

**“Now you have a new pump, you have to manage it.”
Household water management, water rights and
institutional change in Northern Ghana.**

PhD thesis in Social Anthropology

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Zusammenfassung (German Abstract)

Die aktuelle Trinkwasserpolitik für ländliche Gebiete Afrikas setzt auf das Engagement der Wassernutzer in der Überzeugung, dass lokales Ressourcenmanagement zu mehr Entscheidungsmacht der Nutzer, besserem Zugang und zu größerer Nachhaltigkeit in der Wasserversorgung führt. In Ghana wurden im Rahmen des *National Community Water and Sanitation Program* (NCWSP) alle Handpumpen und viele kleinstädtische Leitungssysteme aus dem staatseigenen Wasserversorgungsbetrieb *Ghana Water Company Limited* (GWCL) ausgegliedert und in kommunales Eigentum umgewandelt. Seit Mitte der 1990er Jahre dominiert lokales kommunales Management diesen Bereich des Trinkwassersektors. Der ländlich-kleinstädtische Subsektor deckt alle Orte bis zu 50.000 Einwohnern ab. Er fällt unter die Verantwortlichkeit einer neu entstandenen staatlichen *Community Water and Sanitation Agency* (CWSA), welche die Sektorpolitik entwirft, technische und institutionelle Standards festsetzt, Wasserprojekte plant und deren Ausführung begleitet und beobachtet.

Entgegen der Annahme, dass kommunales Management das zentralisierte Managementsystem der GWCL ablöste, haben Wassernutzergruppen vor und während des Eingreifens staatlicher Autorität die Wasserversorgung und Verteilung von natürlichen und verbesserten Wasserquellen auf lokaler Ebene (mit-)organisiert und ein lokales Regelwerk geschaffen. Lokales Wassermanagement ist also nicht nur politische Innovation, sondern gleichzeitig eine althergebrachte Praxis, die jedoch auch historischen Wandel unterliegt. Obwohl beim kommunalen Management von Handpumpen und kleinstädtischen Leitungssystemen die gleiche Politik hinsichtlich der Versorgung und des Managements angewendet wird, scheint sich das kommunale Management ersterer besser zu bewähren. Da bisher eine detaillierte Untersuchung zum Wandel lokalen Wassermanagements und institutionellen Veränderungen beim Wechsel der Wasserversorgung von Handpumpen zu Leitungssystemen in Ghana fehlt, können bisher wenig Aussagen darüber getroffen werden, warum dieselbe Politik zu unterschiedlichen praktischen Ergebnissen führt.

Das Anliegen der Arbeit war die Sammlung empirischer Daten zur Bildung und Konzeption von Wassernutzergruppen von natürlichen und verbesserten Wasserquellen. Lokale Institutionen für lokales Haushaltswassermanagement waren dabei von besonderem Interesse, ebenso wie deren Wandel unter dem nationalen Trinkwasserprogramm. Dazu wurden Ereignisse, Prozesse und Ergebnisse der Trinkwasserpolitik untersucht, wie sie unter lokalen Wassernutzergruppen zu beobachten sind. Darüber hinaus ging es um die Identifizierung lokaler Interessen im Zusammenhang eines Entwicklungsprojektes zur kleinstädtischen Wasserversorgung. In diesem Kontext wurde das Verhältnis von lokalen Akteuren, der Distriktverwaltung und der CWSA untersucht.

Die zentralen Fragen der Arbeit lauten wie folgt: (1) Welcher sozioökonomische Wandel vollzieht sich im Untersuchungsort, welche Rolle spielt Haushaltswasser als Ressource für die lokale *livelihood*, und (2) welche lokalen Wasserrechte gibt es und wie haben sie sich im Kontext des nationalen Trinkwasserprogramms verändert? Welchen Einfluss haben Wasserechte zudem auf die Praxis der Wasserverteilung?

Die vorliegende Arbeit überdenkt kritisch die dominierende Wahrnehmung von lokalen Wassernutzern und Wassernutzung. Dazu wurden theoretische Konzepte aus der Ethnologie (institutioneller Wandel) und der Rechtsethnologie (Wasserrechte, Rechtspluralismus) herangezogen. Desweiteren wurden Aspekte aus dem Bereich der Politischen Ökologie und Umweltgeschichte in der Arbeit berücksichtigt, was auch dem Kontext der Forschung innerhalb des GLOWA-Volta Projektes zu verdanken war. Dieses untersucht Auswirkungen

von Klimawandel auf den Wasserkreislauf im westafrikanischen Volta Becken. Der Anspruch war, das lokale Management von Haushaltswasser hinsichtlich seiner Einbettung in eine spezifische ökologische und sozio-politische Umwelt zu betrachten, ohne eine historische Sichtweise zu vernachlässigen.

Als Fallstudie wurde ein peri-urbaner Ort in *Kassena-Nankana District* der *Upper East Region* gewählt, der zum Zeitpunkt der Feldforschung durch 27 Handpumpen, eine Handvoll von Hand gegrabener Brunnen und zwei kleine Reservoirs mit Haushaltswasser versorgt wurde. Bewässerung wird so gut wie nicht praktiziert, so dass dieser Aspekt der Studie außen vor bleibt. Von Mitte der 1970er Jahre bis 1989 wurde die Wasserversorgung des Marktzentrums nur unzureichend von einem durch die *Ghana Water and Sewerage Corporation* (der GWCL Vorgängerin) betriebenen Leitungssystem sichergestellt, das seit 1994 rehabilitiert bzw. neu gebaut werden soll. Als wichtigste Geber und Projektplaner im Wasserbereich treten in Nordghana CIDA und die Weltbank auf.

Methoden der klassischen Ethnographie, darunter ein neunmonatiger Feldaufenthalt, teilnehmende Beobachtung und verschiedene Interviewtechniken wurden zur Datenerhebung eingesetzt. Zusätzlich wurden zwei Umfragen im Untersuchungsort durchgeführt, die an lokale Wasserkomitees einerseits und an Gehöfte und Haushalte andererseits adressiert waren.

Die wichtigsten Ergebnisse der Studie verweisen auf die Wichtigkeit einer differenzierten Wahrnehmung lokaler Wasserverfügbarkeit. Auftretender Wassermangel ist ein Zusammenspiel von klimatischen, politischen, sozialen und institutionellen Faktoren. Entgegen der allgemeinen Wahrnehmung einer reduzierten Ressourcenverfügbarkeit, stieg die lokale Verfügbarkeit von Haushaltswasser im Untersuchungsort in der Trockenzeit aufgrund von Wasserentwicklungsprojekten und der Erschließung von Grundwasser-Ressourcen an.

Das Paradigma eines lokalen Managements von Wasserversorgung durch die Nutzer zeigte sich in der Praxis als erfolgreich. Nutzer griffen auf ihre existierende Managementverhalten zurück und implementierten die NCWSP nur in Teilen und selektiv. Lokale Institutionen, die sich im Umgang mit der natürlichen Umwelt bewährt hatten, wurden beibehalten. Lokale Institutionen zum Wassermanagement sind stark in den sozio-politischen Kontext eingebettet, und untereinander vernetzt. Ihre Robustheit reduziert die Anfälligkeit für ad hoc Wandel, wie er durch die Implementierung von neuen „Institutionen vom Reißbrett“ angestrebt wird.

Die Idee eines Menschenrechts auf Wasser, wie es auf internationalem Parkett gefordert wird, war lokal schon als Tabu des Ausschlusses von Wasser und in den herkömmlichen Wasserechten etabliert. Zugangsrechte zu Wasser verbesserten sich nicht in Folge des NCWSP, sondern wurden restriktiver, da das lokal typische dynamische Muster von Nutzergruppen im Falle der Handpumpen unterbrochen wurde. Statt flexibler Nutzergruppen dominieren nun formal organisierte und klar begrenzte Nutzergemeinschaften, die ein Monopol auf die Wasserechte an einer Handpumpe aufrechterhalten.

Das Management von kleinstädtischen Leitungssystemen wurde in der Studie als problematisch wahrgenommen. Beim Wechsel von Handpumpen hin zu Leitungssystem treten eine Reihe relevanter konzeptueller Veränderungen auf, die bisher keine Beachtung in der nationalen Trinkwasserpolitik fanden. Dazu zählen die Konzepte *community*, *payment for water* und *communal management*, die im ländlichen und kleinstädtischen Kontext sehr unterschiedliche Dinge bezeichnen. Dieses, sowie andere Probleme, manifestierten sich schon

vor der eigentlichen Fertigstellung und Übergabe des Leitungssystems an die Nutzer im Forschungsort.

Die Ressource Wasser war für fast alle Bereiche des Lebens und der Gesellschaft relevant. Hinsichtlich der Armutsbekämpfung sind vor allem Kleinstunternehmen von Interesse, die lokal zunehmend als Strategie angewendet werden, um Einkommensverluste in der Landwirtschaft auszugleichen. Viele dieser Unternehmen bedürfen relativ kleiner Wassermengen als Ressourceninput. Dieser Wasserbedarf ist der Kategorie Haushaltswasser zuzuordnen. Andere Klein- und Kleinstunternehmen gehören zur Kategorie der *smale-scale water enterprises*.

Die Forschungsergebnisse können zur Entscheidungsfindung von Politikern, lokalen Wasserexperten sowie Gebern beitragen. Einige der Empfehlungen finden sich ebenfalls in Arbeiten anderer Kollegen innerhalb und außerhalb des GLOWA-Volta Projektes.

Der produktiven Nutzung von Haushaltswasser sollte verstärkt Aufmerksamkeit in der Forschung, Politik und Wasserressourcenplanung zuteil werden. Das würde eine Reformulierung und Erhöhung der Mindeststandards von bisher 20 l/c/d notwendig machen.

Der ghanaische Trinkwassersektor sollte wieder Oberflächenwasser und verstärkt Regenwasser in die Überlegungen zum Ausbau der Versorgung mit Haushaltswasser einbeziehen. Da alle Wasserquellen für die Versorgung der Haushalte und dort für verschiedene Zwecke benötigt werden, ergeben sich Abhängigkeiten voneinander, die bisher wenig politische Beachtung fanden, weil der Blick zu sehr auf die Versorgung mit Trinkwasser gerichtet war. Haushaltswasser ist ein sektorübergreifendes Konzept, das sich an der Realität der Nutzer orientieren sollte.

Die Politik des kommunalen Nutzermanagements für Handpumpen sollte beibehalten und ausgebaut werden. Nutzer haben weiterhin Bedarf an technischer Weiterbildung bzw. Auffrischung derselben und an externer bedarfsorientierter Unterstützung durch *area mechanics* und die bereits existierenden *District Water and Sanitation Teams*.

Die Priorität für das Management von kleinstädtischen Leitungssystemen durch die Nutzer sollte überdacht werden. Ihre Einbeziehung in politische Entscheidungsprozesse ist zu begrüßen und sollte fortgeführt und ausgebaut werden. Eine adäquate Lösung für die typischen Probleme mit diesen Systemen bietet diese Managementoption allerdings nicht. Staatliches Engagement, z.B. in Form von Subventionen und der Schaffung verlässlicher Regeln zur Klärung von Zuständigkeiten, sind in diesem Bereich der Wasserversorgung unverzichtbar.

Lokale Forschung zu Wasserressourcenmanagement sollte verstärkt natürliche und sozio-politische Differenzen im Volta Becken in die Untersuchungen miteinbeziehen. Die Unterschiede in der Sozialorganisation sowie national ungleich verteilte Armut, Infrastruktur, Bildungsniveau und Wasserverfügbarkeit führen zu spezifischen Formen und Problemen des lokalen Wassermanagements.

Stichworte:

Haushaltswasser - kommunales Management – Wasserrechte – Ghana – Volta Becken

Outline

ACKNOWLEDGEMENTS	3
OUTLINE.....	8
ABBREVIATIONS.....	10
LIST OF BOXES	11
LIST OF TABLES.....	11
LIST OF MAPS	12
LIST OF PICTURES	12
1. INTRODUCTION	15
2.1. CONCEPTS OF DEVELOPMENT AND INSTITUTIONAL CHANGE	19
2.2. CONCEPTS OF WATER RIGHTS AND WATER LAW	29
2.2.1. <i>The law perspective</i>	29
2.2.2. <i>The legal anthropology perspective</i>	32
2.3. CONCEPTS OF PARTICIPATION	39
2.4. CONCEPTS OF WATER USER GROUPS.....	42
2.5. RESEARCH CONTEXT AND RESEARCH DESIGN	44
2.5.1. <i>The GLOWA-Volta research project</i>	44
2.5.2. <i>Objectives and research questions</i>	46
2.7. METHODOLOGY AND FIELD RESEARCH PRACTICE	47
3. GEOGRAPHICAL AND POLITICAL CONTEXT.....	56
3.1. NORTHERN GHANA.....	56
3.2. THE DISCOURSE ON RESOURCES AND DEVELOPMENT OF NORTHERN GHANA.....	60
3.3. HOUSEHOLD WATER DEVELOPMENT IN GHANA	69
3.4. THE NATIONAL COMMUNITY WATER AND SANITATION PROGRAM	75
4. INSTITUTIONAL CHANGES IN NANKANE SOCIO-POLITICAL ORGANIZATION.....	84
4.1. COLONIAL SOURCES AND SOCIAL RESEARCH IN NORTHERN GHANA.....	84
4.2. THE RESEARCH SITE	87
4.2.1. <i>Kassena-Nankana</i>	87
4.2.2. <i>The Kassena-Nankana district</i>	88
4.2.3. <i>Research village</i>	91
4.3. KINSHIP, SETTLEMENT AND RESIDENCE	93
4.4. LEADERSHIP.....	97
4.5. LIFE CYCLE	103
4.6. CONCLUSION.....	111
5. KNOWLEDGE SYSTEMS ON WATER RESOURCES AND WATER SUPPLY	113
5.1. ENVIRONMENTAL KNOWLEDGE	113
5.2. DATABASES ON WATER RESOURCES AND HOUSEHOLD WATER SUPPLY	116
5.2.1. <i>The national database on drinking water coverage</i>	116
5.2.2. <i>GLOWA- Volta database on local water resources and coverage</i>	121
5.4. CULTURAL KNOWLEDGE ON THE LOCAL ENVIRONMENT	132
5.5. LOCAL DISCOURSES ON WATER AVAILABILITY	140
5.6. CONCLUSION.....	146
6. HOUSEHOLD WATER AND LOCAL LIVELIHOOD.....	148
6.1. LIVELIHOOD DIVERSIFICATION AND PRODUCTIVE USES OF HOUSEHOLD WATER	148
6.2. LOCAL LIVELIHOOD	153
6.2.1. <i>Socio-economic stratification</i>	153
6.2.2. <i>Farming activities and livestock rearing</i>	155
6.2.3. <i>Food habits and nutrition</i>	161
6.2.4. <i>Water handling practices and health</i>	164

6.2.5. <i>Non-farm income generation</i>	170
6.3. HOUSEHOLD WATER USES AND WATER NEEDS	173
6.3.1. <i>Around the compounds</i>	173
6.3.2. <i>At the market</i>	174
6.4. LIVELIHOOD DIVERSIFICATION	176
6.4.1. <i>Micro-enterprises and small water enterprises</i>	176
6.4.2. <i>Productive uses of water - subsistence</i>	178
6.4.3. <i>Productive uses of water - micro enterprises</i>	182
6.4.4. <i>Productive uses of water – small water enterprises</i>	184
6.5. CONCLUSION	188
7. LOCAL HISTORY OF WATER SUPPLY AND WATER RIGHTS	191
7.1. HISTORY OF WATER AND CUSTOMARY HOUSEHOLD WATER RIGHTS IN GHANA	191
7.2. THE HISTORY OF WATER SUPPLY IN THE SUB-SECTION ABELETEO	198
7.2.1. <i>Dynamic water user group mosaic</i>	198
7.2.2. <i>Surface water sources (continuously)</i>	199
7.2.3. <i>Wells (1965 - mid 1970s)</i>	201
7.2.4. <i>The old piped system (mid 1970s to 1989)</i>	205
7.2.5. <i>Hand pumps (since 1970s)</i>	206
7.2.6. <i>Hand pumps and small reservoir (since 2005)</i>	208
7.3. HOUSEHOLD WATER RIGHT REGIME	209
7.3.1. <i>Overview</i>	209
7.3.2. <i>Ownership – rights to own</i>	213
7.3.3. <i>Access – use rights</i>	217
7.3.4. <i>Power – decision making rights</i>	220
7.3.4. <i>Usufruct rights</i>	229
7.4. CONCLUSION	230
8. WATER ALLOCATION PRACTICE.....	233
8.1. WATER ALLOCATION	233
8.2. THE SITUATION IN ABELETEO PUMP COMMUNITY	236
8.2.2. <i>Communal ownership of the pump</i>	240
8.2.3. <i>Use rights to the Abeleteo hand pump</i>	242
8.3. PREFERENCES FOR WATER SOURCES	245
8.4. COMPOUND WATER FETCHING PATTERN	248
8.5. COMPOUND WATER ALLOCATION PRACTICE	251
8.6. WATER FETCHING PATTERN AND WATER ALLOCATION AT MARKET SITE	255
8.7. CONCLUSION	257
9. SMALL TOWN WATER SYSTEMS – SAME POLICY - DIFFERENT OUTCOME.....	263
9.1. FAILING SMALL TOWN WATER SYSTEMS	263
9.2. COMMUNITY-BASED MANAGEMENT OF SMALL TOWN WATER SYSTEMS	265
9.2.1. <i>Small town water systems in Northern Ghana</i>	265
9.2.2. <i>The Sirigu small town water system project – a chronology</i>	266
9.3. LACK OF CAPACITY AND OVERSIZED SYSTEMS	271
9.4. SIZE OF THE COMMUNITY AND LOCAL SOCIAL DYNAMICS.....	277
9.4.1. <i>Limits for community-based management</i>	277
9.4.2. <i>The Sirigu Water Boards and other interest groups</i>	279
9.5. CONCEPTUAL AND INSTITUTIONAL CHANGES	282
9.5.1. <i>Community – from user group to administrative unit</i>	282
9.5.2. <i>Payments for water – from borehole fee to water tariff</i>	283
9.5.3. <i>Community-based management – from minimal to professional</i>	288
9.6. CONCLUSION	289
10. FINAL CONCLUSION AND POLICY RECOMMENDATIONS	291
REFERENCES	295
APPENDIX	315

