do genuine work, how can I do that with the little money they give me? [...] So you can imagine what we will do with the fertiliser.*<sup>223</sup>

---

<sup>220</sup> Data obtained from the KNE and KNW MOFA, 2013, Upper East Region, Ghana.

<sup>221</sup> Interview with a UER MOFA officer in charge of block Farming, March, 2013, Bolgatanga, Ghana.

<sup>222</sup> Farmer FGDs, July to December, 2012, Biu, Ghana, and presentation on fertilizer subsidy programmes in the region by Cletus Achaab, UER MOFA director, 17.08.2012, Bolgatanga, Ghana.

<sup>223</sup> Interview with a MOFA extension officer responsible for block farming, 03.02.2013, Navrongo, Ghana.

It seems likely that smuggling, through exporters and dealers, is a problem at the district level. At this level subsidies were diminished, as shown by statistics for one of the districts visited, whereas this accusation remains based on interviews in the other. For both districts, however, MOFA records gathered during field research show that vast amounts of support was used directly by local elites, among them most notably the DCEs of the KNE and KNW districts, the NDC chairman, the coordinating director of the KNW, chiefs and their relatives, hospital owners, the president of the Tono irrigation farmers' union, pharmacists, lawyers, even a Pentecostal pastor, and a few large-scale farmers. Several custom house agents and fertiliser dealers, proven to have never engaged in agriculture, were also found among the beneficiaries.<sup>224</sup> Political patronage was again used to attain BF support, initially by NPP, later by NDC officials and partisans.<sup>225</sup> To put the extent of these activities into perspective: in one of the districts visited about one-fifth of all support went directly to what was locally referred to as *'big men and smugglers'*. Misuse also took place within the Regional Agriculture Development Unit (RADU) of MOFA itself, where government employees used 6 percent of all BF inputs! Almost one-quarter went solely to the village from which both the RADU director and his deputy came from, whereas other villages each received only 3 to 8 percent each. In total 40 to 50 percent of all subsidies available at the district level were primarily allocated based on nepotism instead of need, while about 25 percent are characterised as dubious, in the sense that they primarily support local elites and possibly smugglers. The remaining 6 percent kept by MOFA employees were it seems, illegal (see Figure 60).

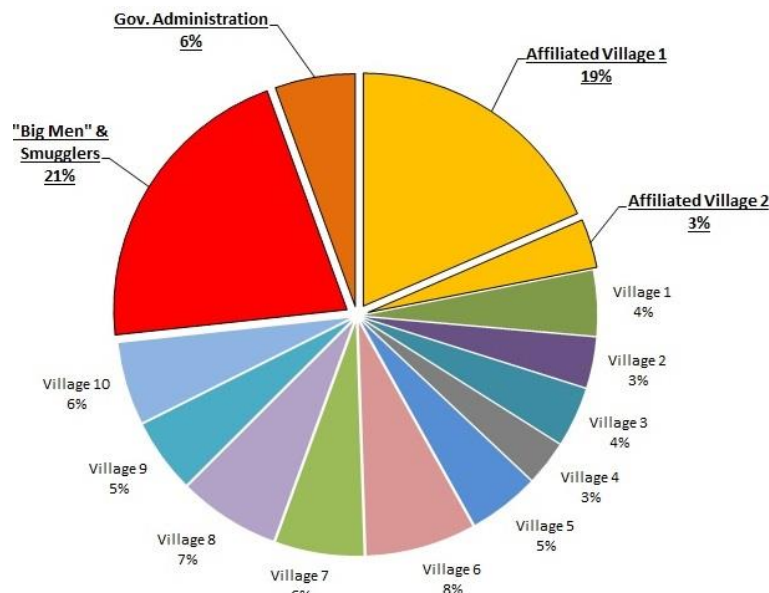


Figure 60: Allocation of all Block Farming subsidies in 2012 at anonymised district level (own figure, 2014, based on data obtained from the MOFA, 2013).

<sup>224</sup> Own investigation on beneficiaries, based on data obtained from the MOFA, 2012/2013.

<sup>225</sup> Interview with a UER MOFA officer in charge of block farming, March 2013, Bolgatanga, Ghana.

About 1,500 bags of fertilisers in one research district and about 4,500 in the other<sup>226</sup>, assuming 50 percent deviation, may have gone into the wrong hands. At a relatively high input level, eight bags of fertiliser per hectare as recommended by ICOUR, those misused subsidies could have translated into fertiliser for a maximum of 562 ha of rice cultivation. That is equal to one-quarter of the whole irrigation project area or a little less than half of its seasonal production. Respectively, that equals more than a thousand farmers in Biu, almost a third of all inhabitants, when assuming they each use only an acre (estimations based on ICOUR 2013: 3).

Putting an end to such practices is difficult. MOFA officers expressed they were afraid to lose their jobs, if they were to speak out against the practices, and that it would not bring change anyhow.<sup>227</sup> A district director added that supervisors themselves would factually often not be in charge of their subordinates content with BF input distribution. Thus political power overrides formal hierarchies in the ministry:

*'You have to be careful in dealing with such staff. Where their voice can go, even you the director cannot go there [they are better connected to those in power]. For the sake of your own work, you don't want problems with them. So, when I ask for information [about who really participated in BF] and he doesn't give, I cannot force him. [...] I always ask for that information, but [...] he won't give it to me. The whole office is aware.'*<sup>228</sup>

The shares of subsidies in BF reaching communities on a fully legal basis are likely to be diverted to elites within these villages. This is a result of the fact that subsidies are given on credit. In turn, extension officers handling allocation are under pressure to attain sufficient return rates, currently said to be at only 40 to 50 percent. If return rates are not met, then communities will no longer receive support or be served last, aside from the problem that extension officers will be made responsible and face consequences from their superiors. Naturally therefore, officers will choose farmers with collateral, or FBOs whose members will already have made sure that they will not have to pay for others in case of default. Thereby access of the poor to BF is hardly given:

*'About 90 percent of those that are in Block Farming are already rich, because government is so focused on recoveries [...]. So if you don't have [...] a group that can pay back in any case and within a specific period, or you not are a very big farmer yourself, then you are out! If you are poor, you cannot even join any group. The other farmers will not allow the poor to partake, because they are afraid they will later have to pay for them. So, it is systematic! [...] We, the*

---

<sup>226</sup> Estimations based on data obtained from the MOFA, 2013, Upper East Region, Ghana.

<sup>227</sup> Interview with a UER MOFA officer in charge of block Farming, March 2013, Bolgatanga, Ghana.

<sup>228</sup> Interview with a district MOFA director, February, 2013, Upper East Region, Ghana.



*extension officers, must also focus on recovery. If you are not able to recover, they [our superiors] say that you are not performing well.*<sup>229</sup>

Recoveries and extra income are instantaneously assured when fertilisers used by MOFA employees themselves are sold locally or smuggled to Burkina Faso with the help of fertiliser dealers and those into export services. The latter even pay cash upfront for government subsidised fertilisers. On the other hand, MOFA employees above the rank of field extension officers state that they would occasionally embezzle returns, to thereby profit from subsidies, without having to face consequences. The system allows manipulation.

Further misallocation of government support results from the fact that MOFA turned a blind eye to the real members of the groups they supported. Locally formed FBOs, at a closer look, often turn out to consist only of the founder himself. These groups are even given names that give the impression they consist of several females! Farmers do so with the aim to access BF and general fertiliser subsidies, government efforts that are now ought to be *'gender-sensitive'*.<sup>230</sup> When government records thus speak of shares of female beneficiaries reached by their programmes, reality is likely to differ greatly. Moreover, government figures for the 2012 season are alarming, since only about 15 percent of all those under BF in the KNW were female, respectively 23 percent in the KNE, even though in the latter BF is organised under a female extension officer. Even more alarming is the fact that BF is supposed to support the youth, while in KNE and KNW the average farmer registered for the programme is said to be over 45 years old.<sup>231</sup> It seems to be primarily those already heading households, older males, which are the primary beneficiaries of BF government help at the village level.

BF placed an initial emphasis on improving sales of rice, to be enabled through government agencies. Since 2010 the National Food Buffer Stock Company (NAFCO) has supposedly bought paddy (un-milled rice) in the area. When supplies outstripped demand, the government company was 'to provide a market window' through independent purchasers to supply the government school feeding programme, Prison Service and NADMO (GAGE et al. 2012: 22). NAFCO cooperated with MOFA BF, by enabling farmers to pay their credit back in kind. However, business conducted by farmers was supposedly so poor that it became a major factor for bad return rates. Farmers' payments in kind often consisted of straw, stones and chaff, but not rice, according to MOFA employees. Interestingly, MOFA FGD participants also attested that payback moral was generally higher among poorer farmers, because they cherish support more than those

---

<sup>229</sup> Participant of MOFA FGD, July to March 2012/'13, Paga/Navrongo, Ghana.

<sup>230</sup> Own investigation on FBO compositions and interviews with the ICOUR project manager and MOFA extension officers, 2012/'13, Upper East Region, Ghana.

<sup>231</sup> Interview with KNE and KNW extension officers, October 2012, and data obtained from the MOFA.

already well-situated. Bad returns mainly come from overfed elites aside from illegal practices within the MOFA.<sup>232</sup>

NAFCO bought rice grain in just one season in 2011, and supposedly did not even source large quantities. NAFCO had severe problems in handling its own business activities. A good illustration of this is the fact that more than 350 tonnes of already purchased rice were left to rot, as it was kept standing in the regional MOFA headquarters for over a year because the government company never managed to pick it up. Prices paid for grain were far below market value, too low to make it an attractive alternative for locals and, worse of all, it took *'far too long'* to pay farmers for their produce, which is why many farmers felt betrayed by NAFCO.<sup>233</sup>

The agency also gathered minor quantities of rice seed, outsourcing the organisational work to ICOUR and sales to a private company called M-Trade, itself headed by an executive of NAFCO.<sup>234</sup> Payment by M-Trade was again delayed and so rice harvests were locked up in ICOUR's silos for months. Inadequate weighing, inaccurate record keeping and fraudulent conversion of payments were reported (GHANAWEB.COM 2011). Due to the numerous problems through payment in kind via NAFCO, MOFA reduced credits given, concentrated on fertilisers and seed, and changed to repayment in cash.<sup>235</sup> The government's attempts to assure better production of rice and market access through such a public form of contractual farming had been of little success. Lack of marketing was often a problem for locals, circumvented only recently as markets have started to show greater interest local produce.<sup>236</sup>

Dynamics in marketing were decisively different for the upper end of local rice production, where farmers produce seed instead of grain within the BF programme. Farmers in BF under ICOUR actually received double the amount of fertiliser as officially granted to those doing grain under MOFA. Equally important is that sales at fixed prices, far above those of grain, were guaranteed. Though NAFCO and its private dummy firm (M-Trade) were largely unsuccessful in becoming reliable buyers, the seed was used by less wealthy farmers growing rice as grain. Seed is produced only on irrigated uplands, which is in the hands of very few, but large-scale farmers, an elite. Their shift to more rice production on these lands led to higher water consumption of the run-down Tono irrigation system, causing droughts in lowland areas of the poor if those lowlands

---

<sup>232</sup> FGD with MOFA extension officers, February 2012, Navrongo/Paga, Ghana.

<sup>233</sup> Interview with a UER MOFA officer in charge of block Farming, March 2013, Bolgatanga, Ghana.

<sup>234</sup> Interview with the UER MOFA officer in charge of block Farming, March 2013, Bolgatanga, Ghana, and with the ICOUR Tono project manager, 23.05.2013, Navrongo, Ghana.

<sup>235</sup> Interview with a MOFA extension officer responsible for block farming, 03.02.2013, Navrongo, Ghana.

<sup>236</sup> Farmer rice FGDs, October, 2013, Biu, Ghana, Interview with the director of the regional SEND Foundation, March 2010, Bolgatanga, Ghana, and the regional GAWU director, 19.02.2010, Bolgatanga, Ghana.

are not flooded. These elites are further fostered because they face the best possible conditions in rice production:

*'ICOUR buys just the seed at a better price and so it makes those [...] with ICOUR become more successful, compared to those that farm with MOFA [grain producers]. The agricultural people [MOFA] [...] don't negotiate prices and they can't buy [...]. We only hear of big aggregators [from USAID] coming to buy, but [...] they come into the hands of only a few people. [...] You only hear that people are scaling [selling via ICOUR], but then, how many people can scale their rice like that? [...] If you are not fortunate to have your farm within those [up-] lands [where seed is done] you are not covered [...]'*<sup>237</sup>

Aside from the fact that ICOUR initiatives in BF are subject to elite capture and little is done to prevent this, there were never any complaints raised by farmers about ICOUR staff or their conduct of business.<sup>238</sup> In combination with the significantly better standing among, and power possessed over local farmers, return rates and thereby the issue of subsidy misuse is said to be much better in ICOUR than in MOFA BF endeavours. Contractual seed farming with ICOUR is arranged in such a way that taskforces constantly monitor and question farmers, aside from the fact that produce is taken to silos right after harvests, which greatly helps in recovery.<sup>239</sup> More successful contractual farming enabling improved rice cultivation and better conditions for market access, including sponsoring of inputs, is possible in principle. Yet at present only elite farmers benefit, due to the MOFA's corrupt and badly equipped system.

#### **6.3.4.3. Governance Dynamics in the USAID ADVANCE Programme**

As a result of the global food crisis in 2007-2008 and with the aim to further support the Feed the Future Initiative, the United States Agency for International Development (USAID) endeavoured to assist in the development of Ghanaian agriculture. Poverty and chronic food shortages were to be addressed through its Agricultural Development and Value Chain Enhancement Project (ADVANCE) (ACDI/VOCA 2015), with the aim of supporting rice value chains in northern Ghana. ADVANCE has, since 2011, moved its resources and most offices to the Northern Region (Tamale), the Upper East Region and West Region. Since then, the programme has implemented 'an aggressive first-year technical program' in rice value chains, through which it tried to increase access to certified seed, linkages between producers and markets, input suppliers and financial institutions, 'to improve productivity and raise incomes of producers, especially smallholder farmers'. To do so, ADVANCE relied on nucleus farmers to

---

<sup>237</sup> Participant of FGD, 11.12.2012, Biu, Ghana.

<sup>238</sup> Farmer rice FGDs, October 2013, Biu, Ghana.

<sup>239</sup> Interview with the ICOUR Tono project manager, 23.05.2013, Navrongo, Ghana.

serve as channels to larger buyers and processors, to supply agricultural inputs and credit and to organise smallholder outgrowers (68 percent of farmers).

ADVANCE used smallholders affiliated to already existing FBOs (32 percent), to thereby guarantee ‘a long-term sustainable approach [...] ensuring that the improved practices remain in the market system after the end of the project’ (USAID GHANA 2012: 1). Via these channels, farmers were supported with Jasmine seed, fertilisers, agro-chemicals and training, to increase yield and volumes. Of further, major significance in the ADVANCE programme were ‘buyer-missions’, which meant that southern wholesalers and companies (a.k.a. ‘Aggregators’) were brought into contact with northern farmers, especially farmer representatives of the local Tono Irrigation Cooperative Farmers’ Union (TICFU), to improve contracting mechanisms in supply chains. The primary outcome of these missions was the sale of rice to several wholesalers, mediated by ADVANCE staff.

Some cash credits were sponsored by these wholesalers, covering the cost of land preparation and seed, in exchange for the right of first (and possibly further) sales from farmers. To do so locally, 330 farmers from across the irrigation scheme were organised under just five nucleus farmers, one of them being the chief of Kodima/the union’s secretary in Biu. Premium Foods Limited (PFL), a southern-based company, was introduced to union executives and ICOUR, to see how far equipment for land preparation could be supplied in future contract farming arrangements for rice. So far, an MOU was signed indicating the future delivery of new tractors, later to be managed by the union itself (Ibid.: 17-22). USAID furthermore offered discounted machinery, tillers for land preparation, donkey carts and tarpaulins, and installed warehouses in the area, one of them in Biu, Kodima. In these warehouses rice is temporarily stored, weight and tested according to moisture content before sale.<sup>240</sup>

The ADVANCE programme (in cooperation with ICOUR) was highly regarded among local farmers, mostly because of the assured input credits, negotiated sometimes higher prices for organised sales, scaling and further services.<sup>241</sup> Those farmers partaking in the USAID rice chain, which is currently still a forerunner of a multipartite model for contractual farming, thereby pay less for production and receive higher, more assured and transparent farm gate prices than normal. Farmers were happy to have their credited inputs directly delivered to the village and have reported no fraudulent behaviour on the side of USAID and ICOUR. On the contrary, both were mostly characterised as greatly beneficial to those working with them, fair and of high moral

---

<sup>240</sup> Interview with two technical associates at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

<sup>241</sup> Farmer FGDs, July to December 2012, Biu, Ghana.

standards.<sup>242</sup> There was, however, also quite some perceived and factual distance between farmers and the involved institutions, especially USAID, which came about as a result of huge socio-economic differences, making these unapproachable for most of Biu's villagers.<sup>243</sup>

At the village level local authorities, namely the chief of Kodima/the TICFU secretary and his chairman, were to mediate within this steep hierarchy. The chief did so by acting as the nucleus farmer for all others included in the programme in Biu, his outgrowers, organised under the same FBOs as used in MOFA programmes. He controlled the quantities and qualities of sales via the USAID warehouse with its scales and moisture meters, as these stood in his section of the village. This was of quite some importance, as it was the first time that at least some more objective measure and thereby higher transparency was given, in terms of quality and quantity in the sale of a crop. Moreover, within his role as the union secretary, he negotiated prices and quantities with traders and, more importantly in the local context, organised sourcing from the village. The chief's chairman Paul was content with the ground implementation of these sales.<sup>244</sup>

The chairman Paul is a long-time companion and protégé of the Kodima chief who had practically proven his allegiance in the violent conflicts that broke out over paramount chieftaincy in Biu. In the 1990s his superior, the Kodima chief, contested against the chief of Seenza, in turned backed by his own brother, the landlord of the whole of Biu (LAUBE 2007: 137-139). This background of violent conflict in the community, though supposedly unknown to USAID, had quite some significance in the implementation of their programme, as it limited potential outcomes. The complaints laid out by farmers during FGDs, pointed out that the chief withheld large shares of locals from participation in the programme. To USAID, the Kodima chief was understood as being the sole chief of Biu, as he would introduce himself this way, despite the fact that he was only one out of many in the community.<sup>245</sup> He thereby became the only one at the village level to have full power over project implementation. As a result, only people from his section – one of three – benefited directly from ADVANCE initiated support and sales.