Abbreviations

AWSDB	Association of Water and Sanitation Development Boards
CDD	Community Driven Development
CSF	Common Sample Frame (of GLOWA-Volta project)
COM	Community Ownership and Management
COWAP	Community Water Project
CMO	Community Mobilizer
CIDA	Canadian International Development Agency
CWSA	Community Water and Sanitation Agency
CWSP	see NCWSP
DA	District Administration
DANIDA	Danish International Development Agency
DISCAP	District Capacity Building Project
DWST	District Water and Sanitation Team (of DA)
DRWD	Department of Rural water Development (of PWD)
DRWS	Department of Rural Water Supply (of PWD)
DSS	Decision Support System (= DST)
DST	Decision Support Tool (as developed by the GLOWA-Volta project)
GAP	GWSC Assistance Project
GLOWA	Globaler Wandel des Wasserkreislaufs (global change of water cycle)
GoG	Government of Ghana
GWCL	Ghana Water Company Limited
GWSC	Ghana Water and Sewerage Corporation
HIPC	Highly Indebted Poor Countries
MDGs	Millennium Development Goals
MWH	Ministry of Works and Housing
NCWSP	National Community Water and Sanitation Program
NIE	New Institutional Economics
NIA	New Institutional Anthropology
NORRIP	Northern Region Rural Integrated Project
NRM	Natural Resources Management
O/M	Operation and Management
PWD	Public Works Department
RWST	Regional Water and Sanitation Team (of CWSA)
SAP	Structural Adjustment Program
SIP	Strategic Investment Plan
SWOPA	Sirigu Women Organization for Pottery and Art
UER	Upper East Region
UWR	Upper West Region
WATSAN	Water and Sanitation Committee
WHO	World Health Organization
WRC	Water Resources Commission
WRM	Water Resources Management
WSDB	Water and Sanitation Development Board
WUP	Water Utilization Project

List of boxes

Box 1 Multidisciplinary concept of institutions	26
Box 2 Water uses exempted from water use permits in Ghana.....	31
Box 3 Country profile Ghana	56
Box 4 Organizational framework of rural and peri-urban drinking water sector.....	82
Box 5 Sectional division of Sirigu.....	96
Box 6 Rainfall data Sirigu	123
Box 7 Nankane vocabulary – rain	136
Box 8 Nankane vocabulary - water sources	139
Box 9 Case study: The Mission Dam reservoir – land rights, Gods and people.....	144
Box 10 Productive uses of household water – at the sector interface	151
Box 11 Case study: Medical water use in bageba’s compounds.....	170
Box 12 Case study: The water oracle - Nyu ko’om investigaton.....	170
Box 13 Case study: Livestock rearing.....	179
Box 14 Case study: Production of food and drinks	182
Box 15 Case study: Water carrier business	185
Box 16 Case study: Water vendor business	187
Box 17 Article 257/ 6 of the Ghanaian Constitution.....	194
Box 18 Customary household water right regimes in Ghana.....	196
Box 19 Case study: Present day shallow wells at Zokko River	201
Box 20 Case study: Hand dug wells in 2006.....	205
Box 21 Case study: Water provision by NGOs.....	214
Box 22 Case study: Contested ownership of a borehole	216
Box 23 Case study: Joining a well community	222
Box 24 Water committee guidelines	223
Box 25 Case study: Selection of committee member.....	224
Box 26 Case study: The right and obligation to manage.....	228
Box 27 Case study: Livestock ownership and preferences for water sources.....	246
Box 28 Case study: Water shortage at household level.....	255
Box 29 Speech of the WSDB chairman to the Sirigu community	266
Box 30 From borehole fee to water tariff – exemplary calculation.....	286

List of tables

Table 1 Three pillars of institutions.....	25
Table 2 Anthropological perspectives on NRM institutions	27
Table 3 Water rights – irrigation versus household water.....	37
Table 4 Water right categorization	38
Table 5 Concepts of participation.....	42
Table 6 Water user groups versus water user communities	43
Table 7 Household water supply management until 1959	72
Table 8 Millennium Development Goals	75
Table 9 Structural changes in Ghana’s drinking water sector since 1965.....	77
Table 10 Management options for drinking water supply since 1991	77
Table 11 External financial dependency of NCWSP	79
Table 12 Access to drinking water supply (coverage data global versus Africa) in 2000	114
Table 13 Percentage of population with access to safe drinking water in Ghana	120

Table 14 Inconsistent statistics on improved water coverage.....	121
Table 15 Boreholes and pump communities in Sirigu.....	128
Table 16 Ritual calendar	139
Table 17 Farming calendar	157
Table 18 Water and diseases.....	167
Table 19 Water uses at compound site.....	174
Table 20 Water uses at market site	175
Table 21 Local water right regime overview	209
Table 22 Local use rights.....	219
Table 23 Sources of income in pump community Abeleteo.....	238
Table 24 Water fetching pattern for compound uses	248
Table 25 Community Contribution for Sirigu water project	269
Table 26 GWSC Statement of income and expenditure on Sirigu water system. From January-March 1985	284

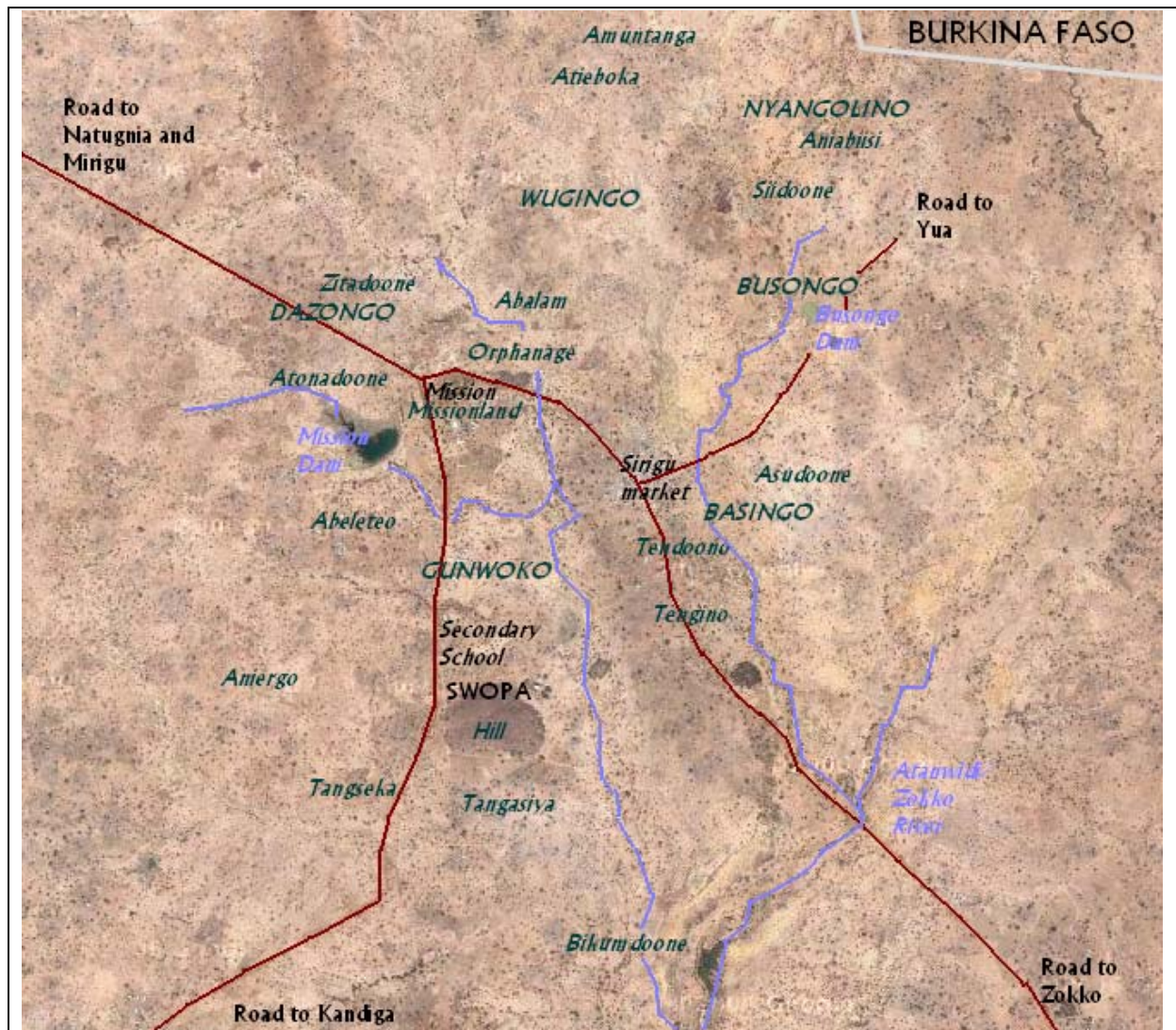
List of maps

Map 1 The main research site Sirigu	13
Map 2 Ethnographic map of Ghana	14
Map 3 The Atankwidi catchment and borehole density in the Volta River Basin	45
Map 4 Sites of field research.....	48
Map 5 Ghana and Northern Ghana	59
Map 6 Kassena-Nankana district and the location of Sirigu.....	89
Map 7 Water supply at Sirigu market dry season 2004	131
Map 8 Pump community Abeleteo	236
Map 9 New water system design	275

List of pictures




Picture 1 Participant observation	50
Picture 2 Water facility inventory and interviews	51
Picture 3 Water committee survey	52
Picture 4 Aboriginal well in Gonja and Dagomba settlements.....	70
Picture 5 SWOPA compound	92
Picture 6 Compound house and general floor plan	94
Picture 7 Simple hand dug wells in Nyangolino.....	126
Picture 8 Food sellers at the market.....	176
Picture 9 Borehole irrigated dry season garden and dish pottery	180
Picture 10: Construction of compound houses	181
Picture 11 Daam brewery.....	183
Picture 12 Water hunting in the 1950s (Kassena-Nankana)	200
Picture 13 Shallow wells in 1953 and 2005	201
Picture 14 The dry Amiziah well in Abeleteo.....	204
Picture 15 The Mission Dam reservoir in late dry season 2004 and 2005.....	209
Picture 16 Transport of water.....	250

Map 1 The main research site Sirigu



Source: google maps images, add-ins by author

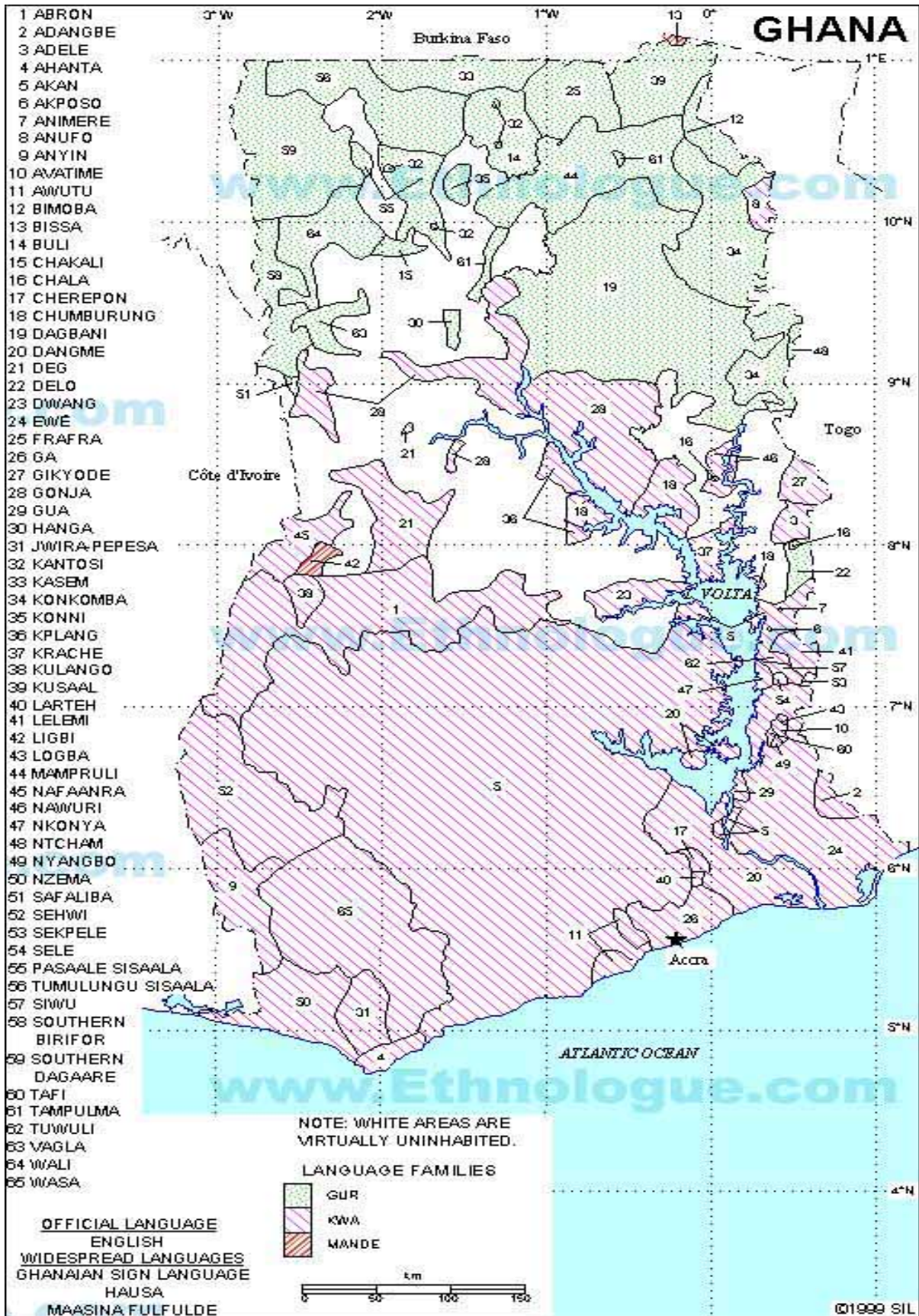
DAZONGO Village section
Abeleteo Village subsection
Mission Dam Permanent surface water body

 Streams (perennial and non-perennial)
 Feeder roads
 National border



Please note that it is only a selection of existing village sub-sections and streams which are indicated to enhance the comprehensiveness of the map linked to the geographic locations mentioned in the text.

Map 2 Ethnographic map of Ghana



Source: Gordon (2005)

1. Introduction

The study is concerned with water - a natural resource, which embodies a combination of specific and unique characteristics. One of them is the incorporation of it in the human body. *“Though we appear to be solid, we are really liquid bodies [...] And although we tend to dry up a little bit as we grow older, we still remain mostly water (about 65 percent)”* (Hillel 1994: 20). Freshwater is indispensable and irreplaceable for human life, especially for primary uses, such as drinking, food preparation and hygiene. It is necessarily interwoven with human societies, their settlements and their history. Water management is embedded in local resource management schemes, which also embrace other natural resources, such as land, flora and fauna. It is informed by interactions between people and their natural but also their socio-political environment. Management practices and rules over resource use and allocation may be adapted to the environment and transferred from generation to generation and in this way become a part of the institutional repertoire of a society. But the environment also undergoes changes and people react towards these changes. At the same time, human activities shape their socio-political but also their natural environment. This dissertation focuses on such changes and interrelationships by the examination of household water and its local management.

The field research area of this study, the Upper East Region, has been facing persistent poverty more than any other region of Ghana. It is situated in the northern part of the Volta River basin, where Ghana borders Burkina Faso. There, the state of the natural environment in general is understood as problematic. It shows negative trends in terms of resource availability and environmental sustainability. Questions of local and national Water Resources Management (WRM) increasingly gain importance and demand for research because water resources are limited in this semi-arid environment. In rural Ghana, it is local water user groups, which manage their household water supply. In the official political discourse, it is participatory ‘community-based management’, which superseded centralized state management of rural water supply at the end of the 1990s. The title of this study *“Now, you have a new pump, you have to manage it.”* quotes from a hand pump manual, which was handed out to local water users (GWSC NO YEAR). This work rethinks the ‘community-based management’ paradigm by applying a wider historical timeframe, by considering the embedment into an ecological and socio-political environment and by approaching the topic from a legal anthropological perspective.

The study contributes to the on-going debate on the opportunities and constraints of local WRM. Questions raised within this debate are for example: Are local users capable to manage their resources in a sustainable and efficient way? What impact do development interventions have on a local resource management scheme? What is the role of socially embedded and politically crafted institutions for local resource management? Or, how does local resource allocation and resource use relate to poverty alleviation?

Field research was conducted in a rural settlement of Kassena-Nankana district in Ghana's Upper East Region. The two main research questions, which this work approaches, are (1) what socio-political changes and processes go on in the field site? What role does water as a resource play for the local livelihood? And (2) what local water right regime exists and how has it changed in the context of the present National Community Water and Sanitation Program? What impact do water rights have on allocation practice?

This study on local WRM has several theoretical backgrounds, such as the study of institutions for common property resource management, legal anthropology (Spiertz 2000), political ecology (Escobar 1999, Ibid. 2003, Zimmerer and Basset 2003) and environmental history (Fairhead and Leach 1996). Institutions of WRM serve as starting point of research and theoretical exploration. Water rights are central institutional components of the local water management; one main assumption was the existence of legal pluralism in the local arena, which is caused by the interface of local water rights, drinking water policy, guidelines for rural water project implementation and water management manuals. Further, it is assumed that customary law, state law and project law contribute to local water law. A political economy and political ecology perspective questions popular narratives of resource degradation as they dominate the resource management discourse on Northern Ghana. Studies of local environmental history provided additional data on other natural resources and a more general view on the state of the environment in the study region.

The understanding of institutions was conceptualised in a generous manner as enduring social structures, conventions and forms of organization. Hence, the empirical data collection, analysis and interpretation considered legal and administrative arrangements, norms and values, customs and routines, as well as belief and knowledge, which were related to household water. These institutions are related to each other in a culture-bound and environment-specific way. Seasonal variation of water availability is a central issue for local livelihood in semi-arid environments. It determines what economic activities can be pursued

at what period and specific water uses and water requirements result from it. Both factors are environment-dependent and result of human agency and decision-making. Moreover, water use and water needs are inscribed in local institutions, such as the division of labour, the festival and ritual calendar, or local forms of leadership.

The starting point of this study was the question: How do people in a semi-arid environment organize their water supply and allocate the scarce resource? A number of sub-questions had to be approached, such as what do people use water for? Water use describes water-related activities, which are performed to contribute to the local livelihood – nutrition and health, reproductive and productive uses. Particular water uses require specific amounts of water, a typical frequency of resource availability and a specific water quality. These three components are summarized as water needs or water requirements. The investigation aimed to find out: What kind of water, how much and how often is it needed? Both water uses and water needs can be identified on a general societal level and on an individual or household level. The water offered by the environment is shared and distributed among local water users before its utilization. This activity is referred to as water allocation practice. Of course, not all water is shared; most of it drains into tributaries of the Volta River, evaporates or recharges groundwater aquifers. It is only a relatively small quantity, which is extracted and consumed by water users before it returns to the hydro cycle. Since the resource is limited in the study region during the dry season, water allocation is subjected to principles and rules. Water rights determine entitlements to water and are part of local water law. In the context of this study, it is mainly non-administrative water rights, which are of interest. Such rights are influenced not only by water availability but also by water needs and the socio-political organization of the society. Socio-cultural norms do not only have an impact on water rights but also on local water handling practices. Such practices include how water is transported, stored, treated and disposed after consumption. Health and hygiene practices are closely related to this issue. Belief and local knowledge about causal relations between human behaviour and health shape water-handling practices. They have a direct impact on local livelihood.

All the ideas and requirements mentioned are put in place, shaped, changed and translated into practice by human beings, who make use of water available in their environment. Thus, a study of local water management has to take an actor-oriented approach to some extent. But local water management cannot be understood without looking at the society as a whole. An understanding of its embedding into a particular natural environment and socio-political

context as well as the knowledge of its history is needed. They result in structural factors, such as rules and other institutions, which form the specific framework for local resources management. Therefore, the focus of this work is laid on structural and institutional factors.

The outline of this study is as follows: The second chapter introduces the theoretical concepts, such as development and institutional change, water rights, participation, and water user groups. In its second part, the research design, as well as the field research is presented. The third chapter provides the geographical and political background for the present study. It contains an overview over Northern Ghana, on-going debates about the role of its natural resources, the history of water development and the present drinking water policy. In the fourth chapter, the ethnographic context of Nankane society is described. At the same time, changes in socio-political institutions and the impact of development on local institutions are discussed. Chapter five is concerned with the geo-hydrological environment and water supply at the research site. It traces the interrelation between society and its natural environment. Moreover, it discusses existing knowledge systems on water and other natural resources and the ways of how this knowledge is managed. The focus of the sixth chapter is on the local livelihood and the role that water plays in it. Water handling practice is also dealt within this context. In chapter seven, the local history of water supply is outlined. The historical data is linked up to the history of the settlement and present water supply in the village. The second part of the chapter is dedicated to the local water right regime and the changes it underwent during the past decades and under the NCWSP. The eighth chapter describes the water fetching pattern and decision-making over household water resources. It further presents a case study of a pump community and data on practical water allocation among its members. Chapter nine traces conceptual changes and problems in community-based water management when a small town water system supersedes rural water supply provided by hand pumps. In addition, it tells the story of the planning and implementation of a small town water project under the NCWSP. A final conclusion and policy recommendations are the subjects of chapter ten.

2. Theory, methodology and field research

“...by no means all, nor even the most important social changes necessarily get their principal impetus from legislated or other legal innovation”
(Moore 1973: 730)

2.1. Concepts of development and institutional change

The study is informed by multiple theoretical ideas. Three of them can be identified as crucial, namely, (1) a genuine social science approach to institutions; (2) a legal pluralism approach with focus on water rights; and (3) an approach derived from political ecology and environmental history. The outcome is a theoretical framework for water resource management, which takes a historical perspective into account, which considers the embedment of the research site in a specific ecological, socio-political and development context. Moreover, the approach includes the view on local water law and recognizes the differences between rule and practice. It is the dynamics in a complex socio-ecological system, which is of interest. People act within and interact with their particular natural and political environment. Rules over resource use and allocation are informed by these environments and may become part of the institutional repertoire of a society, meaning that they get institutionalized as socio-cultural repertoire. However, water use and allocation can also manifest as ad hoc processes.

The present study is understood as a contribution to the field of Anthropology of Development, explicitly made clear by Escobar *“a type of anthropological practice that distances itself from mainstream development institutions and conceptions, even when working within the ‘development field’”* (Escobar 1991: 577). This means that although the research is embedded into a development-oriented research project and delivers tools for political decision-making, the research questions raised go beyond questions of applicable results to serve development targets; for example the political economy approach may explain the present situation and raise awareness for the importance of historic processes but it does not provide a manual for political decision-making.

Most politicians, development workers, and academics, understand the term ‘development’ in a general sense as change, which happens within a society. Kievelitz, for example, defined development as a universal tendency of societies towards change aiming at better adaptation to the natural and social environment. According to him, it serves the assurance of long-term

existence of groups and is based on their capability to deal actively and reactively with environmental requirements (Kievelitz 1988: 251). Changes may root from within the society or be induced externally. This perception is less wide reaching than the one dominant in the present development discourse. The dominant perception of development includes a normative, unilinear and evolutionist understanding of local processes of change. The concept is teleological in character mostly understood in economic terms, as either increased income or capacity etc. Progress is a central notion of the dominant development discourse.

From a historic and social-anthropological perspective, scepticism is unavoidable. Change is a universal characteristic of all societies – even though it may take different forms across time and place. All societies are capable to embody innovations whether emerging internally or influenced by external factors. In this study, innovation is understood in a wide sense as “*any grafting of technique, knowledge or hitherto unused mode of organization (usually in the form of local adaptation, borrowing or importation) onto previously existing techniques, knowledge and modes of organization*” (Olivier de Sardan 2005: 90). The integration of innovation into the existing social field is a process; historical changes and processes are neither one-directional, nor do they necessarily contribute to any improvement or better adaptability to existing natural and social conditions. Processes of change in the context of development intervention form a particular category of change, which happen in a typical hegemonic constellation of power, actors, interest and resources. One can distinguish visible changes from deep changes (Moore 1973: 730). It is the latter, which is considered as institutional change.

From a historical and anthropological point of view it is helpful to differentiate between the concept of change and the concept of development. Change may embrace different facets, such as social change, economic change, legal and normative change, technological change, as well as changes in belief system or knowledge systems. It is a historic process, which happens everywhere and all the time but not necessarily evolutionary.

The concept of development, as it is used in this study, does not describe change but only a particular type of change – local change, which is intentionally initiated by external actors. Olivier de Sardan defines development from a methodological perspective as “*a sum of the social processes inducted by voluntary acts aimed at transforming a social milieu, instigated by institutions or actors who do not belong to the milieu in their attempt at grafting resources and /or techniques and /or knowledge.*” (Olivier de Sardan 2005: 25). As he states further,

this definition intentionally excludes any normative connotation. Development as understood in this sense is embedded in a development configuration, referring to “*this essentially cosmopolitan world of experts, bureaucrats, NGO personnel, researchers, technicians, project chiefs and field agents, who make a living [...] out of developing other people, and who [...] mobilize and manage a considerable amount of material and symbolic resources.*” (Ibid. 2005: 25).

Processes of change and development always take place at the interface of heterogeneous and at times contradictory factors, which characterise the local project communities on one hand and the development professionals on the other. Such heterogeneity concerns norms, value systems, knowledge, action, logics or social systems. Hence, the community and development arena is a place where “*phenomena of confrontations, negotiation, rejection, sidetracking, subversion, power struggles, compromise and transaction come into play*” (Ibid. 2005: 60). Such processes of change are situated at the interface between structural contingencies and the action of social agents (Ibid. 2005: 60-61).

Anthropology of development in Africa is to a large extent the anthropology of contemporary Africa because there is hardly any aspect of society, which is not yet affected by development in one way or the other. Development studies may address development “*as one component, among others, of African modernity, studied with as great an empirical rigour as possible.*” (Ibid. 2005: 15). Societies are examined in a methodological holistic way, which does not stress the difference between economic, socio-political, religious and symbolic practices but shows the interference and relatedness of these spheres of society; development is strongly interwoven with the others.

There are different kinds of development, and they may or may not simultaneously target technical innovation, capacity building or institutional change. The latter comprises the revision of statutory law, the crafting of institutions and the intended change of local norms and customs or practices by education campaigns. All three categories may be summarized as institutional development. For the development of jurisdiction, legal development could also be a possible terminology. The idea behind institutional development is that a change in practice can be reached through the change of law, rules and norms. Institutional development is a process of targeted legal or institutional engineering by actors of the development configuration, which is expected to bear the intended fruits in practice. In fact, this is not always the case.

Already in 1973, long before institutional development was a standard part of donor activities, Moore was sceptical about views, which assumed law to be an appropriate tool for social engineering. According to him, law in general “*is abstracted from the social context in which it exists, and it is spoken of as if it were an entity capable of controlling that context*” (Moore 1973: 719). From her point of view, quite the opposite is happening. It is the social context, which results in law; one can also extend this position to other institutions than law.

Currently, there are many definitions of how to understand institutions. Although social science disciplines and schools differ in their ways of conceptual design, the general and current interest for research, analysis and theory in institutions unifies them and encourages interdisciplinary dialogue. New Institutional Economics (NIE) provides the most dominant theoretical framework in the present development configuration. North compares institutions with rules of a sports game, which perhaps contributed to the popularity of his understanding of institutions as “*formal written rules as well as typically unwritten codes of conduct that underlie and supplement formal rules*” (North 1990). From the NIE perspective, natural resources can be better managed when rules over their use are clearly defined, decision-making authorities are clearly determined and sanctions of rule breaking is predictable for the actors. Formalization of existing institutional arrangements, codification of rules, identification of optimal (locally unchallenged) authority structures, and specific mechanism for conflict resolutions and resource allocation contribute to transparency of the management system and are presumed to result in a more efficient management of the natural resource. This is because individual users may act in an arena, which provides them with sufficient information and security to balance their benefit and cost at individual and community level as well as efficient means to guard their interest against free-riders.¹

Economists and scholars from other disciplines have adopted the NIE definitions and applied them to their particular research context. According to one such scholar working on household water in Ghana, institutions include “*all the norms and values, conventions, rules, legal and administrative arrangements that together provide and define the modus operandi of a group engaged in the provision and distribution of social services for the benefit of its members on a collective basis.*” (Bacho 2001a: 59). Anthropologists and sociologists took up some NIE ideas and terminology and integrated them into their theoretical frameworks. One theoretical outcome is the approach of New Institutional Anthropology (NIA), which

¹ NIE literature embodies two approaches (Common Property Resources approach and transaction cost approach), which differ slightly in their perception of institutions (for critical review see Metha et al. 2005).

combines economic approaches to explain human behaviour and anthropological insight to institutions with Giddens theory of structuration (e.g. Ensminger 1998, Haller 2002.) or with cognitive theories (Guillet 2000). It was used for the study of management institutions of irrigation water (e.g. Guillet 1998, Ibid. 2000, Laube 2006). Others applied the NIE framework to their empirical data but found it less helpful and returned to existing anthropological concepts of institutions (e.g. Cleaver 2002, who worked on rural household water management in Zimbabwe and Tanzania). Several points of NIE are problematic when confronting the theory with empirical data. It is but wishful thinking that resources management is a game in which all participants prioritize existing rules in the same way and act accordingly.

In a further reaching approach, sociologist Scott summarized components from the multidisciplinary literature of institutions, which make up a general concept of institutions. First of all, institutions are social structures, which outlive generation. As such, institutions are stable and to a high degree resilient to changing circumstances although they undergo changes to some extent. *“Institutions are composed of cultured-cognitive, normative and regulative elements that, together with associated activities and resources, provide stability and meaning to social life.”* (Scott 2001: 48). Behaviour as observed in associated activities forms a crucial component of institutions because social structures get not only produced and reproduced in social interaction but also get shaped and maintained by interaction of actors, who are connected with each other over power relations. Material resources contribute to power relations insofar as ownership of resources may legitimate resource use and decision-making authority. Symbolic systems, social relationships, routines and artefacts can embody institutions. To take institutions for water management, for example, the religious meaning and role of water, water rights (which indicate property relationships between people), water fetching practices or withdrawal technologies may implicate norms, conventions and rules for water withdrawal or water allocation. Institutions are not only manifested on macro level (global, national) but at all levels including local, where they may manifest in interpersonal relationships (Ibid. 2001). There is a general consensus that *“Institutions provide guidelines and resources for acting as well as prohibitions and constraints on action.”* (Ibid. 2001: 50).

Scott draws his summary mainly on Giddens, who defines institutions as *“more enduring features of social life [...] giving ‘solidity’ across time and space”* (Giddens 1984: 24). According to Scott, such enduring social structures are based on three pillars: the regulative pillar, the normative pillar and the cultural-cognitive pillar (Scott 2001: 52). The least

common denominator is that they are enduring social structures, which manifest in conventions and organizational forms. The analysis of the regulative pillar includes the analysis of processes of coming into life of rules (rule setting, drafting, and emergence), implementation, monitoring and sanctioning. The idea behind this perspective, which is strongly stressed by the NIE scholars and economic historians, such as North, is that rules may have strong impact behaviour and therefore institutions can regulate behaviour. This opens theoretically the ground for manipulation attempts, e.g. in form of institutional crafting and implementation of new institutions to encourage, facilitate or enhance an intended change in behaviour. Ostrom introduced design principles for robust, efficient and enduring NRM institutions (Ostrom 1990). *“The practical appeal of this approach has been enormous.”* (Cleaver and Franks 2005: 1). The suggested design principles are translated as blueprints in policy and project documents. They made themselves somehow independent resume Cleaver and Franks because Ostrom’s contributions were not meant this way and display much more theoretical nuance. Also, theoretically, the approach has been under critique by a number of institutional scholars. Narrow functionalism, underlying ideas of evolutionism and oversimplification of social reality and social process were identified as main weak points of the design principle approach (Ibid 2005). From an anthropological point of view, it is important to note, that the terminology ‘crafted institutions’ is misleading in most of the empirical cases. One can craft management bodies, laws or rules but for them to be called institutions, they have to gain enduring foothold in society. Only after a process of institutionalization, they become proper institutions. Hence, whether a crafted form of organization turns out to be an institution can only be judged after some time period, such as some years or a generation later.

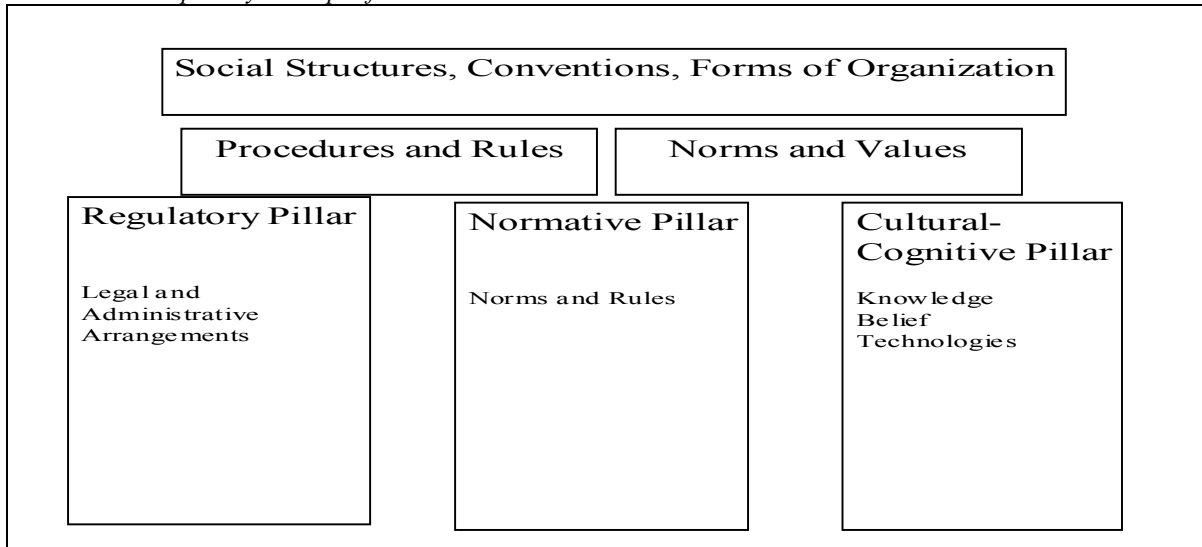
Table 1 Three pillars of institutions

	Regulative pillar	Normative pillar	Cultural-Cognitive pillar
Basis of compliance	Expedience	Social obligation	Taken-for-grantedness Shared understanding
Basis of order	Regulative rules	Binding expectation	Constitutive schema
Mechanisms	Coercive	Normative	Mimetic
Logic	Instrumentality	Appropriateness	Orthodoxy
Indicators	Rules, laws, sanctions	Certification, accreditation	Common beliefs, shared logics of action
Basis of legitimacy	Legally sanctioned	Morally governed	Comprehensible, recognizable, culturally supported
Examples in present research context	National water legislation, local water rights	Offering water to arriving visitors, norm of non-exclusion	Consulting ancestral gods for water, categorization of water sources

Source: Scott (2001: 52) and own examples

Values and norms belong to the second and normative pillar. Values according to Scott are “conceptions of the preferred or the desirable, together with the construction of standards to which existing structures or behaviour can be compared and assessed.” Whilst norms “specify how things should be done; they define legitimate means to pursue valued ends” (Scott 2001: 54-55). It is mainly sociologists, who have stressed on the normative pillar of institutions. Neo-institutionalist scholars in sociology and scholars in anthropology argued that cultural-cognitive elements are central to institutions. Scott summarizes them as cultural-cognitive pillar.