The chief of Kodima sourced ADVANCE funds to initiate development in his part of the village to thereby convince larger parts of the population that he was the best possible paramount chief for development of the community. Consequently, people that lived in other sections had worse chances to improve their livelihood because they could not get subsidies, received worse prices, and could not be as sure to sell all they produced. USAID thus invested the chief with vast executive powers in village development through rice markets, by allowing him to manage access

---

<sup>242</sup> Farmer FGDs, July to December 2012, Biu, Ghana.

<sup>243</sup> Interview with a teacher from Biu, 24.04. 2010, Biu, Ghana.

<sup>244</sup> Farmer FGDs, July to December 2012, Biu, Ghana

<sup>245</sup> Interview with two technical associates at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

to the provided subsidies and services, on top of the judicial role he already played.<sup>246</sup> The irrigation project manager, in this regard, stated that it would not only be selected people from one part of the village that would get support via ADVANCE. But he added that it was indeed mostly farmers from Kodima that make up the membership of TIFCU as a result of the earlier conflict between chiefs.<sup>247</sup> Of all the support that went to Kodima – thus fertilisers, agro-chemicals and seed – large amounts were said to be diverted to the chief himself, his family members and companions, before they reached other shares of the section's population.<sup>248</sup> It was similar with the machinery and donkey carts provided.<sup>249</sup>

Gender balance was another problematic issue in the USAID sponsoring of inputs via the chief and his FBO's. USAID employees estimated the total share of females participating in their programme in Biu to be below 25 percent, as based on the Kodima chief or his representatives' records.<sup>250</sup> Yet many of the farm implements provided to those few partaking women didn't actually reach them. As male and female FGD participants in Biu explained, the primary reason for this was the fact that eventual control within households remained with men. Males even opposed interventions due to their female target groups.<sup>251</sup> So, though many external interventions such as that of USAID may formally have been able to prove that they work for the advancement of women, it was very much questionable to what degree females actually profited.

In Kodima, women were oftentimes used as dummies for other men to acquire help. Donkey carts or tilling machinery supposedly given out to '*only women*' could be found in front of others' houses, even a day after distribution. When USAID machinery remained within the woman's household, no members ever associated it as belonging to the women in whose name it had formally been received. Most household assets were understood to be the property of men, and women were included in the concept of assets.<sup>252</sup> Yet, internal USAID gender reports on the allocation of farm implements praise the positive gender impact of their intervention and especially that of the Kodima chief, claiming that though it was formerly taboo, women now owned cattle, donkeys and donkey carts<sup>253</sup>. In truth, for women to be allowed to partake in the ADVANCE programme, they were forced to provide compulsory labour and cash payment to the Kodima chief. Subsidies allowed the chief to exercise pressure, forcing the exploited women to

---

<sup>246</sup> Farmer FGDs, July to December 2012, Biu, Ghana.

<sup>247</sup> Interview with the ICOUR Tono project manager, 23.05.2013, Navrongo, Ghana.

<sup>248</sup> Farmer FGDs, July to December 2012, Biu, Ghana.

<sup>249</sup> Own calculations based on information attained from subsidy recipients, 2013, Biu, Ghana.

<sup>250</sup> Interview with two technical associates at ACDI/VOCA (USAID – ADVANCE programme), July to August and December 2012, Bolgatanga/Biu, Ghana.

<sup>251</sup> Male FGD participant, head of several FBOs, 11.12.2012, Biu, Ghana.

<sup>252</sup> Own investigation in Biu amongst beneficiary households, March 2013, Biu, Ghana.

<sup>253</sup> USAID-internal gender report on activities pursued in Biu, 31.03.2013, Bolgatanga, Ghana.

leave aside their produce and could also not pursue their primary addition to own small-scale agriculture, casual work on others' lands. Outcomes of rice chain integration were thereby limited through adverse inclusion at the village level:

*'It is really too much that he asks for! [...] If you are in his group [ADVANCE] you are subjected to his will. [...] So that is why some of us just ignore him and his group. [...] You work for him like a donkey before he even takes your name down. Then you still have to make sure you bribe him before he will include it and [...], you still have to make sure you attend his farm duties.'*<sup>254</sup>

Sales under ADVANCE, handled by the Kodima chief, faced similar issues.<sup>255</sup> Large-scale buyers of rice newly attracted in recent years, partly due to USAID involvement, were generally more accessible to large shares of the public, namely for about 48 percent of Biu's households. However, village elites profited most as they occasionally supplied half of what was ordered per aggregator.<sup>256</sup> They were able to do so because they were well connected to the local chief, and mostly large land owners who had attained government subsidies. They told others too late of sales or pretended that demand would be insufficient to allow everybody to partake, after they had gone rid of their own rice, or used officially listed women groups as dummies for sales.<sup>257</sup> Another common practice was that of allocating the most favourable sales to only a selected few. These generally received cash payments, while letting other ADVANCE members serve those aggregators with whom the union had previously agreed on credited sales, payment up to five months later. As indicated, such sales on credits can be a great burden on local farmers, because they require money to reinvest in the next season. This not only deprived others of short and long-term opportunity, it lowered the attractiveness of the whole initiative and threatened the establishment of deeper relations with aggregators.<sup>258</sup>

Further problems arose in the rice chain, when produce bought through ADVANCE went into the hands of the union's president himself previously equipped with money by aggregators. The president gathered rice primarily for himself, sourcing it from intermediaries all over the irrigation scheme – locally established rice traders – and from the chief of Kodima. As mentioned, the president then organised transport of rice to the south of Ghana, through his own transport company, but according to intermediaries partaking in the programme, he charged up to four times as much as was regularly paid. Negotiations between farmer representatives and aggregators were thereby disturbed and had to be repeated several times to reach an agreement. That

---

<sup>254</sup> Female FGD participant, 22.01.2013, Biu, Ghana.

<sup>255</sup> Farmer FGDs, July to December 2012, Biu, Ghana

<sup>256</sup> Records attained from the local chairman, March 2013, Biu, Ghana.

<sup>257</sup> Farmer FGDs, July to December 2012, Biu, Ghana

<sup>258</sup> Interview with a teacher from Biu, 04.05.2013, Biu, Ghana.

agreement, however, did not entail lower profits for the president. Instead, on top of an already charged '*union fee*' and further commission going to ADVANCE intermediaries, prices received by farmers were lowered further to offset the president's charges for transport. Moreover, the president had seemingly kept intermediary charges for himself.

Apart from the Kodima chief, most intermediaries did not receive payment for their services, which is why some of them started to leave the project, or were planning to do so. There was little reason for them to stay in ADVANCE anyhow. In sales conducted without ADVANCE, they receive instant and threefold commission and weight without scales, which increases profitability.<sup>259</sup> Misconduct of a few powerful individuals, the local elite, could thus threaten the entire setup of the USAID value chain programme and lowered outcomes for farmers. These practices were hard to stop. According to a knowledgeable teacher from Biu, who also participated in ADVANCE and is related to the chief of Kodima, the union's president himself was so influential that when a USAID employee complained about rent seeking behaviour, he was soon fired.<sup>260</sup>

Negotiations headed by the farmers' union representative resulted in prices below all local standards. Contract farming schemes under ADVANCE provided credit for seed and land preparation to farmers via aggregators in exchange for the right of first sale, but this boiled down to an immensely low farm gate price of 0.44 GHC/kg (calculations based on USAID GHANA 2012: 24-25). Only after credits had been fully repaid in kind at that price, could farmers sell more of their produce at regular, sometimes even higher prices. The profits made on the side of sponsors were higher than those made from any informal contract farming arrangements. Those providing credit charged an interest rate of over 100 percent per annum. At a regular interest rate of 23 percent p.a., as was charged by local banks in 2012 (ICOUR 2013: 10), this must be considered as usury. As mentioned in interviews conducted with a Premium Food Limited (PFL) representative, PFL's plans are principally similar.<sup>261</sup> In addition, an MOA signed between PFL, ICOUR, TICFU and ADVANCE indicates that TICFU is to take more responsibility for future growing seasons with regard to the machinery and sales provided.<sup>262</sup> Future developments in market arrangements are therefore not only unfavourable; they are again likely to suffer from elite capture and misuse. The crucial aspect in this is supervision:

---

<sup>259</sup> Interviews with a local ADVANCE rice intermediary and a teacher from Biu, Farmer FGDs, July to December 2012, Biu/Navrongo, Ghana.

<sup>260</sup> Interview with a teacher from Biu, 04.05.2013, Biu, Ghana.

<sup>261</sup> Interview with a local PFL representative, November 2012, Navrongo, Ghana.

<sup>262</sup> Memorandum of Understanding, 08.05.2012, Navrongo, Ghana.



*'It is all because the NGO [here USAID] leaves the money in the hands of those people, our leaders. [...] They don't follow the implementation and that is where leakages come in [...]. The leaders can just sit and say the people were happy [...], not knowing that the people are crying at the other side of the village. [...] Even if they check, [...] the leaders go to the poor, force them to produce information that is good [...]. They know the thoughts of the people, they know the problems of the people, so they can take even more control of them and tell them what to say.'*<sup>263</sup>

During field research, USAID was then confronted by the researcher with the accusations made by farmers, however, it denied them all aggressively and then declined to answer further questions<sup>264</sup>. News spread fast within Biu. The next day, the chief of Kodima was unwilling to answer any questions. Equally, those partaking in the ADVANCE programme in Kodima were mostly no longer allowed to partake in interviews and FGDs. Those still willing to answer questions did so in somewhat secret interviews. They expressed that they saw little alternative to the chief, but emphasised that they may be better off without him in the future. They were concerned that the subsidies he attained through programmes such as ADVANCE allow him and other large-scale farmers to take over growing amounts of land at the crowded irrigation system.<sup>265</sup> The chief, who is already a large-scale land-owner, managed to further enlarge his holdings and production through the inputs credits he received through ADVANCE. In 2012/2013 he alone was able to utilise more than 15 hectares of irrigated lands, almost five times as much as the average farmer (household survey, 2013, n=177, and data obtained from ICOUR, 2013).

Farmers were often afraid to speak out against the chief and the president, as they feared exclusion from the programme or revenge through the judicial powers of the chief. At the time of research, issues like the misallocation of support and compulsory labour were only beginning to be addressed because of the rivalry between the two major chiefs of Biu (Kodima and Seenza). To some degree this rivalry has led to a system of mutual checks and balances because either chief makes sure misconduct by the other is reported to their superiors in Kandiga and Navrongo. Impeachment proceedings on the Kodima chief followed, due to his gross misconduct, but had no success.<sup>266</sup> Along with the blind eye that USAID willingly turned to happenings at the grass-roots level, the ADVANCE programme in Biu remained firmly in the hands of the Kodima chief and his local elite.

---

<sup>263</sup> Interview with a teacher from Biu, 04.05.2013, Biu, Ghana.

<sup>264</sup> Attempted interview with USAID UER executives, April 2013, Bolgatanga, Ghana.

<sup>265</sup> Interview with a farmer from Biu, 07.05.2013, Biu, Ghana.

<sup>266</sup> Interview with the son of the Kandiga chief, April 2013, Kandiga, Ghana.

### **6.3.5. Conclusion**

The staple crop rice has a long history in the study area. Import substituting policies, until the era of SAPs and ERPs, contributed to a spread of rice as a more commercial produce (ADU 1969: 17-18; ANTWI-ASARE 2009; FAO 1970: iii, 1; LAUBE 2007: 89, 92; LAUBE 2009: 2; OTENG 1997: 38; SOIL RESEARCH INSTITUTE 1977: 1; SONGSORE 2011: 130; TONAH 2008: 113; YARO 2013: 6-11). Vice versa, following government withdrawal, trade liberalisation and massive imports, it has not been easy for local producers to maintain an economically favourable production and market access, though rice markets are generally characterised as having a small economic threshold and less monopolisation tendencies, in contrast to vegetables.

Conclusions drawn on the effects of policies on rice markets are vague and provide only a little indication as to whether protectionism is by any means useful in contemporary times. The rice market is heavily segmented at the national level (GAGE et al. 2012), as it is at the local scale too. This means that general conclusions drawn on the whole market (e.g. ACKAH & ARYEETAY 2012b: 8; ANTWI-ASARE 2009; SEND FOUNDATION 2008) leave room for doubt when they do not differentiate between the highly varying value chains attached to each market segment. This conceptual gap includes the oversight that some chains are subject to more international competition than others. That global economic competition and a lack of support are a threat and limitation to northern Ghanaian livelihoods cannot be attested in general, as is done so by other scholars (LAUBE et al. 2008; LAUBE et al. 2013, 2011; SCHRAVEN 2010; SONGSORE 2011; YARO 2013). In contrast, on nationwide and local scale rice production levels have at times developed positively despite continuous government withdrawal and trade liberalisation with growing imports.

Ghanaian consumers in the (wealthier) south of the country have started preferring the qualities, not necessarily prices of imported over domestic rice. The market with the highest economic potential which suits the consumers' taste and whose seed was introduced to northern Ghana only in recent times, that of Jasmine rice (GAGE et al. 2012), holds great potential for producer livelihoods while being most dependent on world market dynamics. Large foreign corporations and the countries backing them dominate the market and influence it according to their needs, possibly to the detriment of northern Ghanaians. Yet overall, global dynamics have favoured local producers over imports in recent years (AKRAMOV & MALEK 2012: 26). Price competition initiated by globalisation is not always a disadvantage for local farmers. Domestic policies in the form of a rise in tariffs, and input subsidies provided alongside donor support have been key support measures at the local level. Arguments can be made for government intervention to provide favourable market conditions by protective duties and by supporting farmers' production via import substitution.

Support was successful where it targeted input subsidies that helped locals to perform product and possibly chain/intersectoral upgrading (HUMPHREY & SCHMITZ 2002: 1020, 1025; NAVAS-ALEMÁN 2011: 1395; ROSSI 2013: 223), while also considering demand, specifically taste and thereby the quality concerns of consumers (ACKAH, ARYEETEY, BOTCHIE, et al. 2012: 228-229; GAGE et al. 2012: 15-16, 18). Only through specific support tailored to market demand have northern Ghanaian producers often attained a level of competitiveness to counter future imports (as was asked for by BREISINGER et al. 2011: 52) and to improve livelihoods (income and food security) within an ever more wholesale-driven (not cartel-like) market. Overall publicly initiated market dynamics, side-lined by input subsidies partly also through donors, thereby went along by an economic upgrading (DIETSCHE 2011: 31, 33; GIBBON & PONTE 2005: 87-88; SCHAMP 2008: 8), with a positive impact on farmer livelihoods, a pro-poor market boom with opportunities for value addition, capacity building and independent development (BRAUN & SCHULZ 2012: 209-210).

Input subsidies are the key to partake in recently favourable market dynamics. The government intervention which introduced Jasmine seed set the way for further improvements of farmer livelihoods, though coming with higher investments and threats from the natural environment, and occasionally hard to attain for smallholder farmer. Still, a change to Jasmine rice meant specialisation in a cash crop, and production of a higher yielding crop that can make farmers at least food secure, should markets fail. There is little reason to believe markets would fail. For example, local farmers are increasingly patronised by southern wholesalers instead of northern intermediaries, which allows farm gate prices to be increased and could lead to higher levels of contractualisation within chains. As rice is comparatively more common than other cash crops, at least in Biu, external intervention in the sector can have a comparatively larger pro-poor effect than interventions in other sectors. The concept of subsidising inputs also entails a more bottom up perspective, as engagement in rice is primarily aimed at removing production constraints, whilst prior interventions (such as in tomato) tried to create artificial, public markets. The latter was tried in recent rice initiatives and proved to be poorly managed and unsustainable.

As favourable as conditions are, a pressing issue that arises mostly in rice value chain enhancements is the internal side of local social vulnerability, i.e. societal coping mechanisms that influence input support accessibility to perform chain or inter-sectoral upgrading. That is basically so, because most external support goes to large-scale producers at irrigation schemes like in Biu, which are generally rare throughout in the region and highly exclusive amongst users. Misallocation among the remaining potential recipients deprives the poor amongst them of access to the rice value chain, and they remain subsistence farmers because they cannot acquire sufficient inputs, especially fertilisers. As became clear when observing production networks, actors normally not directly integrated in vertical chain relations again exercise vast power (as was

indicated by BRAUN & SCHULZ 2012: 210, 214-216; ROSSI 2013: 224) and in combination with relations and connectivity amongst entities (HENDERSON et al. 2002: 442), alter processes of value creation, enhancement and capture (COE 2009: 557-558; HENDERSON et al. 2002: 448) to the disadvantage of smallholders. Collective power is too weak to shift institutional rule in favourable directions, which goes for both public and donor support.

If the poor and vulnerable are able to access government subsidies for rice production by cash or on credit, they pay quite a price for doing so. This limits their scope of improvements, sometimes even renders their rice growing useless in terms of generating income. Most locals are actually marginalised and abused within a public system mainly helpful in enriching and empowering politicians in charge, government employees, private fertiliser dealers and local '*Big Men*', all of whom also benefit from subsidy smuggling. Region-wide fertiliser shortages (BANFUL 2009: 24) come about as a result of elite capture, which is a criminal misuse of government help. Furthermore, interventions focus on recoveries, which forces extension officers to concentrate on large-scale farmers with enough collateral. Fertiliser shortages resulting from illegal activities further stress the need for recoveries and thereby the need to systematically favour the upper strata of local society.