In the general understanding of social anthropologists, institutions are social structures, which provide social cohesion to a group of people or a society over a period of time. The most obvious and enduring structures are organizing principles, also referred to as ‘the social structure’. Kinship, the organization of leadership or social networks are typical examples (e.g. Radcliff-Brown 1952, Fortes 1945, Lévi-Strauss 1949). Other structures, such as property right regimes or socio-cultural norms may be more dynamic (e.g. Benda-Beckmann and Benda-Beckmann 1997, Widlok 2001), they are legal entitlements or ‘rules of the game’ as understood by North (1990). Other local regulations are inscribed in customs, routines and habits and social roles (e.g. Bourdieu 1977). Prescribed procedures, such as rituals, ritualised forms of exchange, also belong to institutions. Finally, cultural and local knowledge and other group-specific cognitive manifestations can be referred to as institutions (e.g. Lévi-Strauss 1949, Goody 1956).

Box 1 Multidisciplinary concept of institutions

Source: own figure based on Scott (2001)

Usually, scholars build their main understanding of institutions on two or three pillars. In this way, the understanding of institutions can this way be conceptualised in a much broader sense than e.g. the NIE concept, including e.g. belief, knowledge, technologies, codes or social roles. Finally, it is a matter of individual choice, what institutions to include and to stress in a particular research context. Legal and administrative arrangements, norms and values, rules and rights, as well as routines and organizational forms are of core interest for this study.

Instead of relying on NIE informed design principles and ideas, which tend to over-simplify social reality and processes, current sociologist and anthropological scholars of institutions take factors, such as power and the embedment into a wider context into consideration. In their view, it is not only institutions, which impact behaviour. Resource use and NRM institutions undergo processes, which show no clear tendency to end up in a kind of ideal institution. Moreover, social embedment of management decisions, routines, and norms are crucial components of their institutional analysis They understand institutions in terms of (1) practices and their social, cultural and political structuration; (2) institutional processes and relations are examined in a multi-sited way, which do not neglect the local-global and formal-informal divide; and (3) institutions are linked conceptually to knowledge and power (Metha et al. 1999: 23).

Table 2 Anthropological perspectives on NRM institutions

Component	Conceptualisation, emerging views
Resources	Material, economic, property but also symbolic with locally and historically embedded meanings, which are socially constructed
Livelihoods and NRM	Multiple users, complex and diverse livelihood systems
Community	Multiple locations, diffuse, heterogeneous, diverse, multiple social identities
Institutions	Social interaction and process, embedded in practice, struggles over meaning, formal and informal, interlinked with knowledge and power
Knowledge	Multiple sources, plural and partial, negotiated understandings (plurality of knowledge)
Power and control	Differentiated actors, conflict, bargaining, negotiation, power relations central
Property regimes	Practice not rule determined, strategic, tactical, overlapping rights and responsibilities, ambiguity, inconsistency, flexibility
Legal systems	Law in practice, legal pluralism
Governance	Multi-level, fuzzy/messy interactions, local and global interconnected

Source: Metha et al. (1999: 38) adapted by author

Such views have been summarized as practice-based approach to institutions (Metha et al. 1999) or Post-Institutionalism/ Institutional Bricolage (Clever and Franks 2005) and prepare the ground for an understanding of institutions, which differ from conventional or dominant theory. *“Institutional formation is re-conceptualised as a (frequently opaque) socially embedded process rather than a deliberate and transparent managerial activity. Institutions are often multi-functional, semi-opaque, and contingent. They are shaped by historic factors, by the power relations which prevail social life and by world views which incorporate the roles of the human, natural resources and the supernatural. ‘Bricoleurs’ mould and are moulded by institutions, both in deliberate decision-making and in the iteration of daily life.”* (Ibid. 2005: 4-5).

All institutions are prone to change. External factors, which have been identified in empirical studies to have contributed to institutional change, are: (1) the introduction of new technology, (2) management innovations, (3) shifts in cultural beliefs and practices, (4) major changes in political policies, (5) major political changes and instability, (6) social reform movements, and finally (7) economic crisis or dislocation. In the context of the present research, it is the first four factors, which will prove to be of importance. Endogenous factors initiating institutional changes may be a mismatch between individual experience and societal institutions as well as institutional plurality within a society (Scott 2001: 187,188).

Newly created or emerging institutions are most of the time not complete innovations but new conglomerates of pre-existing institutions, which are born in a process of institutional bricolage (Douglas 1986). *“Principles are amended and compromises reached to form new settlements; models are reconfigured or combined into various hybrid forms; and routines are*

reassembled to serve modified goals. New institutions borrow aspects of order, meaning, and legitimacy from earlier institutions.” (Scott 2001: 192). The result of the formation processes is hybrid, combined or compounded institutions and law (Benda-Beckmann 1996: 89). Thus, *“much that is new co-exists with and modifies the old, rather than replacing it entirely”* (Moore 1973: 742).

Empirical insight from studies conducted within the GLOWA project suggests that existing institutions for irrigation water management show resilience to institutional development (Laube 2006, Van der Schaaf forthcoming). Development interventions, such as changes in policy and legislation or the propagation of water user association impact on the local water management regime but only to some limited extent. In comparison with the management as practiced before on very local level, much continuity was observed. Institutional resilience seems to be an important feature of local fields. The reason is that local water management institutions are embedded into a complex context and linked to and backed up with other institutions, which shape and order life within society. *“The social arrangements are often effectively stronger than the new laws”* (Moore 1973: 723). New laws and newly crafted institutions are backed up by state power, but not by local forms of legitimacy and institutions. That’s why local law often shows some resilience towards newly introduced state law. As a consequence, such ‘innovative legislation intervention’ are often neither predictable nor do they contribute to the target, which was intended.

State power to back up institutional development may be quite weak on the rural local level. A village at the periphery of a country constitutes a semi-autonomous social field with rule-making capacities, although it is embedded into a larger social context, e.g. a region or a country. Within such a village several smaller semi-autonomous social fields may exist in form of corporate groups. A particular individual may belong to several of them. *“These social fields have their own customs and rules and the means of coercing or inducing compliance. [...] They have what Weber called a ‘legal order’”* (Moore 1973: 721). Therefore, it is important to identify the existing social fields of the local arena with their norm systems. Intersections between the local arena with its various semi-autonomous fields and the state exist, even when they are rather weak and may lead to legal pluralism.

Moore’s theoretical ideas have been developed further by legal anthropologists concerned with water rights. Her statement *“All legal rights and duties are aspects of social relationships. They are not necessarily rights in things, though they may pertain to things.*

They are rights to act in certain ways in relation to rights of other people [...] It is only insofar as law changes the relationships of people to each other, actually changes their mutual rights and obligations, that law effects social change." (Moore 1973: 734) was slightly reformulated by property rights and water rights experts, which stated that water rights are manifestations of social relationships (see below).

2.2. Concepts of water rights and water law

2.2.1. The law perspective

From a juristic perspective, water rights are understood as legal rights, which regulate "*the removal (and subsequent use) of water from the natural environment or its use in that environment.*" They are administrative use right or usufruct rights in essence. Such water rights entitle a person or company to divert or abstract water, to impound or store water in a natural source or behind a hydraulic structure, and to use water in a natural source. The water quantity of the water right is determined; administrative water rights are usually temporary rights (Hodgson 2004: 10-11, 16).

Administrative water rights are legal rights. They can be allocated, registered and asserted in legal courts. They are also called formal water rights, modern water rights (e.g. Hodgson 2004) or statutory water rights (e.g. Burchi 2005). Administrative water rights in non-European countries are often highly influenced by European law traditions (civil law and common law) due to colonial expansion of legal concepts. Later, countries reviewed western legislation as orientation and incorporated western legal concepts into their own legislation. (Hodgson 2004: 6).

Administrative water rights only form a share of existing water rights. Many societies regulate water issues based on socio-cultural norms and customary law. Customary law is a "*body of water law pre-existing statutory law*". It is "*based on long-standing practice, not codified in written form*" (Burchi 2005:1). Once written up and made part of statutory law, customary water rights turn into administrative, legal rights. Therefore, one could also speak of non-administrative water rights, to refer to customary water rights. Some authors also call them informal water rights.

Water rights were often merged with land rights or formed a sub-ordinate component of land rights in legislation. Only since the last decades and in the context of their formalization, both

right regimes have increasingly disconnected from each other. Water sector legislations underwent reforms in many countries during the last three decades. Such reforms directed towards the nationalization of water resources, the creation or reformation of a national water administration and the registration and allocation of administrative water rights. Water has become a tradable good under a number of jurisdictions. Water reforms are less re-distributive in character than land reforms because they are more driven by the increased need for efficient water resources management and less by socio-economic reform objectives. The “...debate over water rights and their reform has tended to be less concerned with ideology than with hydrology, with hydraulic engineering than with social reform.” (Hodgson 2004: 2, 31).

State control over water bodies is the precondition for the establishment of administrative water rights. There are four different legal ways, through which state control over surface water, groundwater, and rainwater can be gained. One way is to declare state ownership of water; another is to include water into the public domain of the state. As in the case of Ghana and Zimbabwe, the control over water can also be vested in the president of the state on behalf of the people.² Finally, the state can establish a superior use right to water, such as in Uganda³ (Ibid. 2004: 13).

The way to establish water rights under most jurisdictions is a state agency, which allocates and issues water rights in form of use permits and licences. This allocation of water rights usually happens on basin level because the basin-wide hydrological cycle is considered before deciding about water uses. Water flow and water quality are two crucial factors, which are measured and included in the water resource planning and allocation process (Ibid. 2004: 11-12). In Ghana, it is the Water Resources Commission, which issues water rights to water users, such as factories.⁴ The transformation of customary water rights into administrative water rights took place and provided an “*administrative recognition-sum-safeguarding of existing rights*” option (Burchi 2005: 3). This means that during the transition period, water users could claim their existing water rights in front of the WRC water administration and these claims, if legitimate, were transformed into administrative water rights. Significantly, the Ghanaian population did not utilize this option and not a single such claim was made (Sarpong 2004 quoted in Burchi 2005). However, Ghana is not the only country where

² Constitution of the Republic of Ghana, Article 257/ 6; Zimbabwe Water Act, 1998.

³ Uganda Water Resources Act, 1995.

⁴ Water Resources Commission Act, Act 522, 1996.

ignorance of and indifference towards the formalization of water rights among the population is common.

Typically, some activities are excluded from administrative water rights. Such exclusions are either defined in terms of the activity itself, such as domestic uses or linked to small water quantities; a combination of both is also found in some legislation. The motivation for that is threefold: First, the withdrawal of small water volumes does not matter much for basin wide hydrology, e.g. domestic water uses usually do not compete with hydropower or industries at the level of water volume. Second, it is a question of bureaucratic feasibility to register all small water users in a basin, whose numbers are tremendous and unmanageable. A third factor is the up keep of social peace within the country (Burchi 2005: 4). An enforced registration and allocation of water rights for e.g. domestic water uses would probably entail insecurity among the population and pose a threat (imagined or real) to their very base of life. There are different ways to communicate the exemption of small water uses from the formalization of water rights. In Nigeria, they are recognized as “*original statutory rights*”, which include the right to withdraw water for domestic purposes or water livestock without charge from any public water source. Furthermore, fishing rights fall under the same rights as long as they do not interfere with other water rights issued by the Nigerian water administration. (Ibid. 2005: 4). Moreover, the riparian doctrine used for small water volumes is usually not abolished.⁵ In Ghana, the up keep of the riparian doctrine as well as the exclusion of household water from administrative water rights form crucial features of the water right legislation. The exemption of household water from administrative water rights is determined in the “Water Use Regulations” (WRC 2001).

Box 2 Water uses exempted from water use permits in Ghana

Art. 1	A person may obtain a permit from the WRC for domestic water use
Art. 7	In consideration an application, the WRC shall be guided by (a) the prevailing water policy; (b) domestic water use; (c) any other water use which fulfils the goals of national socio-economic development
Art. 9	Any water use resulting from the abstraction of water by manual means is exempted from theses regulations
Art. 10	Water uses exempted from permit but to be registered: water abstracted by mechanical means and use of any purpose where the abstraction level does not exceed five litres per second
Art. 25	Domestic water use means the use of water for household purposes and personal hygiene

Source: WRC (2001)

This arrangement for domestic water results in little intersection between statutory and customary water rights and therefore a low potential for conflict between the two law systems

⁵ The riparian doctrine determines that land owners may use water sources, which are situated on their property or pass along its borders.

(for the particular situation in Ghana and a case study see chapter five). Although the literature has not yet stressed the difference of water rights for irrigation and water rights for household water, such differentiation would be analytically useful (see below). Irrigation water carries a much larger potential for conflicts caused by legal pluralism because water for irrigation schemes is subjected to administrative water rights. As a consequence, a study of household water is less concerned with national processes of water allocation.

What is important to notice is that the number of existing water rights exceeds to a large extent the number of water rights which are written down and registered in the national water administrations. „*In practice, pockets of customary rights and practices, particularly in rural area, are bound to escape the net cast by the capital city’s lawmakers and water administrators.*” (Burchi 2005: 4). Customary water rights and statutory rights may exist side-by-side and are usually only confronted with each other during the formalization process (acknowledgement of existing rights) and after it only when administrative and customary rights interfere with each other. This may not necessarily be the case. Potential for conflict exists, when administrative water rights were issued in ignorance of customary water rights and the new water rights violate the pre-existing right. Legal intersection and interaction of customary and statutory law can thus be conflictive (Ibid. 2005: 7). An example for that from Ghana is the Bui Dam case, where conflicting interest emerged between household water users, irrigators and the Volta River Authority, which wants to generate hydropower in Bui/Upper East Region (Laube 2005).

2.2.2. The legal anthropology perspective

Empirical and theoretical literature on water rights from an anthropologist or social science perspective conceptualises water rights differently than lawyers and legal experts. Because water rights to household water in Ghana are excluded from the administrative water rights, they cannot be examined by a juristic methodology, e.g. the analysis of court cases, legal documents. Here, a legal anthropology approach is more appropriate, because it offers the tools to examine local, informal property right systems and their socio-political, historical and environmental context.

Of course, also for legal anthropologists, most water rights define who may use what amount of water for what purpose at what time and from what source under what conditions. As such, water rights are entitlements to use the resource. But anthropologist’s interest goes far beyond

the water use rights. Administrative water rights and customary water rights form part of the research subject. The absence of writing in customary water rights carries some particular implications. Whilst administrative water rights once determined and allocated are capable of being asserted in a court, most customary water rights are often unclear and matter of interpretation. They are not stable but may undergo a process of negotiation between actors and interest groups. It is this ambivalence and process characteristic, which constitute customary water rights.

Customary water rights are embedded in a larger set of local norms and rules – including some, which seem to have no direct relation to the resource management. They are “*socially enforced binding rules*” (Moore 1973). Socio-economic stratification and social status may determine the way in which people act with each other and what property they are entitled to or excluded from. Belief systems may enshrine acceptable ways to appropriate and use the resource. As a consequence, the research on customary water right regimes has to take a broader look on society and the way it is organized.

Secondly, the anthropologist’s view also focuses on the mechanism of decision-making over the resource. Water rights may also define entitlement to decision-making. Decision-making rights over water resources are not part of statutory water rights, which define use and especially usufruct right because the decision-making role of the state is assumed and remains untouched. In fact, the allocation of administrative water use rights automatically results in some allocation of decision-making rights, especially local management rights. The water rights allocated to a Water User Association of an irrigation scheme are a good example for that. But the decision-making aspect is not made explicit in legislation and therefore underexposed in the juridical perspective. At times, decision-making rights are not even obviously part of customary water rights but build on local forms of authority and legitimacy. Formalized leadership, e.g. in form of water committees, are not backed up by statutory law but rather by project law, management guidelines and by-laws.

Thirdly, anthropologists stress the difference between legal norm and practice or water rights and practical water management. Norm and practice form two separate categories of analysis in legal anthropology. The analysis of norms is not a sufficient tool to gain a picture of practical water management. Instead, “*reality cannot be deduced from the normative versions of the valid laws and institutions*” (Spiertz 2000: 165). Law is usually perceived as being both: a prescriptive norm and a descriptive fact but this understanding of law is prone to cause

confusion. Laws as norms contribute to the structure of society but do not necessarily reflect human behaviour. Thus, three factors have to be considered: water law, water rights and water-related behaviour (Ibid. 2000). Moreover, even the validity of normative versions as crucial and behaviour-guiding versions within a certain context cannot be taken as granted, e.g. user rights must not necessarily be the crucial or most important factor for practical water allocation. Other non-water-related norms and non-normative factors may provide the crucial impact on people's behaviour in specific situations.

Today's concept of law within legal anthropology understands law in a very general sense "*as cognitive and normative orders generated and maintained in a social field*" (Meinzen-Dick and Pradhan 2002) and characterized it as "*the co-existence of multiple legal systems pertaining to one (the same) domain of social life.*" (Spiertz 2000: 179). That is what legal anthropologists refer to as legal pluralism. To those multiple systems belong lawyer's law (international law, state law, customary law, religious law) or the law of organizations (donor law, project law), as much as law containing local norms and rights, or law in form of self-regulation. These interacting and coexisting laws are neither equal in importance nor clearly differentiated by the people within a social field. The conglomerate of law, which contributes to a normative system of a locality, is called local law. It is very specific for each locality and time. In the context of water resources, one speaks of local water law versus statutory water law. The first is a conglomerate of different normative systems whilst the latter is but one component of that local conglomerate.