Block Farming is a system that partly exploits the poor, since the most lucrative form of production in the programme – that of seed – is done only by large-scale farmers on flood and drought free plots, who then supply poorer farmers growing grain in marginalised areas. The implementation of BF contrasts greatly with its conceptual background. It originally aimed at 'mobilizing the youth' (MOFA 2013b), but did quite the opposite and benefitted mostly elderly, elite males, thus showing gender and seniority bias. With the majority of locals and especially the poor dependent on the elites that dominate support systems, they hardly benefit from government initiatives. The poor instead draw on help indirectly, through other large-scale farmers, via illegal activities such as by ministries and security agencies or powerful individuals, possibly non-agriculturalists, having become fertiliser deals (see Figure 61).

Thus, the most decisive move to post-SAP policies, as embodied by a shift in policies towards import substitution in rice, could have really constituted a step towards meeting goals in poverty alleviation (see also UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT 2009: 103), specifically addressed the north of Ghana since it is a major rice growing area (as was asked for by GHANA STATISTICAL SERVICE 2013: 302) and could have further safeguarded locals from global competition by lowering their production costs, but does not reach the majority of locals in the area and greatly increases local prosperity gaps due to misappropriation by government itself using local, elite structures. However, public institutions

are characterised by inefficiency and mal-governance. Institutional advancements within the MOFA are unable to hold pace with economic, environmental and social realities.<sup>267</sup>

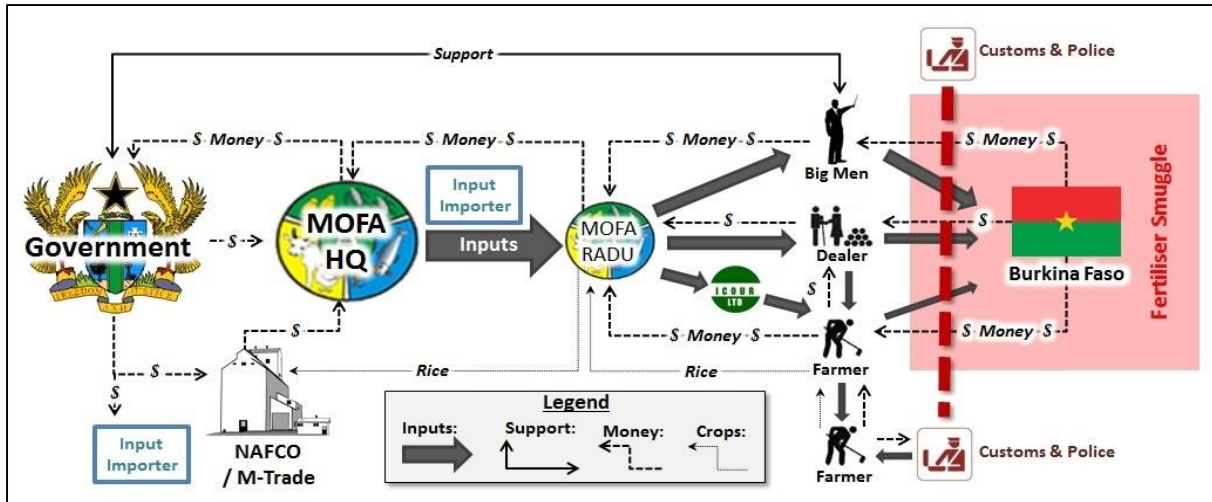


Figure 61: Flowchart of all traceable, legal and illegal government subsidy usages (own figure, 2014, own expert interviews, 2012/'13, MOFA-internal correspondence and data, 2012/'13, graphics partly based on internet sources and AMAKYE et al. 2008).

For local farmers hope arose from the USAID ADVANCE programme, considered a neutral entity content with giving inputs, training and machinery to local farmers. USAID is also heavily engaged in organising farmers for sales with southern wholesalers and has already had some successes in initiating sponsoring of farmers in formal, far more transparent contract farming arrangements, which could boost local production or at least allow for higher farm gate prices. On top of already favourable market conditions set by the government, economic and livelihood upgrading could have resulted from provision of better deals and an improved balance between rewards and risk (PONTE & EWERT 2009: 1637). In fact ADVANCE offered much better conditions than what was offered in public programmes, making the program highly desirable to locals (BOLWIG et al. 2008: 17).

Yet ADVANCE suffered from elite capture too. Even more so than in government activities, USAID's value chain intervention drew on farmer based organisations and unions, identified as precarious in terms of allowing broad-based development. Still, local authorities were put in positions where they could misuse their power in rice value chains at the producer level. Long-standing conflicts within the village (LAUBE 2007: 137-139) and local, post-feudalistic social structures were not sufficiently accounted for by USAID. The conflict still simmers today, though fought out by subsidy allocations instead of physical violence. As in the past (SONGSORE 2011: 88-90), the chief continues to commercialise his power through

<sup>267</sup> Informal interview with the head of cooperation, Embassy of the Federal Republic of Germany, September 2012, Accra, Ghana.

compulsory labour, now through donor interventions, which continues to foster disconnect to villagers, especially women in the village. Thus USAID's intervention was not only gender biased but exercised influence in assuring further suppression of women as well as the continued political disenfranchisement of the poor, especially the marginalised residing in two-thirds of the village where help did not reach.

USAID planned for horizontal, social integration of value chain enhancements, to guarantee 'a long-term sustainable approach' (USAID GHANA 2012: 1), and set avenues for future development in terms of MOUs and greater responsibility for heads of the local union (Ibid: 17-22); however, quite the opposite was achieved. It may have been sustainable in terms of the commercial powers invested in the local chief and the union's president – who both dominated governance of the ADVANCE programme in some respects – but otherwise it frustrated other participants, farmers as much as intermediaries. Thereby, USAID's primary goal, sustaining introduced practices after the end of the project, not only became less likely but was in many ways undesirable. ADVANCE-enabled support and sales primarily served the local elite.

One cannot speak of equal chances in access, but rather a severe bias based on wealth, power and gender. The structures used in aid allocation deprived the poor and vulnerable of higher food security and incomes, while further fostering general inequality. The contract farming arrangements made were mostly only lucrative for large-scale producers with low kilogram prices, specifically those elites who, through the efficiency of their production, were able to attract independent wholesalers by dumping. Other farmers only accepted the conditions because they were otherwise unable to access credit; there was no alternative. ADVANCE facilitated their further exploitation by local authorities. The positive, long-term effect of the US government's Agricultural Development and Value Chain Enhancements (ADVANCE) programme on vulnerability, poverty and food shortages through rice chains (ACDI/VOCA 2015) remains limited.

All public and donor driven interventions in rice value chains were found to suffer from elite capture, thus it can be concluded that they resemble past government/public sector experiences prior to SAPs (SONGSORE 2011: 130, 134, 178, 199). Basic constraints to improving livelihoods in northern Ghana have remained the same throughout. Development projects thereby made and still make intraregional disparities grow, since they provide high incomes mostly to the upper strata of the local population, while the vast majority of peasants remain at subsistence level. As in the past (WHITFIELD 2011b), mal-developments were made primarily possible by clientelism pursued by political actors, limiting potentials of economic change and poverty reduction, despite overall growing market chances. Such opportunism has been previously identified as a general pattern in local livelihood upkeep. Support for rice chains – be it from the USAID or Ghanaian government – is below potential and creates larger problems,

such as that of growing inequality in land allocation. To advance vulnerable farmers, it seems, these interventions themselves need further improvement such that they no longer serve as instantaneous conduits of ‘exploitation and control’ (YARO 2013: 12) at the local level, though not necessarily at the domestic or global level.

### **Avenues for upgrading**

Rice markets are already favourable and when assuming that these are further upheld by sticking to import duties, the only threat currently facing local producers in the open rice market is that the chain is likely to become more driven by wholesale firms. Farmers must prepare for the fact that wholesalers may misuse their growing power and could then act as rice brokers again, thus making local farmers provide their rice interest-free on credit for further processing and allocation amongst somewhat integrated retailers. Thus farmers need strong levels of cooperation, or higher levels of horizontal contractualisation (BOLWIG et al. 2008: 13), to counter and forestall these tendencies. Another threat for vulnerable, northern rice producers arises from a lack of access to external support, which could help them to lower production costs, raise output and thereby participate in markets. Avenues for sustainable or ‘livelihood upgrading’ – currently desirable economic, social and environmental change for the majority of the poor – can thus be found in the setup of interventions, in the way the allocation of support takes place at regional and local levels.

To enable better livelihood upgrading in the case of government engagement, trust in the MOFA must be rebuilt by overcoming mal-administration and crime within the ministry, to enable better compliance of farmers. At the local Tono irrigation scheme, ICOUR could be a genuine alternative in implementation. Though not free from elitist abuse, ICOUR suffers least from the most severe forms of corruption, has a better standing in local communities, and can exercise quite some power over farmers. It is thus regrettable that ICOUR, in the course of the introduction of BF, was partly disempowered by the MOFA. But, in any case, locals must be made aware of their rights and be practically enabled to assure they can make use of these, when dealing with public entities.

Further bodies backing a pro-poor approach can be found in the democratically elected representatives at local scale, assembly-men, who are invested with a significant amount of trust, though not power amongst locals. Generally, external brokers indirectly sharing economic interests in the rice chain are required to avoid opportunistic behaviour from all parties involved. Unless such an entity then provides excellent coordination amongst players, for which it will require substantial powers, internal management difficulties are again likely to occur, as typical for a multi-partite model of contractual farming with sponsoring by external entities such as government (EATON & SHEPHERD 2001: 150). The government is therefore asked to enforce

legislation, to allow for legal certainty in the market, sponsoring arrangements and most of all, to fight crime in MOFA, police and customs units while not using farmers as scapegoats. Yet, it is unlikely the authorities will be willing to do this, for those in control are themselves either engaged in breaking the law or feel unable to challenge those breaking it. Civil rights and anti-corruption organisations working together with media outlets such as radio stations, newspapers and TV should be supported to help reveal these cases to the broader public.

At a smaller scale, similar issues limit donor-imposed development initiatives, e.g. the USAID ADVANCE programme. The primary problem is that neither ADVANCE nor aggregators could take over the sourcing of produce or allocation of subsidies, as they did not know local farmers sufficiently well and thereby didn't have the means to organise them. Using local elites limited access and possible outcomes of the value chain on the side of farmers. If USAID really wanted to cut out intermediaries in the rice trade to increase farmers' incomes and improve levels of contractualisation, it should not have created new middle-men that then misuse the additional powers invested in them. Faults in USAID's endeavours thus come about as a result of how the project was implemented right from the start, and its later poor supervision. Yet, USAID's close interaction with and between parties, to setup marketing arrangements, could have allowed them to take a critical look at the setup of these organisations to enable them to identify institutional weaknesses, especially those of their major target group, farmers. However, USAID failed to do this, thereby failing to attempt to alter local institutions according to democratic needs, and to develop the most crucial part in the set-up of their structures. It is not enough to work with local unions, to thereby be able to claim to have farmers' voices heard in development interventions. Partners must be carefully and critically selected. The project failed to serve as platform for establishing genuine farmer representatives: democratically elected, non-elitist, giving locals equal livelihood opportunity, needed more than ever.

Sustainable livelihood development and (economic) upgrading of locals in rice chains thereby remains mostly a question of democratic, social change and good governance. The poorest of the poor need empowerment so that they themselves can take better advantage of advances in economy and trade and enable greater economic and social sustainability. Does this facilitate environmental sustainability? Newly introduced rice is more input-demanding, which is why locals need greater external support to profit from the crop and require initiatives to maintain the natural resource base, especially since lands are being taken over by large farmers who will further intensify usage. Investments in irrigation projects, aiming to help a greater share of locals to be able to venture into rice safely, facilitate the production of newer varieties that are less tolerant to environmental, especially climatic calamities. Environmental upgrading is thus of far smaller significance in rice as it is in other chains, and does not necessarily go along with economic advances.



Social progress is of greatest importance when it comes to rice value chains. Horizontal contractualisation (BOLWIG et al. 2008: 13), collective and institutional powers, social dialogue (ILO 2008: 1-2) and further improvements in farmers' rights and entitlements, thus social upgrading (ROSSI 2013: 224) is most essential. This points at civil rights and specifically peasants' rights advocacy groups, who must help farmers in their struggles. Such support, including publications on the matter, should abstain from generating too broad insights (as is the case in some studies of rice and tomato markets REFERENCES), and must critically examine the actions they then propose. They should primarily focus on entitlements and the access farmers have to basic assets and external interventions at the local level.

## ***7. Sustainable Livelihoods and Value Chains***

This study investigated Northern Ghanaian smallholder livelihoods facing (globalised) agricultural markets. It focussed on the value chains of tomato, chili and rice – and government and donor interventions in parts of them. It thereby provides an example of how sustainable development could be measured, understood and fostered for the most vulnerable and poor in an economy emerging after structural adjustments. This concluding chapter delivers a number of valuable insights, in reference to the research questions, with implications for conceptual, theoretical approaches and avenues to sustainable development.

### ***7.1. Theoretical insights***

Theoretically this study focused on (mainly gendered) smallholder livelihood systems and how these are exposed to a vulnerability context within a social and physical locality. At the local scale these elements alter the way people are embedded into market value chains. Dynamics, captured by value chain and livelihood analysis, were shown to determine (pro-poor) outcomes and at the same time allowed a look beyond the local scale, a studying of ‘local-global interactions’ (DE HAAN 2012: 351-352), with a focus on the local and regional dynamics. Further useful enrichments came from a Global Production Networks (GPN) perspective, able to account for non-economic constraints imposed by livelihood systems, or networks, within which economic transactions take place. This theoretical combination allowed outcomes of value chains and public or donor interventions – parts of which draw on local, social networks – and livelihood strategies, to be benchmarked by indicators based on normative, yet locally defined principles, those of the Sustainable Livelihood Framework.

With regards to the very basis of the livelihood analysis here performed, SEN’s early work (SEN 1985, 1981a, 1981b, 1981c) rightly emphasises entitlements generated by trade, people’s own production and labour, inheritance and transfers (Ibid.: 1981c: 1-2), aspects of practical agency entitlement as major determinants of local development, food in his context (see also BOHLE & GLADE 2008: 101; DE HAAN 2005: 5). Development is grounded in the political economy, as well as in society in general (DE WAAL 1987; WATTS 1983; WATTS & BOHLE 1993). To define ‘development’, elements of post-development and alternative development approaches, such as the bottom-up perspective used in livelihood analysis, were found to be useful to unmask concepts grounded in structurally defined and reproduced ideas, to deconstruct the ideological concept of (non-) modernity that dominated theoretical, practical and also local discourses (CHAMBERS 1995; DE HAAN 2012: 346; DFID 2001: Section 1.1; HAUCK 2004: 14; KAAG et al. 2004: 52; MÜLLER-MAHN & VERNE 2010: 5, 7; ZIAI 2011). Thereby, values and norms of development, very much shaped by structural adjustment initiatives and thus market-orientated and neo-liberal ideologies that argue for government withdrawal (ARCE 2003:

199, 201-203), could be successfully questioned to limit an ideological bias. The danger of drawing on and overcome developmental discourses (MÜLLER-MAHN & VERNE 2010: 9-10) was limited by asking for local definitions and needs.

Livelihood analysis was used to generate an up-to-date and tailor-made approach to local development. The livelihood approach, as a representative of 'middle-range theories', was proven to be suitable, in contrast to structural analysis (MÜLLER-MAHN & VERNE 2010: 9) as often pursued by other studies concerned with Northern Ghanaian development (e.g. LAUBE et al. 2008; LAUBE et al. 2013, 2011). The approach thereby managed to focus on practical aspects of vulnerability, thus, structural constraints, but those with relevance to agency-centred, local development (RAUCH 2008: 210-211). Livelihood analysis continues to be popular and broadly acknowledged due to its overall comprehensiveness and specifically its incorporation of social inequality, socio-spatial disparity and power-allocation within society. It remains a valuable tool for researchers (BÜRKNER 2010: 36; JAKIMOV 2013: 494; KAISER & ROTHFUß 2013: 2; RAUCH 2006: 52).

Yet on its own livelihood analysis is insufficient. The holistic and synthetic concept of livelihoods (TANG et al. 2013: 17-18) not only allowed but also demanded an incorporation of further theoretical approaches. Since (global) agricultural markets largely determine agrarian potentials (PENDER et al. 1999: 36-38) at the local scale, market-based value chain approaches are the major tool for enhancing local agricultural development in the onset of growing government and donor involvement (GOVERNMENT OF GHANA 2010; OUMA et al. 2012: 227; YARO 2013: 12). Since livelihood analysis lacks the profound investigation of such market based initiatives (respectively the analysis of markets and value chain as indicated by KANJI et al. 2005: 8; SCOONES 2009: 187), additional theoretical perspectives were needed. The perspectives of Global Commodity Chain (GCC) and Global Value Chain (GVC), and of their successor, Global Production Networks (GPN), were thus incorporated.

GCC and GVC perspectives provided general insights on the basic setup of chains, their coordination, governance and allocation of value amongst participants, including problems that arise from the composition of required investment and gained value for farmers, intermediaries, wholesalers and retailers. Basic structures identified were often sufficient to recognise general constraints and potentials imposed upon livelihoods. However, value capture, general trends in the chain, governance dynamics and livelihood impacts, in the case of rice and tomato value chains, could not have been understood without a production network (GPN) perspective, which entails a further look at actors not immediately integrated into commodity/value chains. The GPN concept heuristically applied to the local level was relevant though complex to apply. The shortcomings of many studies (and development approaches) with regards to the notion of social 'embeddedness' of value generation (see MARKUSEN 1999; OINAS 1997; PIKE et al. 2000), could be

conceptually improved by a GPN perspective. This would also allow the exploration of structural preconditions and interfering power relations that shape economic interactions (HENDERSON et al. 2002: 442-443). Similar findings were also derived through the livelihood perspective.