Water rights are the central component of local water law. Water rights are central to the analysis of management institutions because they link actors and interest groups with each other and manifest their legal and socio-political relationship. Non-administrative water rights depend on social consensus for their legitimacy. It is "*claims to use, derive income from, or control water by individuals or groups that are recognized as legitimate by a larger collectivity than the claimants and that are protected through a form of law.*" (Meinzen-Dick and Pradhan 2005: 241). Therefore, non-administrative water rights are a product of a never-ending process. Their legitimacy is based on socio-cultural norms and authority and this also differentiates them from administrative water rights, which are not only held after the allocation of a licence for a limited but usually predictable time but also display a different source of legitimacy. This is based on the power of state, legislation and courts. Customary water rights are also allocated or transferred to and acquired by the right holder. They can be limited for a particular period of time or allocated without any reference to it. Especially,

when water is scarce and many potential users are competing for the resource, the maintenance of water rights, its justification towards and defence against other claims become a crucial issue. This is when not only the factor power and legitimacy, but also the robustness of the questioned water rights gains importance.

When local law is based on several contradictory normative orders, people are confronted with a number of legal options, which they can mobilise to get their interest through. They enjoy a number of legal options, which they may choose from. Legal pluralism with several legal options also contributes to the empirical divergence between norm and practice. Human behaviour in such a context seems rather complicated and unpredictable than following a prescribed normative system with clearly defined rules. Choosing for a legal option can be interpreted as a management of interest using a set of strategies, such as forum shopping, institution shopping or legal idiom shopping.

Especially in natural resources management, where divergent interests and objectives meet each other (commercialised use vs. subsistence use, resource extraction vs. prevention of overexploitation etc.), legal pluralism was identified as a striking feature of normative systems. For users depending on a particular resource for their subsistence, it provides a coping strategy to deal with environmental, livelihood, and social and political uncertainty (Meinzen-Dick and Pradhan 2001, Ibid. 2002) as well as with knowledge uncertainty (Metha 2000). This holds true especially for water because this natural resource has special characteristics: *“mobil, fluid, and fugitive [...] with a great deal of inherent uncertainty regarding its quantity and location”* (Meinzen-Dick and Pradhan 2002).

Studies on local law have shown that natural resources like water are usually not equally distributed within a community but differ according to economic and social status and gender, for instance. Water rights often reflect local hierarchies and hence *“what one holds in one’s hand is not water but relations, relations which are often hierarchical, fluid and transitory, subject to change like the availability and distribution of water”* (Meinzen-Dick and Pradhan 2002). Water rights form a legal construction but social relationships are empirical facts (Benda-Beckmann et al. 1996). Hence, the elaboration of a local water right regime does not necessarily give complete insight on water allocation practice. Additional research is required. If there are enforced rules within the social field, one can speak of a legal field. Its unit of analysis is a small social group in which discourses on resource use and allocation take place.

Further, as the state intervenes through the introduction of new institutions for the management and distribution of water, one may find conflicts at the interface between state law and local law. Both categories of law can consist of a variety of actors and agencies with different interests and objectives. *“It is not just state agencies that determine what the actual consequences of state law are, or what the actual significance of local law is, whether or not it is recognized by the state. Local people themselves, through their own social and economic behaviour, contribute to the relative strength of folk and state law”* (Benda-Beckmann 1997: XI).

To return to the difference of water rights for irrigation and water rights for household water, a number of factors can be identified, which support an analytic differentiation. The main difference is that management arrangements for household water necessarily exist in each society whilst arrangements for irrigation water are only found, where irrigation is practiced. Moreover, each person needs access to household water but not everybody needs access to irrigation water (even within a particular society). These two obvious statements bear some consequences, which are maybe less obvious.

To allow human survival, at least minimal access to household water has to be granted to all members of societies. The extent of practical excludability is a different one in household and irrigation water. Escalating resource conflicts on local level in single source situations have to be solved faster because the exclusion from access would surely lead to either death or expulsion of the weaker conflict party. To ensure access to household water, users tend to rely on a number of existing water sources, which may implicate that they hold a set of water rights to household water or that they are members of several user groups, which may overlap. In contrast, rights in irrigation water usually depend on rights in a single water source (e.g. the irrigation furrow, the well). Because household water is needed on a frequent and daily basis, some management arrangements, such as principle of rotation or determined phases of access are either impossible or rather unusual. If they exist, the time periods between the turns are very short (defined fetching hours, alternate days for fetching). The absolute necessity of household water for survival activates political efforts to establish a human right to household water to a larger extent than is the case with irrigation water. Interestingly, arrangements for local household water allocation often imply such a basic right in a manifestation of public use rights or the non-existence of rights to exclude (Ramazotti 1998), which is not the case with irrigation water. Studies indicate that access to irrigation water can be highly problematic therefore other members of society may systematically exclude groups of people from access

(Roth et al. 2005). This situation has called for development interventions to balance access to irrigation water within societies and to improve the living standard of marginalized groups. Water rights in irrigation water are closely linked to land rights, which are in many empirical contexts the domain of men. Thus, water rights in irrigation water are often also a male domain, although the formalization of land and water rights may lead to a more gender-balanced distribution of water rights. As will be seen from the study, water rights in household water do not depend much on land rights. Although this may vary in other empirical contexts, household water is understood as a female domain, because it is women and girls, who fetch largest water quantities in most of the societies. The line between household and irrigation water becomes blurred when water from irrigation furrows is used for household purposes or household water is used for backyard garden irrigation. Despite that possible overlap, a helpful theoretical line can be drawn between them in research and analysis. A different research approach can be concluded from the theoretical differences between household and irrigation water.

Table 3 Water rights – irrigation versus household water

	Household water	Irrigation water
Users	All society members, allocation to mainly women and girls, who fetch on behalf of household members	Limited to professional group (farmers), allocation to land owners or land tenants (mainly men)
Water sources	Use of single or multiple sources, all year sources and seasonal sources, frequented on daily basis	Use of single source, seasonal sources (dry season), frequented according to crop needs
Management arrangements	Low excludability, fast conflict resolution + minimal access arrangements, membership in multiple user groups, water rights in multiple sources	Higher potential for excludability, slower conflict resolution + exclusion from access, more application of principles of rotation and alternation, membership in one user group, water rights in one source
Political implication	Explicit human right to household water, interventions when access is aggravated for marginalized groups (e.g. in context of privatisation of drinking water sector)	Implicit right to irrigation water, interventions when access is denied to marginalized groups (e.g. formalization of land and water rights)
Implication for research	Water rights and water allocation practice, labour distribution, health and hygiene practices, water quality issues, drinking water policies, management institutions, power relations	Water rights and water allocation practice, labour distribution, land distribution, agricultural practices, agricultural productivity, agricultural policies, formalization of land and water rights, management institution, power relations

Water rights are property rights and theoretically distinguished into three categories: (1) right to own, (2) use rights (withdrawal, access rights, and usufruct), and (3) decision-making rights. The categorization differs slightly from author to author. The right to own is often not

explicitly formulated as a right because water rights generally are property rights. But it is found in the literature (e.g. Hodgson 2004) and reflects a juristic perspective, which is helpful when looking at local water law components deriving from state and project law. Usufruct rights are sometimes mentioned as an extra category.

Table 4 Water right categorization

	Right holder	Water rights
Ownership	Owner	Right to own
Access	User	Use right (right to withdraw water, right to access water source) Usufruct right
Power	Decision-maker	Decision-making right (right to exclude users, right to manage the facility, right to alienate water)

Resources can be owned and used publicly, communally or privately. Decision-making can as well be a matter of a public body, such as water administrations (public), of a group (communal) or of an individual (private). But the investigation of a water right regime is often challenged by the overlapping and intermeddling of aspects because *“the bundle of rights does not refer to a single or unitary right but to bundles of right that vary across property regimes, legal orders, and cultures. [...] the configurations of bundles of rights to water may even differ within the same law or culture across different property regimes, sources of water, and uses of water”* (Meinzen-Dick and Pradhan 2005: 240-241). Normative regulations reflect local categories of water distinguished by criteria, such as physical state, use or quality, and are connected to different property regimes. Due to the variety in kind, form and function *“water rights [...] can never be more than an ‘umbrella concept’”* (Benda-Beckmann et al. 1996: 80). This bundle concept can then be made concrete with the help of analytical categories.

Water rights have to differentiate between rights in the resource as such and rights in the artefacts for water withdrawal. It is for example important to differentiate the ownership of a borehole and hand pump from the ownership of the groundwater, which can be pumped up with it. Water supply artefacts may implicitly determine water rights, as it is the case of irrigation channels or piped water systems. Explicit water rights are regulations, which determine for instance water quantities or times and periods of access. Water rights may display internal aspects or external aspects. Internal water rights are water rights within a community, whereby external water rights define the rights between two communities

(Benda-Beckmann et al. 1996). Categorical rights were differentiated from concretised rights. Access can also be granted without holding use rights; it is then tolerated. The robustness of water rights can be investigated. Some water rights are stronger or weaker than others in the local water law. The transfer of water rights can be categorized into administrative reallocation, market-based reallocation, collective negotiation, none of them (Meinzen-Dick and Pradhan 2005: 245).

The establishment of new water management institutions and regulations concerning access, distribution, operation and management becomes necessary when new water related infrastructure (a well, a canal etc.) is introduced or created, or when external water policies (by states administration, development agencies etc.) intervene the social field. Different property rights might be one of the results of this establishment (Benda-Beckmann et al. 1996). Following the institution theory, efficient institutions of natural resource management can be designed and crafted. Empirical studies in the drinking water sector rather talk of institutional bricolage, characterizing processes of institutional evolution, in which old norms and values are adapted or reinvented to suit new purposes by “*the socially embedded 'do-it-yourself' bricoleurs*”, who play with their overlapping identities and of multi-purpose institutions instead of resource management committees (Clever 2000a).

Rules determine how water rights are allocated, acquired, transferred, withdrawn or implemented. The practical water management is the application of such rules and their translation into water allocation practice. For this work, it is of importance, how entitlements of water are formulated in national and local water law (legislation and local water right regime). These entitlements are analysed concerning their degree of practical implementation, as well as concerning their historical change. The origin of several components of the local water right regime will be traced to former local regulations, local practicalities and national policies to illustrate processes of institutional bricolage and the robustness of local institutions.

2.3. Concepts of participation

The transfer of responsibility for water management to the local users is driven by ideas of community participation, as they are popular in the development configuration. Participation in this study concerns involvement in decision-making as well as financial contributions to acquire and maintain local water supply.

It was argued that the concept of participation seems to be added “*to the list of failing development strategies*” (Lund 1990: 163). Investigating concepts in the development field has to differentiate carefully between three levels: (1) theoretical concepts drawn from scientific research; and (2) policy concepts described in declarations and strategy papers. The development practice resulting from those theoretical inputs can be described as (3) empirical level. Two ways of discussing participation can be distinguished. The first, instrumentalist way, takes participation as a means for development and aims at more efficient and sustainable project implementation. This position shapes present global water policies. The second, normative discussion instead argues that participation is the goal of development and closely connected to the concept of empowerment. This position is also found, when reviewing policy papers in the drinking water sector, even though the authors are rather of a NGO and civil society, or activist background. In both discussions, the policy level is somewhat over-represented and the empirical level not given much attention so far.

The policy level of understanding ‘participation’ can be found in international declarations and strategy papers, such as e.g. Agenda 21 or papers from the Dublin Conference on Water and Environment. In fact, the idea to make recipients of development participate dates back to the 1960s but underwent changes (see Schouten and Moriarty 2003 for a review of the concept related to water development projects). Connected to specific development projects the normative aspect is still of importance in strategy papers but instrumentalist aspects also come into play. Catchphrases like ‘participatory approach’, ‘demand driven’ or ‘lowest level decision making’ are mentioned today in most of the mainstream water development project proposals but also in the literature of alternative development approaches. A post modern and post development critique of concepts of participation in research and development raises its voice stating that participation as mean to development is nothing more than another big myth, another grand narration in the development scene. “*Participation has [...] become an act of faith in development, something we believe in and rarely question. This act of faith is based on three main tenets: That participation is intrinsically a ‘good thing’ (especially for the participants); that a focus on ‘getting the techniques right’ is the principal way of ensuring the success of such approaches; and that consideration of power and politics on the whole should be avoided as divisive and obstructive*” (Cleaver 2002b). This is not meant to deny the potentials of participation schemes but instead suggests watching participation processes empirically. So far, here seems to be little evidence supporting the three tenets (Ibid 2002b: 37, Mosse 2002: 32).

Instead of the local knowledge participatory appraisal claim to enlighten, the appraisal procedures may lead to certain knowledge production processes within the project community and between project community and appraisal facilitators, which create a planning knowledge different from the local knowledge. The documentation of the planning knowledge (Mosse 2002, Benda-Beckmann 1997) is then taken as local knowledge not considering the difference between the two. Planning knowledge is a “*collaborative product, concealing both villagers and project manoeuvres.*” and shaped by dominant interests on both sides, e.g. “*villagers needs were significantly influenced by the perceptions of what the agency was able to deliver*” (Mosse 2002: 21). Planning knowledge, considered as local knowledge is most needed and used for the legitimization of the project agency towards outside donors and it was stated to have little or no impact on the concrete planning and implementation of development projects but often to have only a kind of alibi function. Participatory approaches are neither incompatible with top-down-approaches nor do they reverse old hierarchies in development: “*the reality is that people participate in agency programmes and not the other way round.*” (Ibid. 2002: 17, 22). They don’t always lead to the best planning knowledge and community consensus. The research provides an example of negotiations between a community and a water consultancy, the production of planning knowledge and its practical impact on water system design (see chapter nine.)

.A lack of the concept participation was stated on the theoretical level by several authors (e.g. Lund 1990). Neither there is a common understanding of the terminology “population/local people” nor of the model of collaboration/cooperation connected to the term “participation”. Lund categorises the population term into three sub-categories depending on their context of analysis: (a) local population (versus national); (b) civil population (versus state); and (c) weak and excluded population (versus privileged and powerful).

Like at the policy level, a theoretical distinction between (1) participation “*aiming at the promotion of certain ideological or normative development goals, such as social justice, equity, and democracy.*” and (2) participation seen as “*the need for efficient and practical skills and tools to implement development policies [...] as a management and planning strategy*” can be made (Ibid 1990: 171-172). Both theories are often present at the same time and have different characteristics. The first one is normative, based on political and ethical analysis and participation is perceived as the goal. The second theory is deductive and is based on theoretical and empirical analysis. Participation is understood as a means or precondition to achieve development goals. The theories lead to different participatory

strategies: (1) a political strategy aiming at the empowerment of underprivileged groups by making a transfer of authority and resources, bottom-up-strategy, redistribution of legal rights, authority and resources from the state to the population (*“integrative reaching-up strategy”*); or (2) it leads to a public management strategy to achieve goals defined by the state, more involvement of local population according to criteria of management, efficiency, political and economic feasibility, top-down-strategy, state-population partnership guided by the state (*“inclusive-reaching-down strategy”*). Combining the two theories of participation and the three sub-categories of population, Lund identifies six empirical categories of participatory strategies:

Table 5 Concepts of participation

	(a) local	(b) civil	(c) underprivileged
(1) goal for development	more local autonomy, empowerment of local institutions	retreat of the state, empowerment of civil institutions	empowerment of the weak and poor parts of the population
(2) means to development	administrative decentralization,	delegation of certain tasks and responsibilities to civil institutions	organization and mobilization of the weak and poor by the state

Source: after Lund (1990)

When analysing the Ghanaian water policy (for drinking water, as well as for irrigation), one can clearly recognize that the transfer of water rights to local level and the decentralization of water management follows a top-down strategy of the state, which withdraws step by step from the tasks of public utility provision and financial responsibilities. Even though it is the local water users, which step in according to the policy, the utility provision function and financial burden is in fact taken over by external donors agencies (see chapter three).

2.4. Concepts of water user groups

People who share a water supply facility can be categorized as a group of water users. This group can be a coincidental, changing and unstable group of people, which is neither formally organized nor related with each other in any other respect. Water users are all people, which withdraw water from a specific source. (Fishing, navigation and irrigation were of no importance in the research context.) People can also be users without withdrawing water personally. Others may fetch water on their behalf, e.g. parents for their infants. Livestock owners are also water users. The consumption of water by their animals adds to their personal

benefit. Although belonging to a water user group might seem very random, it is actually a result of some factors, which may contribute to a number of stable users, such as residence of the users, the location of the water source or time patterns. For example, a well might be used on a daily basis by nearby settlers and on market days additionally by people, who pass by to reach the market.

There are two kinds of water user groups. Most groups, which were under observation during this study, were water user communities. Water user communities display relatively well defined boundaries. The same users regularly frequent the water supply facility. They usually know each other, act collectively and can display some formalized regulation and leadership. The basis for a water user community is communal ownership in a supply facility, which is managed collectively. Hence it is *“any group of individuals in a rural setting who jointly own, operate, maintain and manage a given water system for the purpose of producing and distributing potable water to serve the needs of its members.”* (Bacho 2001a: 46).

Table 6 Water user groups versus water user communities

Water user groups	Water user communities
No formal membership	Registered membership
Public/private ownership of source or supply facility	Communal ownership in the supply facility
Low level of collective action	Higher level for collective action
Open boundaries, defined by fetching habits	Fixed and close boundaries defined by membership
Open access, public use rights	Limited or exclusive access, communal use rights
Usually no payments	Regular payments
Leadership by local authorities	Formalized, specialized leadership (water committee)
Typical for streams, wells	Typical for hand pumps, piped systems, reservoirs

Water user communities emerged only around created water supply facilities. Boundaries were drawn in a similar manner, irrespective, whether it was around a hand pump or a small reservoir. Many water user communities originate in water development projects. The term pump community has been used by other scholars working in Ghana to refer to water user communities around hand pump fitted boreholes (e.g. Bacho 2001a). The terminology is taken up in this study and extended to reservoir communities. Although such categorization mainly serves scientific analysis, the term ‘pump community’ is also common among members of such communities.⁶ The NCWSP documents operate with the term ‘communities’ when

⁶ The administrative term for water user communities in Ghanaian irrigation schemes is water user association (WUA). Pump communities were called otherwise in the literature, such as ‘borehole syndicates’ in a study in Tanzania and Botswana (Carlsson 2003). Her concept differs because Carlsson speaks of members of a borehole syndicate and their dependants (e.g. the registered household head and his dependent household members), whereby pump community in this study refers to member compound houses. Thus there are no dependants but

referring to a group of people, which have formed an interest group to receive a new water facility. After group formation, they act collectively to reach their aim. Such interest groups are future water user communities and called project communities. Their members may presently draw water from different water sources. The boundaries of project communities do not necessarily show coherence with the subsequent water user community because additional people might join later after the supply facility is delivered. Water user groups, water user communities and project communities may overlap in membership when several water sources are situated in reach. Their dynamic, overlapping and seasonal shifting mosaic is a typical characteristic in the field site. People, who are not members of the water user community, may belong to the water user group of the same facility.