In this sense, a GPN view is essential if a pro-poor market analysis does not encompass a look at livelihood systems. However, GPN may still be inferior to livelihood analysis. Livelihood analysis provides a more bottom-up perspective than a GPN view, which ‘addresses social, political and cultural contexts ‘on the ground’ within which production processes’ of the ‘most powerless’ are embedded in (DARBY 2013: 45), but more from an economic viewpoint, not a human-centred one as in livelihood analysis, and with little further conceptual outlines on how to do so. The GPN approach, to some extent, neglects livelihood realities, gender relations, (labour) market participation decisions, class mobility, exclusion processes and ‘the cultural context of social reproduction’. Therefore ‘the GPN framework is less effective at addressing: environmental/landscape change, households/livelihoods, and socio-spatial uneven development’ (KELLY 2013: 83). Producer agency must be increasingly understood as grounded in local social relations and livelihood strategies that constitute a reproductive sphere for local development. This, however, is often hidden in GPN analysis (COE & HESS 2013: 6-7). So, future analysis must also ‘incorporate aspects of rural livelihood approaches’ (CHALLIES 2008: 375), to be able to play out its potential for developmental politics and ‘practice in the empirical realm’ (NEILSON et al. 2014: 7). Whether or not market processes improve rural livelihoods is site specific, and depends on the embeddedness and exchanges between actors within general social structures at local level (NEILSON & PRITCHARD 2009: 2) in combination with rules and standards set by the private sector that ‘dictate’ farmers’ livelihoods, their interaction with the environment and production systems and trade networks (NEILSON & PRITCHARD 2009: 5-6).

The Global Production Networks (GPN) perspective allows an incorporation of livelihood analysis, partly by understanding livelihood systems as the human- and actor-centred network within which creation of value takes place. Very much like a holistic livelihood analysis, GPN perspectives operate ‘at the interface of structure and agency’, help to overcome dichotomies of ‘flows and territories, as well as culture and economy’, and are thus a truly ‘integrative perspective’ (COE et al. 2008: 289). The approaches are complex, especially when combined. This was overcome by drawing initially on the livelihood perspective, which then helped to reduce complexity in the subsequent GCC/GVC and GPN analysis. By starting with the livelihood analysis, locals were themselves allowed to define the relevant elements and knots of networks, perform their own analysis, and suggest priorities for further research. Livelihood analysis was thereby also useful to serve as a reference framework, a mostly locally defined ethical/normative benchmark by which to measure dynamics with a special focus on ‘losers’ and the ‘mid-field’ of society (as asked for by RAUCH 2006: 52).

The theoretical synthesis of this study contributes to the theoretical discourse about the role of GPN concepts in answering questions that arise in the context of economic globalisation (as asked for by BRAUN & SCHULZ 2012: 216) and development. General pro-poor market and livelihood analysis cannot only complement each other (BATTERBURY et al. 2011: 4), but rather the concepts need merging, especially those of GPN and livelihood analysis at the local level, if they are to have potential. This can be done by using the Sustainable Livelihood Framework as the basis for analysis, to see how far the elements included prove to be of relevance for further GPN analysis, which can then be concretised further via GVCs and GCCs. Dynamics encountered in these more market-based approaches, can in turn be referred back to livelihood characterisations and especially to locally desirable outcomes. Such proceedings could lead to checks and balances between economic necessities and very concrete aspects of human-centred development, including tangible and immaterial valorisations, and thereby be an efficient tool to increase the efficiency of external aid (CHAMBERS 1995; DE HAAN 2012: 346; DFID 2001: Section 1.1).

Future theorisations can draw on the conceptualisations of YEUNG and COE who try to refocus GPN perspectives on ‘structural competitive dynamics and actor-specific strategies’ (2015: 32). If they were to add livelihood approaches to their concept, meaning that their notion of ‘actor-specific strategies’ should be viewed as a strive for desirable livelihood outcomes, they could make use of a well-established and holistic framework that also get to grips with what they call the ‘ultimate dependent variable’, uneven development (Ibid.: 33). Currently prevailing ideas about economic, environmental and social upgrading need not be viewed separately if a livelihood perspective is taken. The different avenues of upgrading complement each other well. That economic upgrading will bring social advances was shown to be less tight than often assumed (MILBERG & WINKLER 2010: 3), indeed it was even occasionally contradicted. Environmental upgrading accompanies economic advances in the case of tomato markets, and social upgrading in the context of rice. Inherited land-uses were shown to sustain the environment. A holistic and integrative perspective in the context of understanding the pro-poor effects of markets (COE et al. 2008: 289) and interventions within them, need not conceptually separate avenues for upgrading.

The analysis suggests that pro-poor development – essential in the search for upgrading avenues – can only be sustainable at ‘local, regional, national, and global levels’ if it meets ‘the requirements of all three dimensions of sustainability’, namely social, economic and ecological aspects (HURNI & WIESMANN 2011: 17). An equal treatment of these dimensions in analysis, by employing the livelihood framework, can help to ‘break away from normative views of upgrading as moving up the value chain’ (PONTE & EWERT 2009: 1648) in purely economic terms, and instead define ‘positive or desirable change in chain participation that enhances rewards and/or reduces the exposure to risks’ (BOLWIG et al. 2008: 17), ‘a better deal, including

a balance between rewards and risk' (PONTE & EWERT 2009: 1637) in the eyes of those whose ought to be developed. How these theoretical insights were filled with life and how avenues for sustainable development could look like is discussed in the next sub-section.

### ***7.2. Central Aspects of Livelihoods and Avenues to Sustainability***

Local livelihood systems are characterised by their dependency on land that is degraded and insufficiently valued. The potential to make agricultural use of the local natural resource base is thus small and shrinking. Primarily this has to do with the high – though decreasing – population growth rate in an area already having a high population density, in which people make use of a generally infertile, fragile ecosystem that is undergoing severe environmental and social changes. Traditional usage of environmental resources – mostly through the production of traditional staples – was once ecologically sustainable, but this came at the cost of a very low level of basic livelihood outcomes like food security and income. Practices could not be upheld due to growing population pressure, a loss of animals and growing need for finances, in a context of a lack of support from the government.

Thus agricultural intensification, perchance through the production of higher yielding cash crops instead of only traditional staple crops, could be a major avenue to higher livelihood sustainability. This is also the case when considering climatic changes that are already taking place. In this context, an operational and further expanded irrigation system is of high priority, as those having access to irrigation are by far less dependent on rainfall – wet seasons that are regarded as a dying source of livelihood – and have higher outcomes overall, especially financial outcomes. Financial capital is highly relevant to farmers. Financial input is required to produce fast growing crops within rainy seasons shortened by climatic change, which come with a higher economic value and provide more food. Not everybody is able to produce such crops due to a lack of financial capital.

Higher incomes through markets could support local development, but also be the decisive factor for further social differentiation. The substitution of traditional, food-orientated and heavily diversified subsistence agriculture with specialised market orientated production is difficult for the majority of farmers due to high poverty levels and traditional values and norms. Quite some level of social differentiation is deeply interwoven in local society. Not only are hierarchies extremely steep within the villages (Biu and Mirigu), allocation of land, especially fertile and hazard-free land is highly unequal. Due to this, future outcomes will remain imbalanced among farmers. Accordingly, the level of financial capital at hand for investment is greatly polarised. So, while market orientated production may in theory be pursued by the majority of farmers and be a precondition for higher livelihood outcomes, in reality most farmers produce at levels that allow only marginal returns, because they cannot afford fertilisers and have no animals to provide

manure for their poor and run-down soils. Furthermore, though agricultural markets are nowadays often favourable for local producers, this apparent economic boom has developed only in recent years and, moreover, concerns non-traditional crops, which not everybody (has the financial ability to) produces.

People need subsidies to venture into lucrative forms of agriculture. Global and often regional competition makes it harder for locals to compete on domestic markets, mainly due to quality. Greater, more sophisticated production, able to compete at regional and global levels, was the aim of contemporary interventions in value chains of non-traditional crops by entities such as MOFA, ICOUR or USAID (see especially Section 6.3 on rice). Yet these interventions became another important mechanism for local socio-economic differentiation. They altered the conditions under which market access takes place, nowadays primarily at production level in rice. Earlier interventions, such as those in tomato markets, were content with building artificial market outlets that have continued to deceive locals. Current attempts to do just this, by the government, have again failed the northern Ghanaian farmer.

Locals are rightfully disappointed with the role the government has played in providing market alternatives. But, recent attempts, also supported by USAID, seem more promising as they set favourable market conditions, such as the government's increase of rice import duties, to attract wholesalers. This may have been more successful in fostering broad-based poverty reduction. Protective duties and other measures should, however, not be used to cover up drastic insufficiencies in quality – that make commerce unattractive in the long term – as was the case with tomato before SAPs and ERPs. Attention should be given to helping farmers produce not only more but at a higher quality, to meet consumer demand. Quality issues can also not be solved by ad hoc measures, as was tried by the government when it introduced new tomato seed and devastated the local sector. Instead, long-term commitment is required, for example by improving soils upon which sensitive crops like tomato or chili grow.

Though external interventions nowadays support agricultural products that are good for food and income security, and for women, these interventions have many shortcomings. The access people have to this support is greatly limited, as observations made in the wider production network revealed. This internal side of vulnerability was neglected in previous local studies (LAUBE et al. 2008; LAUBE et al. 2013, 2011). All external interventions have severe gender biases which further increase the differences in terms of access to land, self-determination, workload, responsibilities within the family and community. Interventions also discriminate against the lower end of society, because they favour those with greater economic and social/political backing over the poor and vulnerable. That is in turn a result of elite capture, corruption and criminal behaviour from the national to local level, predominantly played out in government programmes. USAID interventions become victim of elite capture at local level, by

identical structures and similar actors to those of government programmes. Whereas both government entities and USAID could solve such problems through greater supervision, evaluation and participation at the grass-roots level, public endeavours may well require substantial funding for appropriate staffing and implementation of programmes, in addition to anti-corruption measures that also include security agencies and do not shy away from targeting high-ranking officials.

Technologies provided through public and donor arrangements, in multipartite attempts to establish contractual farming, have ‘primarily benefited the better resourced groups in society [...] rather than the most vulnerable ones’ (IAASTD 2009a: 23). Further to this, arrangements made amongst farmers themselves as much as between farmers and traders, often have an exploitative character. In the case of cooperation amongst farmers, local sponsors (large scale farmers), yet not large multi-nationals, used smallholders as cheap suppliers of land (as assumed by CLAPP 1994: 79 and 81; OYA 2004: 10). Land-grabbing was mostly made possible by export promotion, as was the case in Biu. Furthermore, the gender mainstreaming effect of arrangements was equally questionable. At the local level, the traditionally lower bargaining power of women really was exploited (SINGH 2003: 2). Finally, a widening of socio-economic gaps can be attested (as indicated by WARNING & SOO HOO 2000: 21).

Contemporary development approaches do not account sufficiently for societal aspects. They neglect inequality in ‘sensitivity’ to externalities and thereby the responses possible to external stress factors, amongst them also environmental concerns. The vulnerable cannot alter their livelihood strategies as a result of the performance of structures and processes (BOHLE 2011: 48). Despite the great importance of structures and processes (DIDERO 2012: 17; OBRIST et al. 2011: 279; WIESMANN et al. 2011: 234-235), which could also be attested at local level, interventions serve as a conduits of ‘exploitation and control’, yet not just as a result of a lack of ‘regulatory mechanisms which are non-existent in a regime of neoliberal globalization’ (YARO 2013: 12), but also as a result of elite capture, which is thus the most relevant socially differentiating, internal dynamic. In previous eras of local agricultural development approaches (SONGSORE 2011: 199), elites dominated the allocation of support, while the majority of the local population were mostly neglected. Horizontal entanglements, the great dependence of interventions and thereby market access ‘on broader networks of social relations’ (OUMA et al. 2012: 228) aside ‘linkages between the external and internal dimensions of vulnerability’ and ‘responses at the individual, aggregate and collective level’ (BRONS et al. 2007: 91) do not provide for a better ‘ability to cope without irreversible loss of assets’ under ‘risks, shocks and stress’ to which vulnerable individuals or households are exposed to (Ibid.: 3). Social relations, institutions, interests and power alter entitlements within market contexts greatly (BOHLE 2011: 49). So, ‘variations in real markets’ become ‘practical problems of development’, yet not as



‘exogenous’ factors (WHITE 1993: 2). Local social networks and general structures exclude people and households from securing benefits as regulated by societal norms and sanctions (ABHEUER et al. 2013: 23). Social structures show quite some level of bonding and mutual contractualisation among villagers and so non-material assets rightfully receive prominence in livelihood studies (JACOBS & MAKAUDZE 2012: 577).

Horizontal relationships are often the last resort to turn to (BOHLE 2005: 71; ELLIS 2000: 36-37). People rely on neighbours, family, extended kin and networks (WOOLCOCK & SWEETSER 2002: 26) to deal with vulnerability, especially in times of severe crisis (ABHEUER et al. 2013: 21; ELLIS 2000: 36-37). Horizontal relations are also often characterised by exploitation, especially when it comes to bridging ties and can at best be characterised by a high level of functionality. Partly as a result of this functionality, access to the most lucrative forms of monetary livelihood upkeep as much as the most valuable lands and external support systems, are fairly exclusive, which fosters social inequality at an already high level. Only those with higher resource endowments or access to external support can shift ‘to more rewarding functional positions [...] that can provide better returns’ (GIBBON & PONTE 2005: 87-88). Thereby growing market potentials are undermined for the poor, which further challenges the social sustainability of projects and economic outlooks.

Institutional capabilities and local collective powers need to advance to be able to provide access to subsidies to the most vulnerable, while maintaining otherwise favourable setups of markets. Improved organisation among farmers, further horizontal and thereby vertical contractualisation (BOLWIG et al. 2008: 13), is important to improve dealings with external, vertical business partners. Trustworthy intermediaries, speaking and acting in favour of the majority of farmers, could be helpful to attract large-scale wholesalers from southern Ghana. They could facilitate contractualisation between farmers and wholesalers, because it needs knowledgeable locals to overcome the segmentation of value chains, to establish closer contact between farmers and traders. An effective, transparent and reliable farmer based organisation that can implement quality standards and give farmers a greater say in any value chain’s governance is desperately needed. External interventions cannot reform all long-established structures of community organisation, but they must also not take over and thereby further cement unfavourable setups. It may not necessarily be of use to simply restructure organisations, because rent-seeking and opportunistic behaviour is common at present at all levels of society. The upper to lower strata of the local population strategise according to the ‘peasant principle of diversification’, meaning to exploit every opportunity possible. Opportunism (see KÜHLMANN 2009) accompanied by legal uncertainty defines transactions within value chains and thereby their basic coordination (VAN DIJK & TRIENEKENS 2012: 54), often to the detriment of northern farmers, but somewhat due to their own fault.

Subsistence logics, most deeply engraved in local hearts and minds by severe famines still recalled by some, have to be overcome by better assuring basic necessities of life such as food, health, education, housing and finances, at least credit, to live a self-dependent life. Ideally the poor and vulnerable will be less dependent on local elite and thereby empowered politically to the degree where they themselves are able to overcome exploitative structures. But, on the whole, sustainable development in northern Ghana remains an issue of transparency and good governance, so that a greater share of the public can participate in developing markets and overcome subsistence logics and feudalistic social structures. That goes particularly with regard to ongoing climatic and environmental change and the drastic inequality in the allocation of most livelihood assets. Another central aspect in this context is the refurbishment of existing and the construction of new irrigation schemes, that also ought to be safeguarded from elite capture. If such support does not reach the majority of locals, as is presently happening, it may be that government support decreases the overall purchasing power and food security of the most vulnerable. In the past, this has led to famines, despite vast government spending (YARO 2013: 9), though it seems unrealistic that the situation in northern Ghana could again become that bad.

To better assure sustainable development in the future, traditional crops and thereby those engaged in this sector need to be targeted. Fast growing crops, that demand labour yet not finance as the primary input, that are suited to local environments and possibly compatible to food habits, are promising. Rice, as a non-traditional crop, could be the exception since it's more commonly grown by women and thus socially as well as comparatively environmentally friendly. Specifically females and also environmental protection would be targeted if the shea sector were supported. Agencies concerned with development would be wise to help locals shift to more environmentally sustainable production, instead of imposing western ideas of (industrial) agricultural development that devastate livelihoods in the long run, especially when it comes to the best paid crops like tomato and chili. Locals need support not only to be able to produce such crops, but to maintain their production and be attractive to markets.

While government entities demand specific, pro-poor support for northern farmers and underline the potential contribution of recent attempts (GHANA STATISTICAL SERVICE 2013: 231, 302) – the recent 'roll out' strategies now at the heart of economic and development policies – these neglect primarily local 'structural environment and power relations' (OUMA et al. 2012: 228). A 'radical readjustment' in (Ghanaian) agricultural policies appears to be needed to fight poverty primarily in a socially, but also environmentally sustainable approach that extends beyond pure economic advances (quoting HERREN 2009: 62; in reference to IAASTD 2009a; 2009b, 2008). Positive change continues to be undermined in Ghana's north, due to imbalances in social and economic prosperity. If left this way, things could become 'catastrophic to the northern rural dweller' (YARO 2013: 12).

## *References*

ACDI/VOCA, 2015. Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance. <http://acdivoca.org>, 2015-07-14.

Ackah, C., Aryeetey, E., 2012a. Cash Cropping, Gender and Household Welfare: Evidence from Ghana. In: Ackah, C., Aryeetey, E. (Eds.), *Globalization, Trade and Poverty in Ghana*. Sub-Saharan Publishers; International Development Research Centre, Accra, 202-220.

Ackah, C., Aryeetey, E., 2012b. Introduction and Overview. In: Ackah, C., Aryeetey, E. (Eds.), *Globalization, Trade and Poverty in Ghana*. Sub-Saharan Publishers; International Development Research Centre, Accra, 1-10.

Ackah, C., Aryeetey, E., Botchie, D., Osei, R., 2012. The Transmission of World Commodity Prices to Domestic Markets: Household Welfare Effects in Ghana. In: Ackah, C., Aryeetey, E. (Eds.), *Globalization, Trade and Poverty in Ghana*. Sub-Saharan Publishers; International Development Research Centre, Accra, 221-247.