2.5. Research context and research design

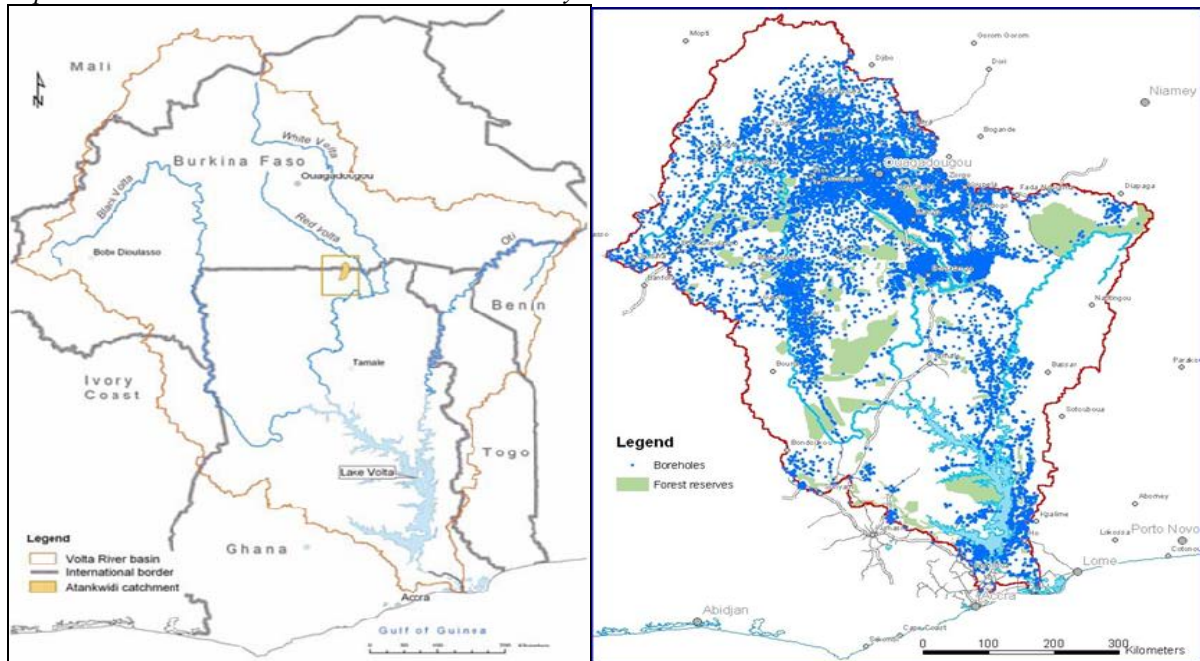
2.5.1. The GLOWA-Volta research project

The research project “Global Change of the Hydrological Cycle” embraces interdisciplinary research on six river basins worldwide.⁷ The large West African Volta River basin with its six riparian states Ghana, Burkina Faso, Togo, Benin, Ivory Coast and Mali faces enormous challenges in water management. Water is needed for agriculture, for household uses, for industries, navigation, and fishing as well as for the generation of hydro electrical power. The Volta River with a length of 1.600 km is the largest river in Ghana. It embodies three rivers, which have their sources in arid Burkina Faso and unite on Ghanaian territory. The Black Volta forms the natural and national border between Burkina Faso, Ivory Coast and Ghana over a distance of a few hundred kilometres and ends in the Lake Volta. The Red Volta unites with the White Volta around the Gambaga Scarp and continues to flow as White Volta before draining into the Lake Volta. The down-stream lake is the biggest artificial lake in the world dammed up by the Akosombo dam. The Volta finally ends at the bay of Benin. The research site is situated in the Atankwidi catchment of the Volta basin. The Atankwidi tributary drains into the White Volta. Its catchment covers 275 km² and belongs to the areas with the highest groundwater extraction rates within the Volta basin (Martin 2005: 10).

all users of that house belong equally to the pump community. Another source of confusion is the term committee, which also means community in Carlsson’s study whilst in Ghana it is restricted to a formally established body of leadership within a water user community.

⁷ GLOWA a German abbreviation for “*Globaler Wandel des Wasserkreislaufs (GLOWA)*”. Detailed information on the project is available under the project homepage (www.glowa-volta.de) and Rodgers et al. (2007).

Map 3 The Atankwidi catchment and borehole density in the Volta River Basin



Source: Martin (2005: 10)

The GLOWA-Volta research project tackles the interrelations between changing natural conditions in the Volta River basin, human interest and activity as well as international and national water policies, especially in Ghana and Burkina Faso. The participating researchers show a diverse disciplinary background. The model-based integration of their results is expected to provide a sound basis for water related decision making in the form of a decision support tool (DST), which will be made available to official stakeholders and civil society agencies in both countries. An interdisciplinary approach is needed to understand the complex dynamics going on in the basin. Household water issues only play a marginal role within the GLOWA-Volta project because the water quantities, which are used for households do not compete with other uses on basin level, such as irrigation or hydropower.

A complex interdisciplinary approach to household water has to involve at least research on hydrology, on parasite ecology, on property regimes, on policies, on power relations and politics, on history, on livelihood strategies and productivity, on local socio-political organization as well as on emic perceptions of the water situation. It is but wishful thinking that one researcher alone can build up expertise in all the areas. Therefore, the co-operation within an interdisciplinary research project aims at complementary and supplementing effects of several sub-sets of research according to the qualification and capacities of the individual

researchers.⁸ My capacity, gained through university training in Social Anthropology, was clearly exceeded in relation to economic evaluations, as well as to technical and medical knowledge. That leads immediately to the question how household water management was approached in this study.

2.5.2. Objectives and research questions

The main purpose of the study consisted in the empirical documentation of processes of changes in rural and peri-urban potable water management in the context of the NCWSP. The research interest focused on institutions and actors regulating and performing water management. The following objectives guided the field study:

- Collecting empirical data on the constitution and concepts of user groups and communities of unimproved and improved water sources.
- Learning about the institutions of water management within a community and the changes concerning those institutions in the context of the NCWSP.
- Documenting empirically the events, processes and consequences of NCWSP project implementation on a water user group on local small-scale level.
- Identifying local interest and agendas coming into play in the context of the establishment of new water facilities.
- Elaborating the relationship between local arena and state administration on district level in respect to water management and provision of improved water facilities.

In comparison with the original proposal, the research questions were reformulated during the research period and subsequent analysis and interpretation of the data.⁹ This shift in focus was necessary because the quality and character of the data gathered was not completely foreseeable at the time of proposal writing. Interesting questions emerged out of the empirical material and the reformulated research questions and sub-questions pay tribute to them:

- What socio-economic changes and processes go on in the field site? What role does water as a resource play for the local livelihood?

⁸ For a personal account of the state of interdisciplinary work in the GLOWA-Volta project phase II, see Eguavoen (2007).

⁹ The two original research questions were: (1) what impact have NCWSP interventions in the potable water sector on local water management institutions, social structures and power relations? (2) What is the relationship between local arena and state administration on local level in respect to water management and provision of improved water facilities?

What are local water uses and water needs? Have gender roles changed? Has economic stratification taken place? What are male and female interests in household water?

- What local water right regime exists and how has it changed in the context of the NCWSP? What impact do water rights have for water allocation practice?

How does a water user community constitute itself? Who holds decision-making rights concerning water facility management and water allocation? How does one gain access to water facilities? Do NCWSP institutions replace existing local ones? Are local institutions integrated into the new normative system? How is household water practically allocated among the users?

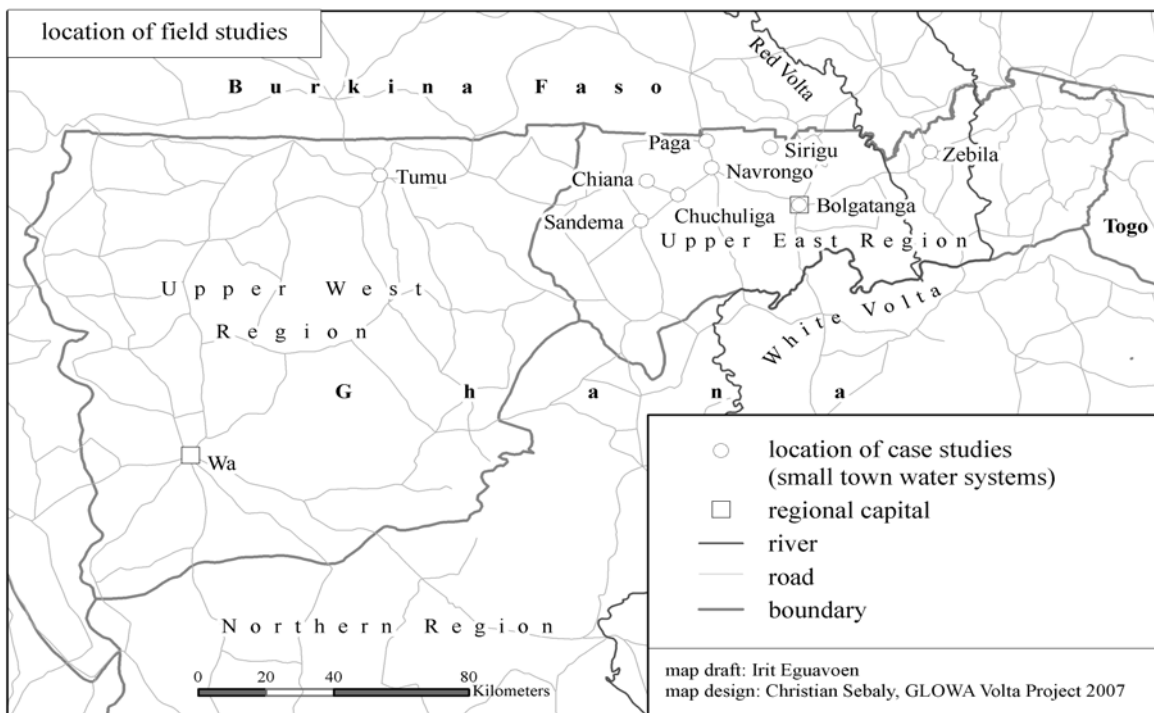
The original research design was mainly based on a number of case studies to collect data on three particular topics: (1) Rural water management schemes; (2) Small town water system management; and (3) The shift from rural to small town water management. For the first and third topic, an in-depth case study was conducted, which took most of the research time. The second topic was elaborated in the form of several case studies conducted in selected small towns, which were visited. The research design was built on the application of ethnographic methods in combination with the conduction of two surveys and document review. The overall research time of nine months was distributed over three periods in dry seasons from 2004 to 2006. My son, then four years old, joined me during the second field trip, which took about six months.

2.7. Methodology and field research practice

The decision where exactly to conduct the research was not taken before going to the field research area. Among which socio-linguistic groups the research would be conducted was left open. Other criteria for the selection of the field site proved more crucial for I was not only interested in existing rural water supply but also in the planning and implementation of small town water projects. Given this, I took a hint from my colleague Nicola Martin and went to a site where such a project was going on. The location is primarily a rural settlement with a market centre showing some urban characteristics. During the first visit itself, the people we met seemed very willing to welcome me in their community. An assemblyman, who we traced later in the day in another town, encouraged me to come to his village. A young man promised to look for and to negotiate on my behalf for a room to live. When returning the next day, the promise was kept and an accommodation was made available. Apart from these factors the decision for this research site was based on sympathy for the place and the people, which is difficult to explain. Later on, the selection of the field site turned out to be a very good choice due to reasons, which were not predictable beforehand, e.g. the chairman of the local WSDB was also the president of the Association of Water and Sanitation Development

Boards, which allowed me to extend my contacts and research on regional level in a very easy and fast way. I also wanted to gain some insight on other small town water projects, therefore, additional research sites were selected, which I visited repeatedly while being based in Sirigu or the GLOWA project house in Navrongo. The second field trip ended with two weeks of intensive touring between the small towns.

Map 4 Sites of field research



A large part of the data set was derived from participant observation in Sirigu. I recorded events, habits and statements about water and water use, seasonal events and information about villagers in a field diary after observing consciously as well as systematically things happening around me. I lived in a central part of the village called the Mission land, which is located just 15 Minutes walking distance to the market, sharing a quarter with a midwife, a local area mechanic for hand pump repairs and a British volunteer. The quarter was equipped with electricity supply which was exceptional in the village. Water had to be fetched most of the time from a tap in the neighbouring orphanage or from a hand pump at a distance 200 meters from the house.

Despite the fact that my household differed strongly from the local households, running my own household, especially when being with my child, turned out to be a rich source for participant observation. It allowed me to fetch and carry water each day, to calculate water

amounts needed for domestic activities as well as to make experiments in household water budgeting (reuse of water). Then, I tried to validate my observations in other households and discussed with local people about it. Habit formation in relation to water use, the constraints of local soap, the difficulties in keeping stored water clean belong to this complex. I learned about time allocation from my own household duties and from visits to neighbouring houses, where I participated in female work activities, which did not emerge in my own household, such as post harvest work (preparing crops for storage), the plastering and decoration of compound houses and pottery. During the times of field preparation, such as sowing and harvesting, I took small time to join befriended families to get an idea of the activities. Market women, took me along to then pump and sent me for water fetching in market drums. They also allowed me to participate in food preparation. Not all recorded experiences have found entrance into this study. Despite this, they were very valuable and shaped my ideas as well as the interpretation of data.

Another very interesting side experience I went through was also due to running an own household and spending most of the time cycling through in the village. I was surprised how fast I adapted physically to the environment. It took only a few weeks and I started resembling the shape of the average women in the village by losing a lot of weight and gaining muscle mass. The body adapted to an extent that the menses stopped showing. I did not fall sick although my body hosted a list of parasites, which were very common among the local population. When I returned for the third field trip, I spent more time in town, went around by car and did not run an own household (which is the usual research situation of my project colleagues), this experience did not repeat.

Picture 1 Participant observation



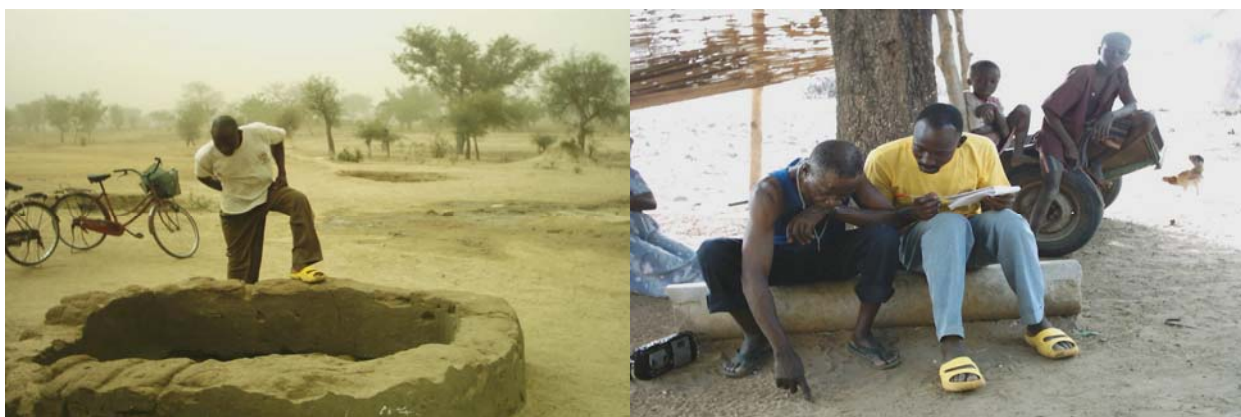
A second area of participant observation, which was not related to water as such but gave me an idea of processes going on in the community and social relationships, was the regular attendance of the Catholic Mass, membership in the church choir, and the participation in weddings, funerals, sport and community activities. They were a good way to gain entrance into the community and getting acquainted with the concerns of the population, and learning and practicing the local language. Living in the proximity of a small clinic and maternity, and being a neighbour of nurses, midwives and teachers taught me something about the health and educational services in the village. So, even leisure time spent with friends and neighbours contributed to my knowledge about the location, community, and local water issues.

The third source of participant observation consisted of meetings, which I attended in the village of Sirigu as well as in Zebilla, Bolgatanga and Tamale. At the regional level, several meetings of the Sirigu WSDB and the AWSDB were attended and documented. On local level, meetings between representatives of the Sirigu community, its WSDB, the responsible consultancy firm and CWSA staff, as well as a number of borehole meetings and meetings of project communities were observed. Other meetings in the village, which had no water on the agenda, were also interesting because they also serve as a forum for communal decision-making and channelling information. They provided an idea of community leadership. One crucial borehole meeting in Sirigu where a new management scheme and water tariffs were about to be introduced was recorded on tape and then transcribed in Nankane and translated into English; during other events, I took notes. Furthermore, I accompanied the area mechanic to his work and visited the different borehole sites repeatedly to find out what is happening there. Finally, I also witnessed the drilling of the first borehole for the new piped system. A focus group discussion with the Sirigu section leaders in front of the chief's house during the

first week ensured their agreement and support to the research project and made them summarize the water situation in their particular village sections.