Ackah, C., Aryeetey, E., Morrissey, O., 2012. Trade, Trade Policy and Total Factor Productivity: The Case of Ghanaian Manufacturing Firms. In: Ackah, C., Aryeetey, E. (Eds.), *Globalization, Trade and Poverty in Ghana*. Sub-Saharan Publishers; International Development Research Centre, Accra, 102-119.

Ackah, C., Aryeetey, E., Opoku, K., 2012. Wage and Employment Effects of Trade Liberalization: The Case of Ghanaian Manufacturing. In: Ackah, C., Aryeetey, E. (Eds.), *Globalization, Trade and Poverty in Ghana*. Sub-Saharan Publishers; International Development Research Centre, Accra, 50-74.

Ackah, C., Baah-Boaten, W., 2012. Trends in Growth, Employment and Poverty in Ghana. In: Ackah, C., Aryeetey, E. (Eds.), *Globalization, Trade and Poverty in Ghana*. Sub-Saharan Publishers; International Development Research Centre, Accra, 33-49.

Ackah, C., Morrissey, O., Appleton, S., 2012. The Effects of Trade Liberalization and the Return to Education in Ghana. In: Ackah, C., Aryeetey, E. (Eds.), *Globalization, Trade and Poverty in Ghana*. Sub-Saharan Publishers; International Development Research Centre, Accra, 75-101.

- Adams, W. M., 2004. When Islands Expand: Intensification and Sustainability. In: Widgren, M. Sutton, J. (Eds.), *Islands of Intensive Agriculture in Eastern Africa*. James Currey, Oxford, 133-140.
- Addaquay, J., 2004. Sub-sector Study on Pepper for Northern Sector of Ghana. PFID; USAID, Tamale.
- Adu, S. V., 1963. The soils of Tono State Farm. Technical No. 58. Agricultural Research Institute - Soil and Land-use Survey, Kumasi.
- Adu, S. V., 1969. Soils of the Navrongo-Bawku area, Upper Region, Ghana. Soil Research Institute; Council for Scientific and Industrial Research, Kumasi.
- Ahnert, F., 2009. *Einführung in die Geomorphologie*. Eugen Ulmer, Stuttgart.
- Ahwoi, K., 2010. Government's Role in Attracting Viable Agricultural Investment: Experiences from Ghana. The World Bank Annual Bank Conference On Land Policy And Administration, April 26-27, 2010, Washington, DC.
- Akramov, K., Malek, M., 2012. Analyzing Profitability of Maize, Rice, and Soybean Production in Ghana: Results of PAM and DEA Analysis. GSSP Working Paper 28. IFPRI, Accra.
- Al-Hassan, S., 2013. Reducing Poverty in Northern Ghana through the Savannah Accelerated Development Authority: What do People Expect? In: Yaro, J. A. (Ed.), *Rural Development in Northern Ghana*. Nova Science Publishers, New York, 225-244.
- Amakye, F. T., Blankson, A. P., Clark, G., 2008. Keep tomatoes moving: strengthening cooperation between traders and farmers in Ghana. In: Royal Tropical Institute and International Institute of Rural Reconstruction (Ed.), *Trading up: Building cooperation between farmers and traders in Africa*. Royal Tropical Institute and International Institute of Rural Reconstruction, Amsterdam; Nairobi, 62-71.
- Amanor, K., 2008. The changing face of customary land tenure. In: Ubink, J. M., Amanor, K. S. (Eds.), *Contesting land and custom in Ghana : state, chief and the citizen*. Leiden University Press, Amsterdam, 55-80.

Amanor, K., Pabi, O., 2007. Space, Time, Rhetoric and Agricultural Change in the Transition Zone of Ghana. *Human Ecology* 35 (1), 51-67.

Amegashie, B. K., Quansah, C., Agyare, A. W., Bonsu, M., Odai, S. N., 2012. On-site effects and cost of fertility erosion from five small reservoir catchments in the Upper East Region of Ghana. *Journal of Science and Technology* 32 (2), 79-93.

Aniah, P., Wedamb, E., Pukunyiemc, M., Yinimid, G., 2013. Erosion and Livelihood Change in North East Ghana: a Look into the Bowl. *International Journal of Sciences: Basic and Applied Research* 7 (1), 28-35.

Antwi-Agyei, P., Fraser, E. D. G., Dougill, A. J., Stringer, L. C., Simelton, E., 2012. ping the vulnerability of crop production to drought in Ghana using rainfall, yield and socioeconomic data. *Applied Geography* 32 (2), 324-334.

Antwi-Asare, T. O., 2009. The Tomato And Rice Value Chains In Ghana. Draft . Department of Economics University of Ghana for the Ghana Trade And Livelihoods Coalition, Accra.

AR, 2011. AR Industrie Alimentari S.p.A. [www.arindustrierealimentari.com](http://www.arindustrierealimentari.com), 2011-01-20.

Arce, A., 2003. Value contestation in development interventions: Community development and sustainable livelihoods approaches. *Community Development Journal* 38 (3), 199-212.

Arku, J., 2013. Government uncovers massive fraud at bonded warehouse. *Graphic*, 24. October. <http://www.graphic.com.gh/news/general-news/550-government-uncovers-massive-fraud-at-bonded-warehouse.html>, 2015-02-01.

Armah, F. A., Yawson, D. O., Yengoh, G. T., Odoi, J. O., Afrifa, E. K. A., 2010. Impact of floods on livelihood and vulnerability of natural resource dependent communities in Northern Ghana. *Water* 2 (2), 120-139.

Asante, B. O., Osei, M. K., Dankyi, A. A., Berc, J. N., Mochiah, M. B., Lamptey, J. N. L., Halegoah, J., Osei, K., Bolfrey-Arku, G., 2013. Producer characteristics and determinants of technical efficiency of tomato based production systems in Ghana. *Journal of Development and Agricultural Economics* 5 (3), 92-103.

Aßheuer, T., Thiele-Eich, I., Braun, B., 2013. Coping with the Impacts of severe Flood Events in Dhaka's Slums – The Role of Social Capital. *Erdkunde* 67 (1), 21-35.

Asuming-Bremoong, S., Asuming Boakye, A., 2008. Socio-economic Analysis of Tomato Production in Ghana. Technical prepared for the Ghana Trade And Livelihoods Coalition. Department of Agricultural Economics and Agribusiness University of Ghana; Ghana Trade And Livelihoods Coalition, Accra.

Atteslander, P., 2003. *Methoden der empirischen Sozialforschung*. Walter de Gruyter, Berlin.

Awo, M., 2007. Tomatoes in Northern Ghana: Risky business or a way out of poverty. M.A. (published), Institute of Social Science (ISS), The Hague.

Awo, M., 2010. Marketing and Market Queens. A case of tomato farmers in the Upper East Region of Ghana. PhD (published), University of Bonn, Bonn.

Banful, A. B., 2009. Operational Details of the 2008 Fertilizer Subsidy in Ghana – Preliminary . Ghana Strategy Support Program Background Paper No. 18. IFPRI, Accra; Washington, DC.

Barral, H., 1968. TIOGO. Étude géographique d'un terroir léla (Haute -Volta). Mouton & Co, Paris.

Barrientos, S., Gereffi, G., Rossi, A., 2010. Economic and Social Upgrading in Global Production Networks: Developing a Framework for Analysis. Capturing the Gains Working Paper 3. University of Manchester, Manchester.

Batterbury, S., Cannon, T., Chimbuya, S., 2011. Sustainable Livelihoods Approaches: Past, present and... future? Sustainable Livelihoods Highlights (June), 2.

Baumann, P., Subir, S., 2001. Linking Development with Democratic Processes in India: Political Capital and Sustainable Livelihoods Analysis. Natural Resource Perspectives Number 68. Overseas Development Institute, London.

- Bazan, L., Navas-Alemán, L., 2004. The underground revolution in the Sinos Valley: a comparison of upgrading in global and national value-chains. In: Schmitz, H. (Ed.), *Local enterprises in the global economy: issues of governance and upgrading*. Edward Elgar, Cheltenham, 110-139.
- Bebbington, A. J., 1999. Capitals and capabilities: a framework for analysing peasant viability, rural livelihoods and poverty. *World Development* 27 (12), 2021-2044.
- Bebbington, A. J., Batterbury, S., 2001. Transnational livelihoods and landscapes: political ecologies of globalization. *Ecumene* 8 (4), 369-380.
- Becx, G. A., Mol, G., Eenhoorn, J. W., Van der Kamp, J., Van Vliet, J., 2012. Perceptions on reducing constraints for smallholder entrepreneurship in Africa: the case of soil fertility in Northern Ghana. *Current Opinion in Environmental Sustainability* 4 (5), 489-496.
- Berry, S., 2008. Ancestral property: Land, politics and 'the deeds of the ancestors' in Ghana and Côte d'Ivoire. In: Ubink, J. M., Amanor, K. S. (Eds.), *Contesting land and custom in Ghana : state, chief and the citizen*. Leiden University Press, Amsterdam, 27-54.
- Bierschenk, T., 2002. Hans-Dieter Evers und die "Bielefelder Schule" der Entwicklungssoziologie. Arbeitspapiere Nr. 1. Institut für Ethnologie und Afrikastudien, Mainz.
- Blench, R. M., 1999. Agriculture and the environment in northeastern Ghana: a comparison of high and medium population density areas. In: Blench, R. M. (Ed.), *Natural Resource Management and Socio-economic Factors in Ghana*. Overseas Development Institute, London.
- Boffa, J.-M., Yaméogo, G., Nikiéma, P., Knudson, D. M., 1996. Shea nut (*Vitellaria paradoxa*) production and collection in agroforestry parklands of Burkina Faso. In: Leakey, R. R. B. (Ed.), *Domestication and commercialization of non-timber forest products in agroforestry systems: proceedings of an international conference held in Nairobi, Kenya, 19-23 February 1996*. FAO, Rome, 110-122.
- Bohle, H.-G., 2011. Social Vulnerability and Livelihood Security: Towards an Integrated Framework for Market Risk Assessment. In: Gertel, J., Le Heron, R. B. (Eds.), *Economic spaces of pastoral production and commodity systems : markets and livelihoods*. Ashgate Publishing, Farnham, Surrey, 43-51.

- Bohle, H.-G., Glade, T., 2008. Vulnerabilitätskonzepte in Sozial- und Naturwissenschaften. In: Felgentreff, C., Glade, T. (Eds.), *Naturrisiken und Sozialkatastrophen*. Spektrum Akademischer Verlag, Berlin, 99-119.
- Bohle, H. G., 2005. Soziales oder unsoziales Kapital? Das Sozialkapital-Konzept in der Geographischen Verwundbarkeitsforschung. *Geographische Zeitschrift* 93 (2), 65-81.
- Bohle, H. G., 2009. Sustainable Livelihood Security. Evolution and Application. In: Brauch, H. G., Behera, N.C., Kameri-Mbote, P., Grin, J., Oswald Spring, Ú., Chourou, B., Mesjasz, C., Krummenacher, H. (Eds.), *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts*. Hexagon Series on Human and Environmental Security and Peace 4, Springer, Berlin; Heidelberg; New York; Hong Kong; London; Milan; Paris; Tokyo, 521-528.
- Boko, M., Niang, I., Nyong, A., Vogel, C., Githeko, A., Medany, M., Osman-Elasha, B., Tabo, R., Yanda, P. 2007. Africa. *Climate Change 2007: Impacts, Adaptation and Vulnerability*. In: Parry, M. L., Canziani, O. F., Palutikof, J. P., Van Der Linden, P. J., Hanson, C. E. (Eds.), *Contribution of Working Group II to the Fourth Assessment of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, 433-467.
- Bolwig, S., Ponte, S., du Toit, A., Riisgaard, L., Halberg, N., 2008. Integrating poverty, gender and environmental concerns into value chain analysis. A conceptual framework and lessons for action research. DIIS Working Paper 2008:16. Danish Institute for International Studies, Copenhagen.
- Bosland, P. W., Votava, E. J., 2012. *Peppers: Vegetable and Spice Capsicums*. CABI, Cambridge.
- Braun, B., Dietsche, C., 2008. Indisches Leder für den Weltmarkt. Umweltprobleme und Standards in Globalen Wertschöpfungsketten. *Geographische Rundschau* 60 (9), 12-19.
- Braun, B., Schulz, C., 2012. *Wirtschaftsgeographie*. UTB, Stuttgart.
- Breisinger, C., Diao, X., Kolavalli, S., Al Hassan, R., Thurlow, J., 2011. A new era of transformation in Ghana: lessons from the past and scenarios for the future. IFPRI, Washington, D.C.



- Brink, M., Belay, G., 2006. Plant Resources of Tropical Africa 1 – Cereals and pulses. PROTA Foundation; Backhuys Publishers, Wageningen.
- Brons, J., Dietz, T., Niehof, A., Witsenburg, K., 2007. Dimensions of vulnerability of livelihoods in less-favoured areas: interplay between the individual and the collective. In: Ruben, R., Pender, J., Kuyvenhoven, A. (Eds.), Sustainable Poverty Reduction in Less-favoured Areas. CAB International, Wallingford, Cambridge, 91-110.
- Brouwer, C., Heibloem, M., 1986. Irrigation Water Management: Irrigation Water Needs. FAO, Rome.
- Brown, L. R., Eckholm, E. P., 1974. *By Bread Alone*. Praeger Publishers, New York.
- Bürkner, H.-J., 2010. Vulnerabilität und Resilienz – Forschungsstand und sozialwissenschaftliche Untersuchungsperspektiven. Working paper. Leibnitz-Institut für Regionalentwicklung und Strukturplanung, Erkner.
- Byakagaba, P., Eilu, G., Okullo, J. B. L., Tumwebaze, S. B., Mwavu, E. N., 2011. Population Structure and Regeneration Status of *Vitellaria paradoxa* Under Different Land Management Regimes in Uganda. *Agricultural Journal* 6 (1), 14-22.
- Callo-Concha, D., Gaiser, T., Ewert, F., 2012. Farming and cropping systems in the West African Sudanian Savanna. ZEF Working Paper Series No. 100. ZEF, Bonn.
- Cameron, J., 2005. Focusing on the focus group. In: Hay, I. (Ed.), *Qualitative Research Methods in Human Geography*. Oxford University Press, Melbourne, 116-132.
- Carr, E. R., 2008. Between structure and agency: Livelihoods and adaptation in Ghana's Central Region. *Global Environmental Change* 18 (4), 689-699.
- Catholic Church Navrongo, 1905-1920. *Our Lady of Seven Sorrows – Navarro Mission Diary 1905-1920*. Catholic Church Navrongo, Navrongo.
- Catholic Church Navrongo, 1921-1950. *Our Lady of Seven Sorrows – Navarro Mission Diary 1921-1950*. Catholic Church Navrongo, Navrongo.

- CDKN, 2014. The IPCC's Fifth Assessment . What's in it for Africa? Climate and Development Knowledge Network; Overseas Development Institute, London.
- Chalfin, B., 2004. Shea Butter Republic: State Power, Global Markets and the Making of an Indigenous Commodity. Routledge, New York.
- Challies, E. R. T., 2008. Commodity Chains, Rural Development and the Global Agri-food System. *Geography Compass* 2 (2), 375-394.
- Chambers, R., 1989. Vulnerability: How the Poor Cope. *IDS Bulletin* 20 (2), 1-7.
- Chambers, R., 1995. Poverty and livelihoods: whose reality counts? *Environment and Urbanisation* 7 (1), 173-104.
- Chambers, R., Cornwall, G. R., 1991. Sustainable rural livelihoods: practical concepts for the 21st century. *IDS Discussion Paper No. 296*. IDS, Brighton.
- Chandler, R. F., 1979. *Rice in the tropics : a guide to the development of national programs*. Westview Press, Boulder, Colorado.
- Chandrashekar, A., Satyanarayana, K. V., 2006. Disease and pest resistance in grains of sorghum and millets. *Journal of Cereal Science* 44 (3), 287-304.
- Choudhary, D., Pandit, B. H., Kala, S. P., Todaria, N. P., Dasgupta, S., Kollmair, M., 2014. Upgrading Bay Leaf Farmers in Value Chains – Strategies for Improving Livelihoods and Poverty Reduction from Udayapur District of Nepal. *Society and Natural Resources* 27 (10), 1057-1073.
- Christian Aid, 2003. Pipped at the post.  
[http://www.surefish.co.uk/campaigns/features/2003/0503\\_tomato\\_letters.htm](http://www.surefish.co.uk/campaigns/features/2003/0503_tomato_letters.htm), 2011-01-20.
- Clapp, R., 1994. The moral economy of the contract. In: Little, P., Watts, M. (Eds.), *Living under contract: Contract farming and Agrarian transformation in Sub-Saharan Africa*. University of Wisconsin, Madison, 78-98.

Clottey, V. A., Karbo, N., Gyasi, K. O., 2009. The tomato industry in northern Ghana: production constraints and strategies to improve competitiveness. *African Journal of Food, Agriculture, Nutrition and Development* 9 (6), 1437-1451.

Coe, N. M., 2009. Global Production Networks. In: Kitchin, R., Thrift, N. (Eds.), *The International Encyclopedia of Human Geography*. Elsevier, Oxford, 556-562.

Coe, N. M., Dicken, P., Hess, M., 2008. Global production networks: realizing the potential. *Journal of Economic Geography* 8 (3), 271-295.

Coe, N. M., Hess, M., 2008. Introduction: Global production networks – Debates and Challenges. *Journal of Economic Geography* 8 (3), 267-269.

Coe, N. M., Hess, M., 2013. Global Production Networks, Labour and Development. *Geoforum* 44, 4-9.

Coe, N. M., Yeung, H. W.-C., 2015. *Global Production Networks: Theorizing Economic Development in an Interconnected World*. Oxford University Press, Croydon.

COMTRADE, 2015. UN COMTRADE International Trade Statistics Database. <http://comtrade.un.org>, 2015-05-02.