During the first two weeks in the village, I and my local research assistant conducted a borehole and well inventory visiting all borehole sites, dams and wells in Sirigu. We also talked informally to the water users, identified responsible villagers, asked committee members in an unstructured way about the water situation in their village sub-section and looked at some of their documents, if available. Because the village covers an area of ca. 27 km² and we moved to the boreholes on local second hand bicycles, it was a very good and fast way to get acquainted to the place and make the villagers get used to me. We stopped on the way to explain the work and accepted invitations from villagers. My local assistant Joseph Awindongo Asakibeem, a people's teacher¹⁰ by this time and on school holidays, explained many things to me on the way. Afterwards, I took my field notes and integrated them with the two datasets on existing hand pump-fitted boreholes and improved hand dug wells from the DWST in Navrongo and the Catholic Dioceses in Bolgatanga. The outcome of this exercise was a complete list of all twenty-six boreholes (in the second phase we discovered one, which we missed before), two clusters of wells and the two functioning dams in Sirigu. Additionally, I continued working on a pump committee survey questionnaire, which I had already started to draft in Germany and adapted to local circumstances based on the field notes from the first two weeks.

Picture 2 Water facility inventory and interviews



¹⁰ People's teachers in Ghana are teachers, which teach primary school children without having any professional training. They start working after completing Secondary School.

We fixed appointments with the water user committees and made sure that they were represented by at least two or three of its members when going through the questionnaire. The questionnaire consisted of 65 questions (see appendix 1), which were asked by me and translated by my field assistant. We completed the questionnaire with two more questions, which came up during the survey. For completeness and comparison, the same questionnaire was applied to the three existing hand dug well committees. The detailed survey results were summarized in a research documentation (Eguavoen 2005). Because there were seven attempts in Sirigu to acquire a new borehole, we went to see six of those communities and asked them a different and much shorter questionnaire (see appendix 2). Additionally, specific questions at each appointment came up, which we tried to clarify right during or after the survey and during the meetings.

Picture 3 Water committee survey



During the first field stay I also tried a compound survey in a selected pump community but soon realized that not very interesting results would emerge out of it if I conduct it the way I had prepared it in Germany. The respondents were not very talkative and I thought about using photographs with water activities and fetching situations to make them more interested. The hope was that respondents would rather describe what was on the pictures and relate it to their own experience. After ordering a series of ten photographs on water use from the local photographer, the idea was given up because the pictures did not meet my expectations and were not usable for the purpose I had in mind. While being in Germany, I overworked the compound survey questionnaire and the compound survey finally took off during the second field period. The questionnaire of 44 questions (see appendix 3) was translated into Nankane by Mr. Steven Asamah, a skilled local linguist and teacher, and then carried out by me in

cooperation with Mr. Asakibeem, and four other local assistants Mr. V. Akabange, Mr. Maxwell Akabange and Mr. Clement Adongo, who worked in two teams. The responses were recorded on a prepared data sheet during the survey.

As sample for the compound survey, I selected three pump communities within the catchment area of the planned new piped system that are situated next to each other. Out of those 117 member compounds, 36 member compounds contributed for a new borehole, which had formed two groups to apply for a new borehole. Hence, there were two sub-sets within the sample. For the sake of comparison, I additionally selected a geographically isolated new pump community in Sirigu, which did not belong to the catchment of the planned piped system. The samples for the compound survey are complete samples. All compound houses holding the membership status were interviewed. Only some results of this survey are presented in this study because the focus was laid on one particular case study (one pump community) rather than on a comparison between several pump communities during the writing up period.

Despite the fact that quantitative data was collected during the two surveys, the most valuable data and most interesting findings result from the application of qualitative methods. Several sets of semi-structured interviews were conducted. The first set of interviews consisted of so-called expert interviews. Experts were both, local experts and experts of the national and development administrations. In the village, I interviewed (alone or in cooperation with Mr. Asakibeem) people, who had expert knowledge about the history, the community, development issues or who held a position or title. We talked for example to the assemblymen, to members of the WSDB, to a *tendaana* and a *saadaana* (custodians of land and rain), to local healers, to very old community members and to some individuals, which I identified as development brokers. At district and regional level, interview partners I met, worked e.g. for the Catholic Dioceses, CWSA, the District Administration, the DWST, several NGOs, DISCAP, the AWSDB or for a consultancy company. Subject of these interviews was the situation of the village, the state of its water project as well as the general situation and on-going processes in the region in relation to the NCWSP. In other small towns, where the community manages a water system, the interviews addressed their WSDB members and operation team members. The findings from interviews in small towns were enriched with participant observation, document review, and inventories of pump houses, water board offices, outlets, water tanks etc.

When the situation or the respondents did not allow audio records, the interviews were summarized on the basis of notes made during the interview. Otherwise, the interviews were recorded on a tape and later transcribed by local assistants and me. It was very hard to find people being able to do Nankane transcription with English translation due to the high number of illiterates. Even being literate does not guarantee good writing skills in both the languages, for Nankane is not taught at schools.

The second set of interviews was carried out among ca. 20 people running businesses and micro-businesses at the local market. Mrs. Helen Amiziah supported me as an assistant with translations and insider knowledge. The interviews aimed at learning more about productive uses of household water and the water need and availability at the market site. During the third phase of the research, when a particular pump community had been selected for the study of water allocation and the translation of water rights and water rules into practice, Mrs. Norberta Abaane assisted me to conduct a series of interviews with inhabitants of member compounds. The topic of the interviews was the historical water provision of the sub-section, water allocation practice, and background information about the pump community.

Document research in the National Archive in Accra and the Regional Archive of Bolgatanga (PRAAD) provided me with some files on water management, borehole allocation and management institutions but also gave an insight on ethnographical issues discussed among colonial officers. Other files and documents, which were used as primary sources, originated from the GWCL in Navrongo, the Catholic Dioceses; the AWSDB, the consultancy company and District Administration and several water committees or boards. Some additional methodologies were used: photographs served for the documentation of events; distance measurements took place with a step counter, and water users did mapping exercises. Satellite images of the village became available only during the final writing up period and therefore did not contribute to data collection when conducting the field research.

My knowledge of the local language Nankane did not grow sufficient enough to conduct interviews but enabled me to interact with the large number of villagers who did not speak English. It allowed me to know when someone talked something about water (and let me ask for translation) and to crosscheck the transcriptions. A local teacher and linguist translated phrases and vocabulary for me and practiced their pronunciation with me. These meetings took place only four or five times and materials for language learning were not available at the beginning of the research. The university training of Hausa, which I had gone through for

my master degree, was helpful because the language functions as lingua franca in Northern Ghana.

At times, it was problematic to draw a line between scientific research and advocacy. It was impossible to reject help when it was requested by the villagers, such as to talk to the responsible staff in the district administration about a well which had collapsed eight months ago and about the hopeless efforts made by the community to get it rehabilitated. These hints or chunks of information sometimes had a practical consequence and thus an impact on the subject of research. Apart from the ethical dimension of such help in knowledge transfer, sharing information also proved to be a facilitator while working with water experts; withholding all knowledge would have given the impression of incompetence. The only appropriate way to deal with such situations was to keep exact records on such knowledge transfers and results.

3. Geographical and political context

“In economic terms, Northern Ghana is best perceived as the backyard of Ghana. This is an entrenched view that has its roots in the official policy of deliberate separate development pursued since its birth in 1902.”
Bacho (2001b: 21)

“As people struggle to improve their well-being, it is the environment that provides the materials and at the same time frustrates the effort.”
Songsore (2000: 211)

3.1. Northern Ghana

Ghana stretches over three climatic zones. Whilst the swampy coastal zone with its grassland characterizes the South, the South Western part of the country is covered by thick rain forest and its climate is hot and humid. The Northern savannah zone is hot and dry most of the year; current environmental issues include droughts in the North, deforestation, overgrazing, soil erosion, wild animal habitat destruction and water pollution. Further, the provision of potable water is yet insufficient. Ghana, which became independent from the United Kingdom in 1957, is today a constitutional democracy. It has joined a number of international environmental agreements, concerning e.g. biodiversity, desertification and the Kyoto Protocol for Climate Change. Owing to its rich natural resources, the country has a GDP of 2.500 \$, which is roughly double the GDP of other countries in West Africa. Despite this, the country depends on external donors and technical development intervention continues. It is a part of the HIPC program (Heavily Indebted Poor Country Program) since 2002 as well as of the G-8 debt relief program since 2005. A large part of the population faces poverty, but this poverty and related problems are unevenly distributed across the country. *“The poorest areas of Ghana are the savannah regions of the north [...] poverty often has a hold on entire rural communities [...] In the Upper East region almost nine out of ten people live in poverty. More than eight out of ten people in the Upper West region are poor. In the Northern region, poverty affects seven out of ten people, and slightly less than half the population of the Central region is poor”* (Rural Poverty portal homepage).

Box 3 Country profile Ghana

Population:	22.409.572 people
Median age:	19, 9 years
Life expectancy:	58, 87 years
Population growth rate:	2, 07 %

Territory:	239.460 km ² (total), 230.940km ² (land mass), 8.520 km ² (water)
Natural resources:	gold, timber, industrial diamonds, bauxite, manganese, fish, rubber, hydropower, petroleum, silver, salt, limestone
Agricultural products:	cocoa, rice, coffee, cassava, groundnut, corn, Shea nut, banana, timber
Industries:	mining, aluminium smelting, food processing

Source: CIA World Fact Book (2006)

According to Buah, a Ghanaian historian, the country today is divided “*into two main zones of land: the savannah to the north, and the rich forest lands to the south*” (Buah 1998: 2, my emphasis), which are separated by an upland range. The Northern part of what is today Ghana consists of a “*distinct geographic entity due to a combination of historical, socio-political and ecological factors*” (Bacho 2001b: 15). The history of the region can be written and interpreted from different perspectives. While most authors wrote a history of marginalization and exploitation, Lentz took a more differentiated perspective when she wrote the history of Northwest Ghana by rethinking boundaries, identities and ethnicity (Lentz 1998).

The northern part of Ghana is populated by Mole-Dagbane speaking societies. The area was sparsely populated by small communities in late Holocene, which rather lived in isolation from each other before their settlements became the final destination of in-migrating family groups from areas more north and north-east. The late Holocene starts from 3rd century B.C.; the period from 4.100 to 2.500 B.C. was characterized by a temperature decline, which resulted in an abrupt shift of savannah vegetation. From 3.200 to 3.000 B.C. deserts became drier and the desertification of the Sahara started, which led to migration movements towards the bigger river basins (wikipedia, 05.03.2007, Casey 2000). These migrated family groups integrated and mixed with the older settlers or started new settlements. For example, the people referred to as Kassena-Nankane, are assumed to be of heterogeneous origin. Kassena came mainly from the North whereby Nankana are thought of as a conglomerate from autochthones and in-migrants from different origins. Laube argues that given a hostile environment (wild animals, frequent fighting and later also slave raids) and availability of land, the strategy to include new settlers into existing communities was advantageous as it ensured security (Laube 2005: 61). Even though land close to settlements was allocated to the new settlers, the remaining land was occupied and the new settlers established squatter’s rights on it. Once allocated or squatted, it remained under the ownership of the concerned family group as long as they made use of it or upheld their claims of ownership. Local communities in the region administered land through custodians. It is the oldest settlers in a particular place, from which the custodians originate. It is because it was these groups who

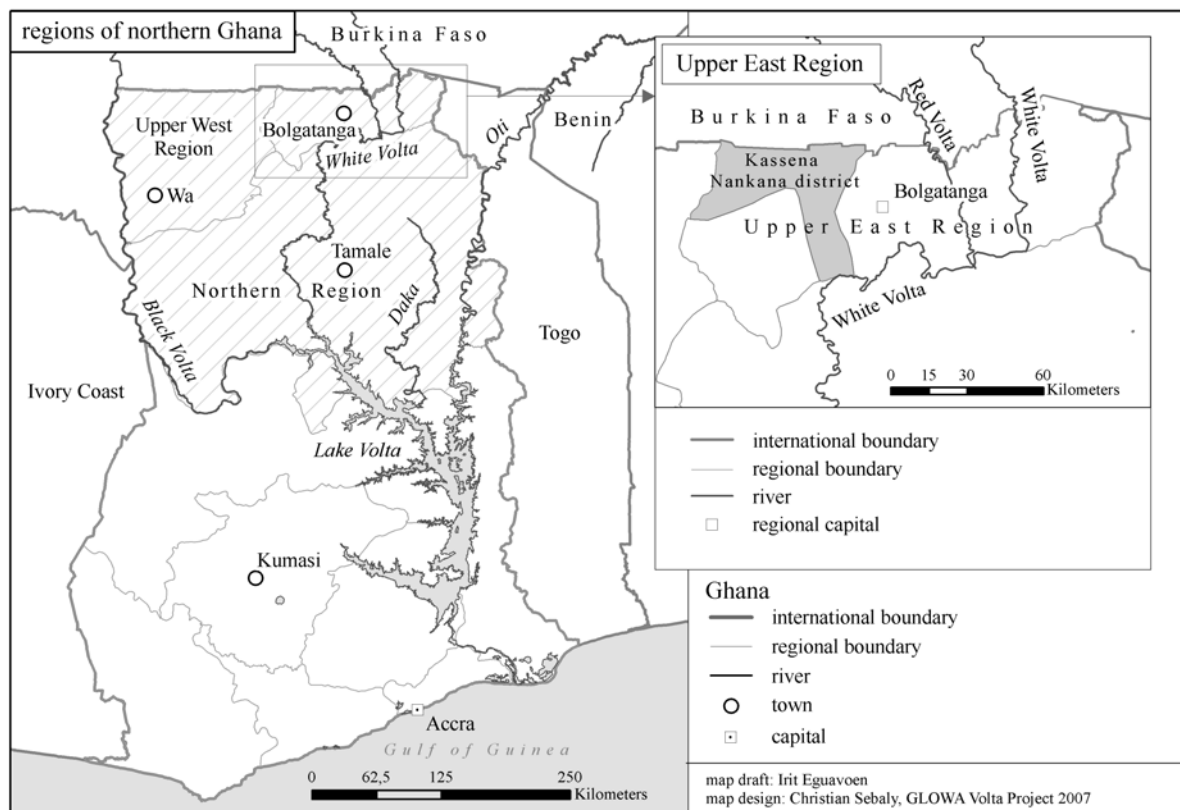
first established ancestral relationships with the land in the form of ancestral spirits, which have their seat in natural objects, such as trees, stones or water bodies.

Between the 11th and 13th centuries, the area was frequently invaded by warriors from the Lake Chad region or Zamfara in Hausaland of what is today Nigeria. The first arrival was led by Tohajije (also known as the Red Hunter). His grandson Bawa is thought of as the founder of the Mamprussi kingdom, whilst it is his descendants who founded the Dagomba, Nanumba and Mossi kingdoms, which developed into centralized states by the 15th century. Indigenous slavery was a widespread social institution in both centralised states as well as in decentrally organized societies of Northern Ghana. The period from 16th to 18th centuries was characterized by increasing in-migration and state building processes. Mande warriors invaded Gonja areas and established their rule over them (Buah 1998, Perby 2004). As a result, slave owning and trading grew in importance in the newly founded Gonja state. The Mole-Dagbani states such as Mamprussi, Dagomba and Gonja, and Mossi frequently sought to expand their influence and power through war against non-centralised societies. Captives were enslaved and contributed to the middlemen position of those states (linking desert, savannah and forest belt) in indigenous slave trade. Slave raiding and kidnapping became strategies to ensure frequent supplies in slaves. Short before the turn towards the 20th century, Mande warriors under Samory Toure invaded from the North and established local slave markets and tapped Mole-Dagbani societies as reservoir for slaves. A Muslim slave raider called Mossa caused havoc; whilst Zabarimas, who conquered a vast area reaching from Ouagadougou to Wa, also claimed their share by raiding for slaves in their area of control. Especially, one of their leaders, Babatu is recalled in many oral traditions in Northern Ghana. Zabarimas opened additional slave markets, one being situated in Kasena (Ibid. 2004). With the Transatlantic slave trade, the intensity of raiding increased and showed drastic demographic effects. *“Oral and documentary reports relate how large areas of land in the northern part of Ghana were desolated and depopulated by domestic slave dealers.”* (Ibid 2004: 64). *“The ‘Grushies’ suffered a lot from raids and kidnapping. The climax of slave raiding was reached in the 1880s and 1890s.”* (Ibid. 2004: 56). The North went into the historical records as *“rather lawless area”* (Laube 2005: 63), which was shaped by a high degree of insecurity for local people, traders and travellers (Lentz 1998: 83). The situation became even more complex, when the British and French military started operating in the region to establish their domination and finally implemented colonial rule. In 1897, a political stabilization was reached, when the European forces pushed the slave raiding African

invaders back to the North and the border between the Northern Territories and *Haute-Volta* was fixed in 1898 (Ibid. 1998).

The colonial enterprise started in 1901, when the first British officers arrived in Navrongo. The formal extension of the colony followed 1902 when about 30.000 square miles of savannah were sub-ordinate to the Northern Territories Protectorate. Military rule was established. Later, Northern Togoland, which was occupied by the Germans, fell to the British in 1919 and was incorporated into the Northern Territories (Plange 1978). The Northern Territories remained a political entity until 1956. When talking about Northern Ghana, most of the authors refer to the geographic area, which was defined as Northern Territories in 1919 under the British rule. Others refer to the present political regions Upper East, Upper West and Northern Region, which are often summarized as the Northern Regions of Ghana. Due a number of intra-administrative reorganization in colonial and post-colonial times (Bening 2001, Bacho 2001b: 17), the historical and present borders of the Ghana's North are not exactly congruent.

Map 5 Ghana and Northern Ghana



As a by-effect, the resistance of the Asante state to colonial expansion which lasted until 1874 resulted in the late opening of the geographic areas North of Asante to European travellers, missionary attempts, trade relationships and scientific documentation of the environmental conditions and societies which lived there. Owing such historical circumstances, among the first texts describing the situation in the area are secondary sources written by Bowdich in 1819, by Clarke in the 1840s and by Koelle in 1854. It was only after the defeat of Asante, that sources based on observations gave a first hand insight on the area. When the British military expeditions started entering the area from 1890 onwards, the number of records increased, but first ethnographic documentation stated only by 1913, when the colonial administration was already established and diary writing was made a duty for all district commissioners (Kröger 2001). The ethnographic records available on the research region are discussed in chapter four.