Contreras, R. B., 2011. Examining the Context in Qualitative Analysis: The Role of the Co-Occurrence Tool in AtlasTI. *AtlasTI Newsletter* (2), 5-6.

CSIR SARI, 2008. *Analysis of Pepper Value Chain in Northern Region of Ghana*. CSIR-Savanna Agricultural Research Institute, Tamale.

Da Silva, C. A. B., 2005a. *Agricultural Management, Marketing and Finance Service*. FAO, Rome.

Da Silva, C. A. B., 2005b. *The growing role of contract farming in agri-food systems development: drivers, theory and practice*. FAO, Rome.

Da Silva, D. J. H., Abreu, F. B., Caliman, F. R. B., Antonio, A. C., Patel, V. B., 2008. Tomatoes: Origin, Cultivation Techniques and Germplasm Resources. In: Preedy, V. R., Watson, R. R. (Eds.), Tomatoes and tomato products : nutritional, medicinal and therapeutic properties. Science Publishers, Enfield, N.H., 3-26.

Dagnoko, S., Yaro-Diarisso, N., Sanogo, P. N., Adetula, O., Dolo-Nantoumé, A., Gamby-Touré, K., Traoré-Théra, A., Katilé, S., Diallo-Ba, D., 2013. Overview of pepper (*Capsicum* spp.) breeding in West Africa. *African Journal of Agricultural Research* 8 (13), 1108-1114.

Dalton, T. J., Yahaya, I., Naab, J., 2014. Perceptions and performance of conservation agriculture practices in northwestern Ghana. *Agriculture, Ecosystems and Environment* 187 (2), 65-71.

Darby, P., 2013. Moving players, traversing perspectives: Global value chains, production networks and Ghanaian football labour migration. *Geoforum* 50, 43-53.

Davies, S., Hossain, N., 1997. Livelihood adaptation, public action and civil society: a review of the literature. IDS Working Paper No. 57. IDS, Brighton.

De Bruijn, M., van Dijk, H., 2005. Introduction: Climate and Society in Central and South Mali. In: De Bruijn, M., van Dijk, H. (Eds.), *Sahelian pathways : climate and society in Central and South Mali*. African Studies Centre, Leiden, 1-16.

De Haan, L. J., Lakwo, A., 2010. Rethinking the Impact of Microfinance in Africa: 'Business Change' or Social Emancipation. *European Journal of Development Research* 22 (4), 529-545.

De Haan, L. J., 2000. Globalization, localization and sustainable livelihood. *Sociologia Ruralis* 40 (3), 339-365.

De Haan, L. J., 2005. How to research the changing outlines of African livelihoods. 11th General Assembly of CODESRIA, December 6-10, 2005, uto.

De Haan, L. J., 2012. The Livelihood Approach: a critical exploration. *Erdkunde* 66 (4), 345–357.

## References

---

De Haan, L. J., Kamanzi, A., 2011. Who gets drunk at the bottom of the pyramid when a bottle of whiskey is dropped from the top? Development cooperation as a chain of political arenas. In: Hoebink, P. (Ed.), *The Netherlands Year on International Cooperation 2009*. Van Gorcum, Assen, 119-140.

De Haan, L. J., Zoomers, A., 2005. Exploring the Frontier of Livelihoods Research. *Development and Change* 36 (1), 27-47.

De Schutter, O., 2010. Addressing Concentration in Food Supply Chains. The Role of Competition Law in Tackling the Abuse of Buyer Power. Briefing Note 3. United Nations Special Rapporteur on the Right to Food, New York.

De Waal, A., 1987. *Famine that kills: Darfur 1984-5*. Save the Children Fund, London.

DFID, 2001. *Sustainable livelihoods guidance sheets*. DFID, London.

Didero, M., 2012. Cairo's informal waste collectors: a multi-scale and conflict sensitive perspective on sustainable livelihoods. *Erdkunde* 66 (1), 27-44.

Dietsche, C., 2011. *Umweltgovernance in globalen Wertschöpfungsketten. Umweltschutz und Qualitätssicherung im Handel mit tropischen Garnelen und Ledererzeugnissen*. LIT, Berlin.

Dörfler, T., Graefe, O., Müller-Mahn, D., 2003. Habitus und Feld. Anregungen für eine Neuorientierung der geographischen Entwicklungsforschung auf der Grundlage von Bourdieus "Theorie der Praxis". *Geographica Helvetica* 58 (1), 11-23.

Duggleby, W., 2005. What About Focus Group Interaction Data? *Qualitative Health Research* 15 (6), 832-840.

Dünckmann, F., 2004. Plantagen im Weltsystem heute. *Geographische Rundschau* 56 (11), 4-9.

Eaton, C., Shepherd, A., 2001. *Contract farming : partnerships for growth*. FAO, Rome.

EDAIF, 2013. *Status on the EDAIF Mango Plantation Development Project to the MOFA*. EDAIF, Accra.

EDIF, 2011. Annual 2010. EDIF, Accra.

Eguavoen, I., 2008. The political ecology of household water in Northern Ghana. LIT, Berlin.

Ellis, F., 2000. Rural livelihoods and diversity in developing countries. Oxford University Press, Oxford; New York.

Engelke, E., Borrmann, S., Spatschick, C., 2008. Theorien der Sozialen Arbeit. Eine Einführung. Lambertus, Freiburg.

Ermann, U., 2005. Regionalprodukte: Vernetzungen und Grenzziehungen bei der Regionalisierung von Nahrungsmitteln. Steiner, Stuttgart.

Erzberger, C., 1998. Zahlen und Wörter : die Verbindung quantitativer und qualitativer Daten und Methoden im Forschungsprozess. Deutscher Studien Verlag, Weinheim.

Escobar, A., 2001. Culture sits in places: reflections on globalism and subaltern strategies of localization. *Political Geography* 20 (2), 139.

Etzold, B., 2012. Contested Fields and Arenas in the Megacity. A Relational Analysis of Street Food Governance in Dhaka (Bangladesh). Ph.D. (published), Rheinischen Friedrich-Wilhelms-Universität Bonn, Bonn.

Expom, 2011. Expom Ghana. [www.expomghana.com](http://www.expomghana.com), 2011-01-20.

FAO, 1970. Conditions for the Expansion of Fruit and Vegetable Processing for the Government of Ghana. Technical 3. FAO; UN Development Programme, Rome.

FAO, 2005. Fertilizer use by crop in Ghana. FAO Land and Plant Nutrition Management Service/Land and Water Development Division, Rome.

FAO, 2014. Crop Water Information: Pepper. [http://www.fao.org/nr/water/cropinfo\\_pepper.html](http://www.fao.org/nr/water/cropinfo_pepper.html), 2014-10-27.

FAOSTAT, 2011. Food and Agriculture Organization of the United Nations Database. <http://faostat.fao.org/>, 2011-08-15.

- FAOSTAT, 2014. Food and Agriculture Organization of the United Nations Database. <http://faostat.fao.org/>, 2014-11-17.
- Fetene, M., Okori, P., Gudu, S., Mneney, E., Tesfaye, K., 2011. Delivering New Sorghum and Finger Millet Innovations for Food Security and Improving Livelihoods in Eastern Africa. International Livestock Research Institute, Nairobi.
- Finck, A., 1982. Pflanzenernährung in Stichworten. Hirt, Kiel.
- Flick, U., 2007. Qualitative Sozialforschung : eine Einführung. Rowohlt, Reinbek bei Hamburg.
- Flick, U., 2011. Triangulation - Eine Einführung. VS, Wiesbaden.
- Fold, N., Larsen, M. N., 2011. Upgrading of smallholder agro-food production in Africa: The role of lead firm strategies and new markets. *International Journal of Technological Learning, Innovation and Development* 4 (1-3), 39-66.
- Froschauer, U., Lueger, M., 2003. Das qualitative Interview zur Praxis interpretativer Analyse sozialer Systeme. WUV, Vienna.
- Gage, D., Bangnikon, J., Abeka-Afari, H., Hanif, C., Addaquay, J., Antwi, V., Hale, A., 2012. The Market for Maize, Rice, Soy, and Warehousing in Northern Ghana. U.S. Agency for International Development, Accra, Washington, DC.,
- Gaillard, J., Maceda, E., Stasiak, E., Le Berre, I., Espaldon, M., 2009. Sustainable livelihoods and people's vulnerability in the face of coastal hazards. *Journal of Coastal Conservation* 13 (2), 119-129.
- Geiser, U., Bottazzi, P., Epprecht, M., Fokou, G., Fritschi, A., Ramakumar, R., Shahbaz, B., Steimann, B., Strasser, B., 2011. Access to Livelihood Assets: Inclusion, Exclusion, and the Reality of Development Interventions. In: Hurni, H., Wiesmann, U. (Eds.), *Research for Sustainable Development: Foundations, Experiences and Perspectives*. NCCR North-South, Bern, 313-330.

Geiser, U., Müller-Böker, U., Shahbaz, B., Steimann, B., Thieme, S., 2011. Towards an Analytical Livelihoods Perspective in Critical Development Research. In: Hurni, H. Wiesmann, U. (Eds.), *Research for Sustainable Development: Foundations, Experiences and Perspectives*. NCCR North-South, Bern, 257-272.

Gereffi, G., 1995. Global Production Systems and Third World Development. In: Stallings, B. (Ed.), *Global Change, Regional Response: The New International Context of Development*. Cambridge University Press, Cambridge 100-142.

Gereffi, G., 1996. Global Commodity Chains: New Forms of Coordination and Control among Nations and Firms in International Industries. *Competition & Change* 1 (4), 427-439.

Gereffi, G., 1999. International trade and industrial upgrading in the apparel commodity chain. *Journal of International Economics* 48 (1), 37-70.

Gereffi, G., Humphrey, J., Sturgeon, T., 2005. The Governance of Global Value Chains. *Review of International Political Economy* 12 (1), 78-104.

Gereffi, G., Korzeniewicz, M., 1994. *Commodity Chains and Global Development*. Praeger, Westport.

Gertel, J., 2007. Geschichte, Struktur und fachwissenschaftliche Leitlinien der Entwicklungstheorien. In: Böhn, D., Rothfuß, E. (Eds.), *Handbuch des Geographieunterrichts*. Aulis, Köln, 52-72.

Ghana Government Survey Department, 1966. Topographical Sheet No. 1002 B-2, Tono area 36th Ghana Survey, 1: 50000, Accra.

Ghana Health Service, 2012. Annual . Upper East Region. Ghana Health Service, Bolgatanga.

Ghana Statistical Service, 2005. 2000 Population and Housing Census Upper East Region – Analysis of District Data and Implications for Planning. Ghana Statistical Service, Accra.

Ghana Statistical Service, 2007. Pattern and Trends of Poverty in Ghana 1991-2006. Ghana Statistical Service, Accra.



## References

---

Ghana Statistical Service, 2012. 2010 Population and Housing Census. Summary of Final Results. Ghana Statistical Service, Accra.

Ghana Statistical Service, 2013. 2010 Population and Housing Census. National Analytical . Ghana Statistical Service, Accra.

GhanaVeg, 2014. Vegetables Business Opportunities in Ghana: 2014. Wageningen UR; GhanaVeg Secretariat, Accra; Wageningen.

ghanaweb.com, 2005. Trusty Foods fires 200 workers. ghanaweb.com, 03.10.2005. <http://www.ghanaweb.com>, 18.04.2015.

ghanaweb.com, 2011. Bureaucracy delays farmers' rice at silos in Tono. ghanaweb.com 7. February. <http://www.ghanaweb.com/GhanaHomePage/NewsArchive/Bureaucracy-delays-farmers-rice-at-silos-in-Tono-202689>, 2013-10-24.

Gibbon, P., 2001. Upgrading primary production: a global commodity chain approach. *World Development* 29 (2), 345-363.

Gibbon, P., 2004. Commodities, donors, value-chain analysis and upgrading. Strategic dialogue on agriculture, trade negotiations poverty sustainability, July 14-16, 2004, Windsor, UK.

Gibbon, P., Ponte, S., 2005. Trading down: Africa, value chains, and the global economy. Temple University Press, Philadelphia.

Glover, D. J., 1984. Contract farming and smallholder outgrower schemes in less-developed countries. *World Development* 12 (11/12), 1143-1157.

Göll, E., Henseling, C., Nolting, K., Gaßner, R., 2005. Die Fokusgruppen-Methode: Zielgruppen erkennen und Motive aufdecken. Motivation in der Bevölkerung, sich für Umweltthemen zu engagieren. Eine qualitative Studie mit Fokusgruppen. Institut für Zukunftsstudien und Technologiebewertung, Berlin.

Government of Ghana, 2010. Medium-Term national Development Policy Framework: Ghana Shared Growth and Development Agenda (GSDA), 2010-2013. Volume I: Policy Framework. National Development Planning Commission. Accra.

Grégoire, E., 1997. Major Sahelian Trade Networks: Past and Present. In: Raynaut, C., Grégoire, E., Janin, P., Koechlin, J., Lavigne Delville, P. (Eds.), *Societies and nature in the Sahel*. Routledge, London; New York, 90-108.

GSA, 2010. Ghana Standards Authority. <http://www.gsa.gov.gh>, 2015-04-17.

Gulati, A., Dutta, M., 2010. Rice Policies in India in the Context of the Global Rice Price Spike. In: Dawe, D. (Ed.), *The Rice Crisis. Markets, Policies and Food Security*. FAO; Earthscan, London; Washington, DC.

Hahn, H. P., 2000. Raumkonzepte bei den Kassena. *Anthropos* 95 (1), 129-148.

Haselberger, H., 1964. *Bautraditionen der westafrikanischen Negerkulturen: eine völkerkundliche Kunststudie*. Herder, Wien.

Hauck, G., 2004. Die Geschichte der Entwicklungstheorie. In: Gerlach, O., Kalmring, S. (Eds.), *Peripherie und globalisierter Kapitalismus: zur Kritik der Entwicklungstheorie*. Brandes & Apsel, Frankfurt am Main, 12-50.

Hay, I., 2005. *Qualitative Research Methods in Human Geography*. Oxford University Press, New York.

HCID, 2015. Harvard Center for International Development. <http://atlas.cid.harvard.edu/>, 2015-04-18.

Henderson, J., Dicken, P., Hess, M., Coe, N. M., Yeung, H. W.-C., 2002. Global production networks and the analysis of economic development. *Review of International Political Economy* 9 (3), 436-464.

Herren, H. R., 2009. Zurück zur Natur. Der Weltagrarrat (IAASTD) verlangt radikalen Kurswechsel in der Agrarpolitik. *Vereinte Nationen* (2), 62-65.

Hollander, J. A., 2004. The Social Contexts of Focus Groups. *Journal of Contemporary Ethnography* 33 (5), 602-637.

Hülsebusch, C., Wichern, F., Hemann, H., Wolff, P., 2007. Preface. In: Hülsebusch, C., Wichern, F., Hemann, H., Wolff, P. (Ed.), *Organic agriculture in the tropics and subtropics : current status and perspectives*. Kassel Univ. Press, Kassel, I-IV.

Humphrey, J., Schmitz, H., 2002. How Does Insertion in Global Value Chains Affect Upgrading in Industrial Clusters? *Regional Studies* 36 (9), 1017–1027.

Hunter, J. M., 1967a. Population Pressure in a Part of the West African Savanna: A Study of Nangodi, Northeast Ghana. *Annals of the Association of American Geographers* 57 (1), 101-114

Hunter, J. M., 1967b. The Social Roots of Dispersed Settlement in Northern Ghana. *Annals of the Association of American Geographers* 57 (2), 338-349.

Hurni, H., Wiesmann, U., 2011. Global Change Research for Sustainable Development. In: Hurni, H., Wiesmann, U. (Eds.), *Research for Sustainable Development: Foundations, Experiences and Perspectives*. NCCR North-South, Bern, 15-42.

Hussein, K., Nelson, J., 1998. *Sustainable Livelihoods and Livelihood Diversification*. IDS Working Paper No. 69. IDS, Brighton.

IAASTD, 2008. *International Assessment of Agricultural Knowledge, Science and Technology for Development – Issues in Brief: Towards Multifunctional Agriculture for Social, Environmental and Economic Sustainability*. IAASTD, Washington, DC.

IAASTD, 2009a. *Agriculture at a Crossroads: Global Summary for Decision Makers*. Island Press, Washington, DC.

IAASTD, 2009b. *Agriculture at a Crossroads: Sub-Saharan Africa*. Island Press, Washington, DC.

ICOUR, 2013. *ICOUR Corporate Plan 2013 to 2018*. ICOUR, Navrongo.

IFAD, 2006. Republic of Ghana. *Country Strategic Opportunities Paper*. Executive Board – Eighty-seventh Session. International Fund for Agricultural Development, Rome.

ILO, 2008. *ILO Declaration on Social Justice for a Fair Globalization*. ILO, Geneva.

- Imbruce, V., 2007. From the guest editor. Multi-scale transformations of agriculture and the environment. *Agriculture and Human Values* 1 (24), 1-7.
- Imbruce, V., 2008. The production relations of contract farming in Honduras. *GeoJournal* 73 (1), 67-82.
- IPGRI/INIA, 2006. Descriptors for Shea tree (*Vitellaria paradoxa*). International Plant Genetic Resources Institute, Rome.
- ISSER, 2015. Institute of Statistical, Social and Economic Research, <http://isser.edu.gh/>, 2015-01-01.
- IUSS Working Group WRB, 2007. World Reference Base for Soil Resources 2006, first update 2007. World Soil Resources s No. 103. FAO, Rome.
- Jacobs, P., Makaudze, E., 2012. Understanding rural livelihoods in the West Coast District, South Africa. *Development Southern Africa* 29 (4), 574-587.
- Jaeger, P., 2008. Ghana Export Horticulture Cluster Strategic Profile Study. Part I – Scoping review. World Bank Sustainable Development Network; Ghana Ministry of Food and Agriculture; European Union All ACP Agricultural Commodities Programme, Accra.
- Jakimov, T., 2013. Unlocking the Black Box of Institutions in Livelihoods Analysis: Case Study from Andhra Pradesh, India. *Oxford Development Studies* 41 (4), 493-516.
- Jalulah, W. N., 2012. Fertiliser smuggling ‘booms’ in Upper East. *The Chronicle*, 21. August. <http://thechronicle.com.gh/fertiliser-smuggling-booms-in-upper-east/>, 2014-03-08.
- Kaag, M., van Berkel, R., Brons, J., de Bruijn, M., van Dijk, H., De Haan, L. J., Nooteboom, G., Zoomers, A., 2004. Poverty is Bad: Ways forward in livelihood research. In: Kalb, D., Pansters, W. G., Siebers, H. (Eds.), *Globalization and development : themes and concepts in current research*. Kluwer Academic Publishers, Dordrecht; Boston, 49-74.
- Kaiser, C., Rothfuß, E., 2013. Vom Individuum zum Kollektiv – eine moralökonomische Reformulierung des Livelihoods-Konzeptes. *Contemporary Southeast Asian Dynamics*. Working Paper Series No.1 Lehrstuhl für Südostasienskunde. Universität Passau, Passau.

Kang, B. T., Tripathi, B. R., 1992. Technical Paper 1: Soil classification and characterization. The ANETA alley farming training manual – Volume 2: Source for alley farming research. FAO, Rome.

Kanji, N., MacGregor, J., Tacoli, C., 2005. Understanding market-based livelihoods in a globalising world: combining approaches and methods. Combining the use of livelihoods and value chain analysis. International Institute for Environment and Development, London.

Kelle, U., 2007. Die Integration qualitativer und quantitativer Methoden in der empirischen Sozialforschung: theoretische Grundlagen und methodologische Konzepte. VS, Wiesbaden.

Kelly, P. F., 2013. Production networks, place and development: Thinking through Global Production Networks in Cavite, Philippines. *Geoforum* 44, 82-92.

Khor, M., Hormeku, T., 2006. The impact of globalisation and liberalisation on agriculture and small farmers in developing countries: the experience of Ghana. Third World Network, Accra.

Kilcher, L., 2007. How organic agriculture contributes to sustainable development. *Journal of Agriculture*. (Beiheft 89), 31-49.

Kirsten, J., Sartorius, K., 2002. Linking agribusiness and small-scale farmers in developing countries: is there a new role for contract farming? *Development Southern Africa* 19 (4), 503-529.

Konrad, M., Sauerborn, J., 2013. Climate Zones and Land Use. In: Konrad, M., Sauerborn, J. (Eds.), *Agroecology*. Springer, Dordrecht; London, 261-298.

Kopelman, M. D., Thomson, A. D., Guerrini, I., Marshall, E. J., 2009. The Korsakoff Syndrome: Clinical Aspects, Psychology and Treatment. *Alcohol & Alcoholism* 44 (2), 148–154.

KPMG, 2012. *Doing Business in Ghana*. KPMG, Accra.

Krings, T., 1991. Kulturbaumparke in den Agrarlandschaften Westafrikas – eine Form autochtoner Agroforstwirtschaft. *Die Erde* (122), 117-129.

Kröger, F., 2010. *First Notes on Koma Culture. Life in a Remote Area of Northern Ghana*. LIT, Münster.

- Krüger, F., 2003. Handlungsorientierte Entwicklungsforschung: Trends, Perspektiven, Defizite. *Petermanns Geographische Mitteilungen* 147 (1), 6-15.
- Kuhlmann, C., 2007. *Geschichte Sozialer Arbeit 2. Textbuch*. Wochenschau Verlag, Schwalbach.
- Kühlmann, T., 2009. Risiken der Kooperation in grenzüberschreitenden Netzwerken von Unternehmen. In: Kühlmann, T., Haas, H.-D. (Eds.), *Internationales Risikomanagement*. Oldenbourg München, 135-154.
- Kulke, E., 2007. The Commodity Chain Approach in Economic Geography. *Die Erde* 138 (2), 117-126.
- Kulke, E., 2013. *Wirtschaftsgeographie*. Ferdinand Schöningh, Paderborn.
- Kumar, R., Solankey, S. S., Singh, M., 2012. Breeding for drought tolerance in vegetables. *Vegetable Science* 39 (1), 1-15.
- Kunze, C., 2003. Lehmbautradition in Ghana. Eindrücke einer Studienreise. *IBO Magazin* (2), 21-23.
- Kyerematen, A., 2007. Stimulating Growth. *Ghana 2007. First Magazine*, London, 76-77.
- Lamnek, S., 1995. *Qualitative Sozialforschung Bd. 1. Methodologie*. Beltz, Weinheim.
- Lamnek, S., 2005. *Qualitative Sozialforschung*. Beltz, Weinheim.
- Laryea, A., Akuoni, S., 2012. An Overview of Trade Policies and Developments in Ghana. In: Ackah, C., Aryeetey, E. (Eds.), *Globalization, Trade and Poverty in Ghana*. Sub-Saharan Publishers; International Development Research Centre, Accra, 10-33.
- Laube, W., 2007. *Changing Resource Regimes in Northern Ghana: Actors, Structures and Institutions*. LIT, Berlin.
- Laube, W., 2009. *Creative Bureaucracy: Balancing power in irrigation administration in northern Ghana*. ZEF Working Papers No. 41. ZEF, Bonn.

- Laube, W., Awo, M., Schraven, B., 2008. Erratic Rains and Erratic Markets: Environmental change, economic globalisation and the expansion of shallow groundwater irrigation in West Africa. ZEF Working Papers No. 30. ZEF, Bonn.
- Laube, W., Schraven, B., Awo, M., 2011. Smallholder adaptation to climate change: dynamics and limits in Northern Ghana. *Climatic Change* 111 (3-4), 753-777.
- Laube, W., Schraven, B., Awo, M., 2013. Peasant Adaptation to Environmental change and Economic Globalization in Northern Ghana. In: Yaro, J. A. (Ed.), *Rural Development in Northern Ghana*. Nova Science Publishers, New York, 63-82.
- Laux, P., Kunstmann, H., Bárdossy, A., 2008. Predicting the regional onset of the rainy season in West Africa. *International Journal of Climatology* 28 (3), 329–342.
- Lentz, C., Sturm, H.-J., 2004. Von Bäumen und Erdschreinen. Interdisziplinäre Perspektiven auf die Siedlungsgeschichte der westafrikanischen Savanne. In: Albert, K.-D., Löhr, D., Neumann, K. (Eds.), *Mensch und Natur in Westafrika. Ergebnisse aus dem Sonderforschungsbereich 268 "Kulturentwicklung und Sprachgeschichte im Naturraum Westafrikanische Savanne"*. DFG; Wiley-VCH Verlag, Bonn.
- Linares, O. F., 2002. African rice (*Oryza glaberrima*): History and future potential. *Proceedings of the National Academy of Sciences of the United States of America* 99 (10), 16360-16365.
- Little, P., Watts, M., 1994. Living under contract: Contract farming and Agrarian transformation in Sub-Saharan Africa. In: Little, P., Watts, M. (Eds.), *Living under contract: Contract farming and Agrarian transformation in Sub-Saharan Africa*. University of Wisconsin, Madison, 97-139.
- Lohberg, F., 2001. *Stadtnahe Landwirtschaft in der Stadt- und Freiraumplanung: Ideengeschichte, Kategorisierung von Konzepten und Hinweise für die zukünftige Planung*. Ph.D. (published), Universität Stuttgart, Stuttgart.
- Long, N., Roberts, B., 2006. Changing Rural Scenarios and Research Agendas in Latin America in the New Century. *Research in Rural Sociology and Development* 11, 57-90.

Mabe, F. N., Sarpong, D. B., Osei-Asare, Y., 2012. Adaptive Capacities of Farmers to Climate Change. Adaptation Strategies and their Effects on Rice Production in the Northern Region of Ghana. *Russian Journal of Agricultural and Socio-Economic Sciences* 11 (11), 9-17.

Macmillan, 2007. Atlas for Ghana. Macmillan Education, Accra.

Manu, F. W., Amoa-Mansah, K., Baiden-Amisah, P. D., Nsiah-Achempong, N. K., 2008. Die Überschwemmung von Sandema im September 2007 - Auswirkungen auf Lehmbauten und der Weg in die Zukunft. *Lehm 2008. Tagungsbeiträge der fünften Fachtagung für Lehmbau*. October, 9-12, 2008, Weimar.

Manzano, V. J. P., Mizoguchi, M., 2013. Field Monitoring System and Analysis of Rainfall Data for Tomato Cropping Calendar in Batac City, Ilocos Norte, Philippines. *Journal of Nature Studies* 12 (2), 11-17.

Markusen, A., 1999. Fuzzy concepts, scanty evidence, policy distance: the case for rigor and policy relevance in critical regional studies. *Regional Studies* 33 (9), 869-884.

Martin, K., Sauerborn, J., 2006. *Agrarökologie*. Ulmer, Stuttgart.

McKendrick, J. H., 2009. Mixed and Multiple Methods. In: Thrift, N. J., Kitchin, R. (Eds.), *International encyclopedia of human geography*. Elsevier, Amsterdam, London, Oxford, 128-133.

Mdemu, M. V., 2008. Water productivity in medium and small reservoirs in the Upper East Region (UER) of Ghana. Ph.D. (published), ZEF, Bonn.

Mensah, E. J., 2012. The Sustainable Livelihood Framework: A Reconstruction. *The Development Review* 1 (1), 7-24.

MIDA, 2010. Investment opportunity in Ghana: Maize, rice, and soybean. Millennium Development Authority, Accra.

MIDA, 2012. Investment Opportunity in Ghana. Chili Pepper Production. Millennium Development Authority, Accra.



- Mieg, H., Brunner, B., 2001. Experteninterviews. MUB Working Paper 6. Professorship for human environmental relationships, Zürich.
- Milberg, W., Winkler, D., 2010. Economic and Social Upgrading in Global Production Networks: Problems of Theory and Measurement. Capturing the Gains Working Paper 4. University of Manchester, Manchester.
- MOFA, 2009. Expanded Tomato Production Program – Offer by Expom Ghana to the Government of Ghana. Ministry of Food and Agriculture Ghana, Accra.
- MOFA, 2010. Production Guide for Tomato. Ministry of Food and Agriculture Ghana, Accra.
- MOFA, 2011a. Agriculture in Ghana: Facts and Figures. Ministry of Food and Agriculture Ghana, Accra.
- MOFA, 2011b. Pest Management Plan. Ministry of Food and Agriculture Ghana, Accra.
- MOFA, 2013a. Agriculture in Ghana: Facts and Figures. Ministry of Food and Agriculture Ghana, Accra.
- MOFA, 2013b. Ministry of Food and Agriculture Ghana. <http://mofa.gov.gh>, 2013-11-06.
- MOFA RADU Bolgatanga, 2013. Rainfed Crop Production 2012. Ministry of Food and Agriculture, Regional agricultural Development Unit Bolgatanga, Bolgatanga.
- MOFA UER RADU, 2013. Annual on government of Ghana fertilizer & seed subsidies for 2012. Submitted to the Director of Crop Services, Accra. Ministry Of Food and Agriculture, Upper East Regional Agriculture Development Unit, Bolgatanga.
- Mohapatra, S., 2013. Decoding Patterns of Climate Change and Rice Disease. *Rice Today* 12 (3), 40-41.
- Mohapatra, S., 2014. Climate-smart rice for Africa. *Rice Today* 13 (2), 40-41.

- Monney, E., Poku, V. E., Amah, E., 2009. Baseline Survey of Tomato Production in Ghana. A Study of Twelve Production Districts in Four Regions. Directorate of Crop and Agriculture Engineering Services Ministry of Food and Agriculture, Ghana, Accra.
- Moormann, F. R., Breemen, N. v., 1978. Rice: soil, water, land. International Rice Research Institute, Los Baños.
- Morrison, P. S., Murray, W. E., Ngidang, D., 2006. Promoting indigenous entrepreneurship through small-scale contract farming: The poultry sector in Sarawak, Malaysia. *Singapore Journal of Tropical Geography* 27 (2), 191-206.
- MOTI, 2012. Proposal for Joint Venture with the Ministry of Trade and Industry in the Running of the Northern Star Tomato Company Limited. Ministry of Trade and Industry Ghana, Bolgatanga.
- Müller-Mahn, D., Verne, J., 2010. Geographische Entwicklungsforschung – alte Probleme, neue Perspektiven. *Geographische Rundschau* 62 (10), 4-11.
- NADMO, 2009. 2007 Data Assessment on Flood Victims, Crops and Livestock – UER. NADMO, Bolgatanga.
- NADMO, 2010. 2009 UER – Flood s. NADMO, Bolgatanga.
- NADMO, 2011. 2010 – UER Data on Flood and Rain. NADMO, Bolgatanga.
- NADMO, 2012. 2011 UER – March-May – Data on Households Affected by Windstorm and Rainstorm. NADMO, Bolgatanga.
- NADMO, 2013. 2012 UER – Latest Update on Flood Disasters. NADMO, Bolgatanga.
- Nadvi, K., 2008. Global standards, global governance and the organization of global value chains. *Journal of Economic Geography* 8 (3), 323-343.
- Navas-Alemán, L., 2011. The Impact of Operating in Multiple Value Chains for Upgrading: The Case of the Brazilian Furniture and Footwear Industries. *World Development* 39 (8), 1386–1397.

Neilson, J., Pritchard, B., 2009. Introduction. In: Neilson, J., Pritchard, B. (Eds.), *Value Chain Struggles*. Wiley-Blackwell, Oxford, 1-26.

Neilson, J., Pritchard, B., Yeung, H. W.-C., 2014. Global value chains and global production networks in the changing international political economy: An introduction. *Review of International Political Economy* 21 (1), 1-8.

Ngeleza, G., Owusua, R., Jimah, K., Kolavalli, S., 2011. *Cropping Practices and Labour Requirements in Field Operations for Major Crops in Ghana. What Needs to Be Mechanized?* IFPRI Discussion Paper 01074. IFPRI, Washington, DC.

Nortcliff, S., 2010. Soils of the Tropics. In: Dion, P. (Ed.), *Soil Biology and Agriculture in the Tropics*. Springer, Heidelberg; Dordrecht; London; New York, 1-15.

Obrist, B., Pfeiffer, C., Henley, R., 2011. Multi-layered Social Resilience: A New Approach in Mitigation Research. In: Hurni, H., Wiesmann, U. (Eds.), *Research for Sustainable Development: Foundations, Experiences and Perspectives*. NCCR North-South, Bern, 273-288.

OECD, 2009. *Regional atlas on West Africa*. OECD/SWAC, Paris.

Oinas, P., 1997. On the socio-spatial embeddedness of business firms. *Erdkunde* 51 (1), 23-32.

Orwa, C., Mutua, A., Kindt, R., Jamnadass, R., Simons, A., 2009. *Agroforestry Database: a tree reference and selection guide version 4.0*. *Vitellaria paradoxa*. [www.worldagroforestry.org/treedb2/AFTPDFS/Vitellaria\\_paradoxa.pdf](http://www.worldagroforestry.org/treedb2/AFTPDFS/Vitellaria_paradoxa.pdf), 2014-11-10.

Oteng, J. W., 1997. Rice production and development in Ghana. *International Rice Commission Newsletter* 46, 38-43.

Ouma, S., Boeckler, M., Lindner, P., 2012. Extending the margins of marketization: Frontier regions and the making of agro-export markets in northern Ghana. *Geoforum* 48, 225-235.

Ouma, S., Lindner, P., 2010. Von Märkten und Reisenden. *Geographische Rundschau* 62 (10), 12-19.

- Oya, C., 2004. Agricultural Mal-Adjustment in Sub-Saharan Africa in the Context of Macroeconomic Reforms. The Agrarian Constraint and Poverty Reduction: Macroeconomic Lessons for Africa, December 17-18, 2004, Addis Abeba.
- Oya, C., 2012. Contract Farming in Sub-Saharan Africa: A Survey of Approaches, Debates and Issues. *Journal of Agrarian Change* 12 (1), 1-33.
- Paasch, A., 2008. Verheerende Fluten – politisch gemacht. EU-Handelspolitik verletzt Recht auf Nahrung in Ghana – Die Beispiele Hühnchen und Tomaten. Germanwatch e.V., Bonn; Berlin.
- Patel-Campillo, A., 2011. Transforming Global Commodity Chains: Actor Strategies, Regulation, and Competitive Relations in the Dutch Cut Flower Sector. *Economic Geography* 87 (1), 79-99.
- Peet, M. M., Willits, D. H., 1995. Role of Excess Water in Tomato Fruit Cracking. *HortScience* 30 (1), 65-68.
- Pender, J., Place, F., Ehui, S., 1999. Strategies for Sustainable Agricultural Development in the East African Highlands. EPTD Discussion Paper 41. IFPRI, Washington, D.C.
- Pike, A., Legendijk, A., Vale, M., 2000. Critical reactions on 'embeddedness' in economic geography: the case of labour market governance and training in the automotive industry in the North-East region of England. In: Giunta, A., Legendijk, A., Pike, A. (Eds.), *Restructuring Industry and Territory. The Experience of Europe's Regions*. TSO, London, 59-82.
- Ponte, S., 2007. Governance in the value chain for South African wine. TRALAC Working Paper 9/2007. Trade Law Centre for Southern Africa, Stellenbosch.
- Ponte, S., Ewert, J., 2009. Which Way is "Up" in Upgrading? Trajectories of Change in the Value Chain for South African Wine. *World Development* 37 (10), 1637-1650.
- Prussin, L., 1969. *Architecture in Northern Ghana; a study of forms and functions*. University of California Press, Berkeley.
- Prussin, L., 1974. An Introduction to Indigenous African Architecture. *Journal of the Society of Architectural Historians* 33 (3), 182-205.

- Przepiorkowska, D., 2010. An Interpreted Focus Group Interview as a Type of Interpreter-Mediated Event. Translation Effects. Selected Papers of the CETRA Research Seminar in Translation Studies 2009. University of Warsaw, Warsaw.
- Przyborski, A., Wohlrab-Sahr, M., 2014. Qualitative Sozialforschung ein Arbeitsbuch. Oldenbourg, München.
- PWC Ghana, 2013. 2014 Budget Highlights – Rising to the Challenge: Re-aligning the Budget to meet Key National Priorities. PWC Ghana, Accra.
- Rabiee, F., 2004. Focus-group interview and data analysis. Proceedings of the Nutrition Society 63 (4), 655-660.
- Ragasa, C., Dankyi, A., Acheampong, P., Wiredu, N. M., Chapo-to, M., Asamoah, M., Tripp, R., 2013. Patterns of Adoption of Improved Rice Technologies in Ghana. IFPRI Working Paper No. 35. IFPRI, Accra.
- Rauch, T., 2003. Bessere Rahmenbedingungen allein beseitigen Armut nicht! Eine theoriegeleitete Vier Ebenen-Strategie für entwicklungspolitische Interventionen. Geographica Helvetica 58 (1), 35-46.
- Rauch, T., 2006. Zum Fortbestehen verurteilt – Kleinbauern der Länder des Südens im Globalisierungsprozess. Geographische Rundschau 58 (12), 46-53.
- Rauch, T., 2008. Geographische Entwicklungsforschung: Zum Umgang mit weltgesellschaftlichen Herausforderungen. Umgang mit Risiken: Katastrophen - Destabilisierung - Sicherheit: Deutscher Geographentag 2007, September 29-October 5, 2007, Bayreuth, 203-219.
- Rauch, T., 2012. Can Supply Chain Integration Help Small Farmers Survive? UK Parliamentary Investigation into the Integration of Smallholder Farmers into Supply Chains Submission of Evidence Based on Experiences from Sub-Saharan Africa. London.
- Rehm, S., Espig, G., 1976. Die Kulturpflanzen der Tropen und Subtropen: Anbau, wirtschaftl. Bedeutung, Verwertung. Ulmer, Stuttgart.

- Reuber, P., Pfaffenbach, C., 2005. *Methoden der empirischen Humangeographie*. Westermann, Braunschweig.
- Rimmer, D., 1992. *Staying poor : Ghana's political economy, 1950-1990*. Published by Pergamon Press for the World Bank, Oxford; New York.
- Robinson, E., Ngeleza, G., 2011. *Cartels and Rent Sharing at the Farmer-Trader Interface. An Example from Ghana's Tomato Sector*. IFPRI Discussion Paper 01065. IFPRI, Washington, DC.
- Robinson, E. J. Z., Kolavalli, S., 2010. *The Case of Tomato in Ghana: Processing*. GSSP Working Paper 21. IFPRI, Accra.
- Rossi, A., 2010. *Economic and Social Upgrading in Global Production Systems: The case of the Garment Industry in Morocco*. Ph.D. (published), University of Sussex, Brighton.
- Rossi, A., 2013. *Does Economic Upgrading Lead to Social Upgrading in Global Production Networks? Evidence from Morocco*. *World Development* 46, 223-233.
- Rothfuß, E., 2009. *Intersubjectivity, Intercultural Hermeneutics and the Recognition of the Other – Theoretical Reflections on the Understanding of Alienness in Human Geography Research*. *Erdkunde* 63 (2), 173-188.
- Ruben, R., Slingerland, M., Nijhoff, H., 2006. *Agro-food chains and networks for development: issues, approaches and strategies*. In: Ruben, R., Slingerland, M., Nijhoff, H. (Eds.), *The agro-food chains and networks for development*. Springer, Dordrecht, 1-25.
- Ruthenberg, H., 1971. *Farming Systems in the Tropics*. Clarendon Press, Oxford.
- Sachs, L., Hedderich, J., 2006. *Angewandte Statistik*. Springer, Berlin.
- Sakdapolrak, P., 2014. *Livelihoods as social practices – re-energising livelihoods research with Bourdieu's theory of practice*. *Geographica Helvetica* 69 (1), 19-28.
- Schamp, E. W., 2008. *Globale Wertschöpfungsketten. Umbau von Nord-Süd-Beziehungen in der Weltwirtschaft*. *Geographische Rundschau* 60 (9), 4-11.

Schneider, F., Ledermann, T., Fry, P., Rist, S., 2010. Soil conservation in Swiss Agriculture – Approaching abstract and symbolic meanings in farmers' life-worlds. *Land Use Policy* 27 (1), 332–339.

Scholz, K., 2010. Governance and upgrading in high-value chains of non-timber forest products the case of shea in Ghana. *Dipl.-Geogr. diploma-* (published), Goethe-University, Frankfurt/Main.

Schraven, B., 2010. Irrigate or migrate? Local livelihood adaptation in Northern Ghana in response to ecological changes and economic challenges. P.h.D. (published), Rheinischen Friedrich-Wilhelms-Universität, Bonn.

Schröder, H., 2010. *Lehmbau: Mit Lehm ökologisch planen und bauen*. Vieweg+Teubner Verlag; GWV Fachverlage, Wiesbaden.

Schultze, J. H., 1955. *Kartenbeilagen: Westafrika*. Wissenschaftliche Veröffentlichungen des Deutschen Instituts für Länderkunde. Neue Folge Band 13. Deutsches Institut für Länderkunde, Leipzig.

Schürmann, R., 1967. *The Market for Processed Fruit and Vegetables in Ghana*. FAO, Rome.

Schwarz, G., 1988. *Allgemeine Siedlungsgeographie*. Teil 1. De Gruyter, Freiburg.

Scoones, I., 1998. Sustainable rural livelihoods: a framework for analysis. *IDS Working Paper No. 72*. IDS, Brighton.

Scoones, I., 2009. Livelihoods perspectives and rural development. *The Journal of Peasant Studies* 36 (1), 171-196.

Scoones, I., Wolmer, W., 2002. *Pathways of change in Africa : crops, livestock & livelihoods in Mali, Ethiopia & Zimbabwe*. James Currey; Heinemann, Oxford; Portsmouth, N.H.

Sen, A., 1981a. Ingredients of Famine Analysis: Availability and Entitlements. *Quarterly Journal of Economics* 95 (3), 433-464.

Sen, A., 1981b. *Poverty and Famine. An Essay on Entitlement and Deprivation*. Clarendon Press, Oxford.

## References

---

Sen, A., 1981c. *Poverty and famines : an essay on entitlement and deprivation*. Clarendon Press ; Oxford University Press, Oxford; New York.

Sen, A., 1985. *Commodities and Capabilities*. Elsevier, Amsterdam.

SEND Foundation, 2008. *Free trade, small scale production and poverty in Ghana*. SEND Foundation, Accra.

Setboonsarng, S., 2008. *Global Partnership in Poverty Reduction: Contract Farming and Regional Cooperation*. ADBI Discussion Paper 89. Asian Development Bank Institute, Tokyo.

Simmons, P. R., 2003. *Overview of smallholder contract farming in developing countries*. ESA Working Paper No. 02-04 . FAO, Rome.

Singh, S., 2003. *Contract farming in India: impacts on women and child workers*. Gatekeeper Series No. 111. International Institute for Environment and Development, London.

Skop, E., 2006. *The Methodological Potential of Focus Groups in Population Geography*. *Population Space and Place* (12), 113-124.

Soil Research Institute, 1977. *Survey of the Tono Irrigation Project Area, Navrongo*. Soil Research Institute; Council for Scientific and Industrial Research, Kumasi.

Songsore, J., 2011. *Regional development in Ghana: the theory and the reality*. Woeli Publishing Services, Accra.

Stadlmayr, B., Charrondiere, U. R., Addy, P., Samb, B., Enujiugha, V. N., Bayili, R. G., Fagbohoun, E. G., Smith, I. F., Thiam, I., Burlingame, B., 2010. *Composition of Selected Foods from West Africa*. FAO, Rome.

Start, J., Johnson, C., 2004. *Livelihood Options? The Political Economy of Access, Opportunity and Diversification*. . Working Paper No. 223. Overseas Development Institute, London.

Strahler, A. H., Strahler, A. N., 2002. *Physische Geographie*. Ulmer, Stuttgart.



- Takeshima, H., Jimah, K., Kolavalli, S., Diao, X., Funk, R. L., 2013. Dynamics of Transformation. Insights from an Exploratory Review of Rice Farming in the Kpong Irrigation Project. IFPRI Discussion Paper 01272 . IFPRI, Washington, D.C.
- Tang, Q., Bennett, S. J., Xu, Y., Li, Y., 2013. Agricultural practices and sustainable livelihoods: Rural transformation within the Loess Plateau, China. *Applied Geography* 41, 15-23.
- Thrupp, L. A., Bergeron, G., Waters, W. F., 1995. Bittersweet harvests for global supermarkets: challenges in Latin America's agricultural export boom. World Resources Institute, Washington, D.C.
- Tonah, S., 2008. Chiefs, earth priests and the state: Irrigation agriculture, competing institutions and the transformation of land tenure arrangements in Northeastern Ghana. In: Ubink, J. M., Amanor, K. S. (Eds.), *Contesting land and custom in Ghana : state, chief and the citizen*. Leiden University Press, Amsterdam, 113-130.
- Trienekens, J., 2012. Value Chains in Developing Countries. In: van Dijk, P. M., Trienekens, J. (Eds.), *Global value chains: linking local producers from developing countries to international markets*. Amsterdam University Press, Amsterdam, 43-70.
- Tschakert, P., Sagoe, R., Ofori-Darko, G., Codjoe, S. N., 2010. Floods in the Sahel: an analysis of anomalies, memory, and anticipatory learning. *Climatic Change* 103 (3-4), 471-502.
- Turner, B. L., Kasperson, R. E., Matson, P. A., McCarthy, J. J., Corell, R. W., Christensen, L., Eckley, N., Kasperson, J. X., Luers, A., Martello, M. L., Polsky, C., Pulsipher, A., Schiller, A., 2003. A framework for vulnerability analysis in sustainability science. *PNAS* 100 (14), 8074-8079.
- UN-HABITAT, 2010. *Housing as a Strategy for Poverty Reduction in Ghana*. UN-HABITAT, Nairobi.
- United Nations Conference on Trade and Development, 2009. *World investment 2009 Transnational corporations, agricultural production and development*. <http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=348856>, 2014-11-23.

USAID Ghana, 2011. Ghana Climate Change Vulnerability and Adaptation Assessment. USAID, Washington, DC.

USAID Ghana, 2012. Ghana Agricultural Development and Value Chain Enhancement Project (ADVANCE). Third Annual : October 1, 2011 – September 30, 2012. USAID Ghana, Accra.

USDA, 2015. National Nutrient Database. <http://ndb.nal.usda.gov/ndb/foods>, 2015-02-10.

Van Dijk, P. M., Trienekens, J., 2012. Global value chains: linking local producers from developing countries to international markets. Amsterdam University Press, Amsterdam.

Van Dijk, T., 2011. Livelihoods, capitals and livelihood trajectories: a more sociological conceptualisation. *Progress in Development Studies* 11 (2), 101-117.

Van Wesenbeeck, C. F. A., Venus, V., Keyzer, M. A., Wesselman, B., Kye, D. A., 2014. Development of a horticulture production chain in Western Africa: a case study of tomatoes in Burkina Faso and Ghana. WP - 14 - 01 Stichting Onderzoek Wereldvoedselvoorziening van de Vrije Universiteit. Centre for World Food Studies., Amsterdam.

Venus, V., Asare-Kyei, D. K., Tijskens, L. M. M., Weir, M. J. C., De Bie, C. A. J. M., Ouedraogo, S., Nieuwenhuis, W., Wesselman, S. L. M., Cappelli, G. A., Smaling, E. M. A., 2013. Development and validation of a model to estimate postharvest losses during transport of tomatoes in West Africa. *Computers and Electronics in Agriculture* 92, 32-47.

Vergara, B. S., 1992. A farmer's primer on growing rice. International Rice Research Institute, Manila.

Von Franz, J., Schal, N., 2009. Practitioner's Guide – Transect Analysis. Method Finder's Practitioner's Guide. GTZ; Bundesministerium für Wirtschaftliche Zusammenarbeit u. Entwicklung, Eschborn

Voscon Associates Magna Consulting, 1997. GIHOC Pwalugu Cannery. Divestiture by Government of Ghana. Divesture Implementation Committee, Accra.

- Wacquant, L. J. D., 1992. Toward a Social Praxeology: The Structure and Logic of Bourdieu's Sociology. In: Bourdieu, P., Wacquant, L. J. D. (Eds.), *An Invitation to Reflexive Sociology*. The University of Chicago Press, Chicago; London, 1-59.
- Warning, M., .Soo Hoo, W., 2000. The Impact of Contract Farming on Income Distribution: Theory and Evidence. Western Economics Association International Annual Meeting June 30, 2000, Sydney.
- WASCAL, 2010. Core Research Program Overview of Work Packages. WASCAL, Accra.
- Watanmal Group, 2012. Africa, China & Tomato Paste. World Processing Tomato Congress, June 10-11, 2012, Beijing.
- Watts, M. J., 1983. *Silent violence: food, famine and peasantry in Northern Nigeria*. University of California Press, Berkeley.
- Watts, M. J., Bohle, H. G., 1993. The space of vulnerability: the causal structure of hunger and famine. *Progress in Human Geography* 17 (1), 43-67.
- Webster, C. C., Wilson, P. N., 1998. *Agriculture in the tropics*. Blackwell Science, Malden, MA.
- Weil, S., 2008. Is there a Legitimation Crisis in Qualitative Methods? *Forum Qualitative Sozialforschung* 9 (2), Art. 6.
- White, G., 1993. Towards a Political Analysis of Markets. *IDS Bulletin* 24 (3), 4-11.
- Whitfield, L., 2011a. Competitive Clientelism, Easy Financing and Weak Capitalists: The Contemporary Political Settlement in Ghana. DIIS Working Paper 2011:27. Danish Institute for International Studies, Copenhagen.
- Whitfield, L., 2011b. Growth without Economic Transformation: Economic Impacts of Ghana's Political Settlement. DIIS Working Paper 2011:28. Danish Institute for International Studies, Copenhagen.
- Widgren, M., 2010. Besieged Palaeonegritics or Innovative Farmers: Historical Political Ecology of Intensive and Terraced Agriculture in West Africa and Sudan. *African Studies* 69 (2), 323-343.

Wiesmann, U., Ott, C., Speranza, C. I., Kiteme, B. P., Müller-Böker, U., Messerli, P., Zinsstag, J., 2011. A Human Actor Model as a Conceptual Orientation in Interdisciplinary Research for Sustainable Development. In: Hurni, H., Wiesmann, U. (Eds.), *Research for Sustainable Development: Foundations, Experiences and Perspectives*. NCCR North-South, Bern, 231-256.

Williams, T. O., Powell, J. M., Fernandez-Rivera, S., 1995. Manure Availability in Relation to Sustainable Food Crop Production in Semi-Arid West Africa: Evidence from Niger. *Quarterly journal of international agriculture* 34 (3), 248-258.

Winter, R., 2011. Ein Plädoyer für kritische Perspektiven in der qualitativen Forschung. *Forum Qualitative Sozialforschung* 12 (1), Art. 7.

Woolcock, M., Sweetser, A. T., 2002. Social capital: the bonds that connect. *ADB Review* 34 (2), 1-26.

World Bank, 2007. *World Development 2008. Agriculture for development*. World Bank ; Oxford University Press, Washington, D.C.; New York.

World Bank, 2014. World Bank. [www.worldbank.org](http://www.worldbank.org), 2014-06-03.

Yap, C. L., 1997. Major issues of concern for the world rice economy in the medium term: an economic perspective. *International Rice Commission Newsletter* 46. FAO, Rome.

Yaro, A. J., 2013. The Story of Northern Ghana. In: Yaro, J. A. (Ed.), *Rural Development in Northern Ghana*. Nova Science Publishers, New York, 1-16.

Yeung, H. W.-C., Coe, N. M., 2015. Toward a Dynamic Theory of Global Production Networks. *Economic Geography* 91 (1), 29-58.

Yiran, G. A. B., Kusimi, J. M., Kufogbe, S. K., 2012. A synthesis of remote sensing and local knowledge approaches in land degradation assessment in the Bawku East District, Ghana. *International Journal of Applied Earth Observation and Geoinformation* 14 (1), 204-213.

Zech, W., Hintermaier-Erhard, G., 2002. *Böden der Welt: ein Bildatlas*. Spektrum, Heidelberg.

Ziai, A., 2011. Some reflections on the concept of 'development'. ZEF, Abteilung für Politischen und Kulturellen Wandel, Bonn.

Zoomers, A., 1999. Linking Livelihood Strategies to Development. Experiences from the Bolivian Andes. Royal Tropical Institute; Center for Latin American Research, Amsterdam.

Zoschke, H., 2008. Das Chili-Pepper-Buch 2.0 – Wissenswertes, Anbau, Produkte und Rezepte rund um Chili, Paprika & Co. Suncoast Peppers GmbH, Kressbronn am Bodensee.

Zündorf, L., 2010. Zur Aktualität von Immanuel Wallerstein. Einleitung in sein Werk. VS, Wiesbaden.

## *Erklärung*

Ich versichere, dass ich die von mir vorgelegte Dissertation selbständig angefertigt, die benutzten Quellen und Hilfsmittel vollständig angegeben und die Stellen der Arbeit – einschließlich Tabellen, Karten und Abbildungen –, die anderen Werken im Wortlaut oder dem Sinn nach entnommen sind, in jedem Einzelfall als Entlehnung kenntlich gemacht habe; dass diese Dissertation noch keiner anderen Fakultät oder Universität zur Prüfung vorgelegen hat; dass sie – abgesehen von unten angegebenen Teilpublikationen – noch nicht veröffentlicht worden ist sowie, dass ich eine solche Veröffentlichung vor Abschluss des Promotionsverfahrens nicht vornehmen werde. Die Bestimmungen der Promotionsordnung sind mir bekannt. Die von mir vorgelegte Dissertation ist von Prof. Dr. Boris Braun betreut worden.

Köln, 08.11.2015

---

*Jan-Niklas B a m l e r*