Generally, the history of Northern Ghana has been interpreted as being shaped mainly by external influences. These include the violent invasion by other African societies, slave raids, Trans-Sahara trade and the resulting introduction of Islam before the 15th century A.D. as well as by the scramble of the colonial forces, and the British colonial enterprise. It is not well documented as to how local societies, who were exposed to these influences, reacted to it and what impact it had on their internal organization. What we know suggest that they were not only victims of their political environment but also important actors (Lentz 1998, Howell 1994, Laube 2005: 64). Laube suggests that a deep mistrust against intruders and “*anything they brought*” remained part of the collective memory (Ibid. 2005: 65).

3.2. The discourse on resources and development of Northern Ghana

Compared to other regions of the country, the Upper Regions of Ghana show higher levels of poverty. In 1999, 80% of the population of Upper East Region fell into the nationally defined category of extreme poverty. It was stated on the base of a GLOWA-Volta survey¹¹, that the average annual household income from farm and non-farm activities in Nankana Kassena district was an equivalent to ca. 78 Euro (Codjoe 2004: 128). This does not belie the national trend, which clearly indicates positive changes, for nationally, population below the poverty line decreased from 52 % in 1992 to 40 % in 1999 (Whitehead 2004). For example, the total annual household income for the Ejura-Sekyedumas district, which is situated more South in

¹¹ An intense survey was carried out among 12 settlements in Kassena-Nankana district and with a total number of 252 households from November to December 2001 under the leadership of a project colleague, who also conducted a comparative survey in Ejura-Sekyedumase district (Codjoe 2004).

the Main Volta sub-basin is about 879 Euro (Codjoe 2004: 128). This shows the exceptional economic status, which is attached to the Upper Regions in comparison to the rest of the country. Anthropological studies on poverty in Upper East Region showed that households in the region grew poorer from 1975 to 1989 and the occurrence of a new “*hopeless category*” of households, which were considered as too poor to farm. “*Despite the positive trends in assets and cash crop income, it was not just the poor who complained of being poorer. In the five years before 1989, people in the region began to perceive an increase in hunger, poverty and difficulty in farming. Many outside factors contributed. [...] In addition to economic shocks, [...] farmers in 1989 were considerably more concerned with food production problems than they had in 1975. Many cited a shorter raining season, ‘exhausted’ land, and declining yields.*” (Whitehead 2004: 2). The growing economic divergence between the North and the South of the country poses the starting question of why is (and remains) the North the poorest geographic region in Ghana? The literature discussed in this paragraph offers different ways to explain the origin of the existing poverty gap from a political economy perspective.

The debate tracing the reasons for the precocious situation in the North follows mainly two lines of argumentation. The first and naturalistic fraction holds mainly the lack and short supply of natural resources, shifts in geographic and hydrological conditions and climate change in the region responsible for it. The argument is old and based on early traveller’s reports and ethnographies, but it experiences an on-going revival in the debate around Natural Resources Management in Ghana. The GLOWA-Volta research project also builds on such naturalistic idea because its data collection stresses on the differences between North and South in relation to climate change, hydrological and geographical constraints as well as due to inappropriate but improvable water and natural resources management. The project design implies that if the hydro cycle is fully examined and the information on local socio-political circumstances, processes and resource management regimes are well documented and understood, an informed decision-making may be possible. “*The DSS [DST] will provide a comprehensive monitoring and simulation framework, enabling decision-makers to evaluate the impacts of climatic and land use trends overlaid on the consequences of deliberate policies, investments and other interventions on the social, economic, and biological productivity of water resources.*” (BMBF/ GLOWA 2005: 132). Thus, one connotation of the project is that better management of resources will lead to more sustainable management of natural resources, improved economic productivity; which also manifests in a growing focus

in GLOWA-Volta research and decision support on Northern Ghana, the White Volta sub-basin respectively.

The second socio-historic and political economy line of argumentation suggests that the North experienced a different history than the South. Historical circumstances have led to economic exploitation and a delayed political integration of the North with the rest of the country. Compared to the South, the North was systematically 'underdeveloped' or 'non-developed' due to political decision-making (especially Plange 1979). The two opposite lines of argumentation mainly originate from the separation of natural and social sciences. Generally, there is some consensus today, that both natural and political conditions caused the present-day poverty gap. "*The area is typical for many marginal areas in sub-Saharan Africa produced by a combination of ecological factors and the legacy of development neglect by both colonial and post-colonial governments.*" writes Whitehead (2002: 578, also see Sutton 1989). We will look at both positions in detail because they refer strongly to the role, which natural resources played and continue to play in the justification of Northern poverty.

The Upper East Region faces serious potable water shortage during the dry season when most of the natural water sources are drying out due to high rates of evapotranspiration caused by the Harmattan. This also affects parts of the Black, White and Red Volta. In contrast, during the raining season, there is considerably high rainfall, which results in swelling of the rivers and flooding. Other water related problems in the region include the pollution of drinking water and disruption of transport system caused by the washing away of roads. This leads to seasonal isolation of communities or households (Bacho 2001a: 28-30). In the perception of the local population, which is also backed up by natural science data, the environment shows a trend towards more erratic rainfalls and degradation of natural resources (see chapter five).

Being confronted with such empirical evidence provided by the project participants, it is still worth keeping in mind that "*African savannas have been the subject of much speculation and misunderstandings in the literature on the continent and its people.*" (Barret and Crummey 2003: 5). The authors further argue that the discussion and the stressing on evadable key characteristics, such as desertification, deforestation and drought, which shape the academic and political discourse about savannah regions, also contribute to the public and media perception of ongoing processes of devastation, degradation and declining human-ecology relations in Africa (Ibid. 2003: 1). Further, they claim "*images of chaos and destruction grossly misinterpret the history and geography of the relationships between people and*

environment” (Ibid. 2003: 1). Other contributions of their edition on global narratives in environmental thinking also point out a number of similar arguments, namely, (1) the existence of environmental data gaps and the inadequate data base on which conclusions of the state of the environment are drawn, (2) the existence of dominant environmental narratives, which exclude social and political factors and which frame natural resource management, (3) the importance but widespread ignorance of local knowledge and local perceptions of environmental change, and (4) a specific but inappropriate long-term and persistent pattern of environmental thinking and planning in Africa. Finally, the authors make a good point in indicating, “*the inadequate empirical base on which environmental policy and intervention is founded in Africa would not be tolerated in Western Europe, Japan or the United States. The degree of urgency which accompanies so many calls for intervention is far too often directly proportional to the ignorance out of which it arises*” (Ibid. 2003: 24-29). Hence whilst the GLOWA-Volta research project is on the right path in collecting a large and distinctive database before setting up the planned Decision Support Tool (DST), which contains natural science and social science components at local and basin level, the scientists working on the DST seem not to rethink the popular and ever-present narratives but succumb to them. Natural science models and projections do not only work on the basis of empirical data but also on the basis of assumptions and ideas of how and which natural processes take place. Moreover, the time frame selected for natural science observations and studies may have an impact on the presentation and grading of results. The GLOWA-Volta project is a development-oriented research project; hence the focus is strongly laid on on-going processes. A limitation of the project is the relatively short time span covered by the natural database, especially when historic documents, which are available, are not included in the studies.¹² Our work is shaped very much by assumptions of how the natural and socio-economic situation was in the past before we can reconstruct the rather recent period based on historical sources and data. This is an important issue to be kept in mind.

¹² Data sets used often start from the 1960s only, e.g. rainfall data sets, or data on forest cover (e.g. Martin 2005, Codjoe 2004). Case studies in Africa, which considered a wider timeframe and historical data have for example led to some reinterpretations of the forest- savannah mosaic by showing the shortcomings of a methodology, which deducts only from present-day observations (e.g. Fairhead and Leach 1996). That does not challenge the stated global trends in climate change but shows that global and local ecological processes are not necessarily coherent. We actually do not know much about long-term processes in Northern Ghana. An archaeological study seems to support the idea of a forest derived savannah due to human activity and climate change (Casey 2000) but another seems to suggest also the reverse – the creation of forest through human activity in the forest-savannah transition zone (Davies quoted in Fairhead and Leach 1996), which gets supported by recent observations (Blench 2004, Wardell 2005 for Ghana, Basset and Zuéli 2003 for Ivory Coast). The GLOWA-Volta database indicates a loss in forest within the White Volta Basin from 1990 to 2000, indicating some ‘hot spots’, such as Lawra-Jirapa, Sandema and Tolon. “*All local urban councils [...] experienced deforestation.*” (Codjoe 2003: 123).

Already about thirty years ago and without the large hydrological and geographical data set available today, Plange blamed the popular argumentation on the reasons of poverty in Ghana's North as being driven by "*Naturalistic Fallacies*" (Plange 1979: 4). He identified five such fallacies, which were popular in the anthropological and other academic literature of his time. (1) The absence of natural resources in the region, (2) Problems of survival in harsh environment (poor soil quality, soil erosion, variability in rainfall leading to little farming yields), (3) Change of climate leading to long dry seasons, which are seasons of economic inactivity of local population and periodic hunger periods, (4) The combinations of all three factors gets supported by an 'intellectual incapacity' of the local societies to use opportunities for advancing their economic situation, and finally (5) The inability or ignorance of Northerners to use natural resources of their environment (Ibid. 1979: 5). Plange strongly rejects these interpretations and argues that the situation met during the first anthropological studies was not a manifestation of authentic socio-economic patterns, activities and the human - environment relations in the Northern Territories but the result of the expansion of colonial capitalism. From colonial documents he reconstructs the livelihood of people in the region before and at the beginning of the colonial enterprise. The description of the historical livelihood then gives him some insight onto the relationship between local population and their environment. Plange's historic interpretation rehabilitates the local people and shows that they were competent and capable in making use of the specific resources offered by their natural savannah environment. According to him, the pillars of historic livelihood were subsistence rain fed farming and trade. Commodity production was subsistence oriented and surpluses were turned into trade commodities. The period of non-agricultural activities (dry season) was utilized for non-farm activities, such as extensive communal work (well digging, road clearing), construction and repair of houses and the production of crafts. Furthermore, the non-farm season was the period for festivals, rituals and marriage ceremonies; this general pattern has been maintained up till today. The Northern Territories hosted vivid markets, which were situated at important trade route junctions, which connected large regions of West Africa with each other as well what now constitutes the North and South of the Gold Coast. Local products, like cotton-cloth, leather wears, hides and skins, foodstuffs, Shea butter, and livestock were traded on over-regional level and in remarkable quantities. Plange concludes from the trade commodities, that it would be a serious fallacy to think of savannah ecology as poor in natural resources (Ibid. 1979: 6-8). Local people made extensive use of the flora and fauna offered by their environment. According to him, the local ways of dealing with natural resources were heavily disturbed and changed by a number of colonial interventions and

colonial legislation, which aimed at the capitalist exploitation of the region. The only natural resource of interest for the Gold Coast government, he writes, was human labour. Milestones of this political and economic interventions were the termination of transit trade and closing down of local markets (which were meant to be shifted to new centres of colonial administration, but they failed), the discouragement of the commercialisation of cotton, groundnuts, rice and Shea butter, the draining of male labour to Southern cocoa and palm oil plantation as well as to mines by conscription, the expulsion of Northerners from over-regional cattle trade, the import of cattle from French territories and the institution and establishment of the border between British and French territories. The consequences for the local livelihood were immense, for *“by the mid – 1940s the region had been sufficiently proletarianized that it was impossible for the active male population to provide other means of earning their keep”* than labour migration (Ibid. 1979: 12). Because of the colonial administration’s neglect to provide infrastructure in the North, problems resulting from labour migration to the South, e.g. incoming diseases, could not be addressed due to missing health infrastructure. This further weakened the economic position of the region. Finally, the Northern Territories of the Gold Coast were *“underdeveloped”* in terms of education, income levels, social services, health facilities, disease and gross levels of poverty in comparison with the Southern part of the colony (Ibid. 1979: 5). The work of Plange suggests that the problem of poverty in Northern Ghana is to a great extent, a result of political intervention even though it can be critically seen as an *“approach of harmony”* between local livelihood and natural resources (Leach et al. 1999).

Despite the fact that an increase in population density is supported by demographic studies, the demographic trend may be different and even adverse when comparing national, regional district and village level. For sure, the population in Northern Ghana has grown in number, as demographic data for the area of the Northern Territories raised from 307.806 people in 1901 to 3.317.478 inhabitants in 2000. A upward trend can be stated for the Upper East Region (257.949 inhabitants in 1921, 920.089 inhabitants in 2000) but comparing the factors of increase across the scales, some variation becomes observable; e.g. the growth factors since 1948 were ca. 4, 5 on national level, ca. 2 for Upper East Region, and ca. 1, 3 for Bolgatanga district (Wardell 2005: 173, 181). Similarly, diversity in population trends was stated for Kassena-Nankana district, where *“apart from Atiababiisi, population declined in all other localities [...] within the period 1984 to 2000. However, agricultural land use increased in most of the localities with the exception being Nabango and Mirigu.”* (Codjoe 2004: 77); only

a weak statistical correlation between population and land use was observed for the years 1984 and 2000 (Ibid. 2004: 78). Thus, neo-Malthusian arguments have too be handled with care.

Although contradicting Plange over some of his interpretations, such as concerning the share of local products in over-regional trade, Sutton draws the same general conclusion. She argues that since the remote North has not been of great economic interest, not much effort was made to develop the infrastructure and non-farm income opportunities. *“the vision of the north as supplier of labour conditioned colonial investment, or the lack of it, in northern agriculture and especially infrastructure, so that little was done to create alternatives to labour migration.”* (Sutton 1989: 638) Sutton argues that the peripheral North was a region being *“non-developed”*; which represents a more moderate point of view than Plange. According to her, natural degradation had already been identified as a problem at the beginning of the colonial enterprise *“the Northern Territories was reckoned to be a generally poor area, with low rainfall and poor soil producing a marginal subsistence in most areas”* (Ibid. 1989: 652) and agricultural advisors of the colonial administration had implemented first soil and water conservation practices from the 1930s onwards, such as a better integration of agriculture and livestock, manure management, the introduction of more selective stockbreeding and veterinary services, the construction of small reservoirs, and the fencing of grazing land. Resettlement of people from densely populated areas, where shifting cultivation had been abandoned and regular food shortages occurred, served as another official land conservation strategy. Other interventions by agricultural extension officers show a high incidence of failure; the experimental introduction of cash crops failed (Ibid. 1989). The degradation of forests was already debated by this time and respective forest policies implemented, such as bush fire control, or the protection of economic valuable trees. After 1940, forest reservations were created to protect the headwaters of the Volta; but in 1947 the benefits of such practice for water shed protection were not yet evident and political plans to resettle people to allow soil conservation and headwater protection were abandoned before being implemented (Wardell 2005: 176-177). Still, 153.587 ha in Upper East Region were claimed as forest reserves, 65 % of them being situated at the banks of the Red and White Volta (Ibid. 2005: 178). *“Upper East Region was selected as the initial and primary focus for [...] forest reservation policy in northern Ghana, due to both the colonial forest officer’s perception of population pressure and associated land degradation processes, and the influence of the dominant environmental narratives of the era”* (Ibid. 2005: 178-179).

Geographers, ecologists and environmental historians strongly suggest that landscapes and environment are anthropogenic – formed by human activities. A pure naturalistic explanation for on-going natural processes is therefore a shortfall. Having an eye on management issues, institutions and local social dynamics implicates the importance, which human societies play in shaping their environment. This view is upheld in the GLOWA-Volta project by including research on both the past and present human impact on the environment as well as on developing a DST, which is expected to influence the natural resource base via human decision-making and behaviour in resource management. Whilst human–environment interrelationships were discussed in some length from the ecological point of view (e.g. Codjoe 2004), questions of political economy and political ecology have not yet been addressed or reviewed appropriately within the research project but they will be tackled in the third research phase (see, e.g. Tsuma 2007).

Saaka (2003) follows up the political economy direction and supports the ‘non-development’ argument by putting the historical political relationship between societies in Northern and Southern areas in the foreground. According to him, crucial moments of contact and relationship between North and South of what is today Ghana, were the Asante oppression of their Northern neighbours, the slave raids conducted by them, and the colonial pecking order of the British. This clearly favoured Southerners to their Northern counterparts and manifested in the preference for Southerners in the allocation of government jobs. Both factors resulted in mistrust and stereotypes, which were upheld and enforced by relatively little direct contact of people from the two geographic regions. Inarguably, the enthusiasm for political questions concerning the North was very low in the political decision-making circles of the South, which determined the political agenda, from which the North was excluded until 1934. After the extension of legislative powers to the Northern Territories for the Legislative Council, an “*isolationist ‘national park’ policy*” set the political trend (Ibid. 2003: 142). Later, fear of rebellion and political unrest enhanced the intended political isolation of the Northern Territories, which was abolished in a very slow process of integration into national politics. Still regionalism remained the characteristic of the political relationship between North and South, of which the founding of the Northern Peoples Party in 1954 is only one expression. Results of this isolation and slow integration of the Northern Territories are obviously the lack of infrastructure as well as the inappropriate political tackling the concerns of the Northern areas.

The political economy and political ecology argument presented by Songsore (2000) traces a large number of reasons for natural degradation in Northern Ghana, including the neglect of the governments to invest in infrastructure, the particular socio-economic system in this region “*which encourages diverse forms of social exploitation. [...] these exploitive burdens are transferred to the environment*” (Ibid. 2000: 225), profit-generation being the post-independence policy priority on cost of the ecosystems (introduction of inappropriate agricultural technologies, rural-urban terms of trade), and the rising of urban demand for biomass fuel (Ibid. 2000: 225-218). Further, he takes up the neo-Malthusian argument by stressing on the ‘former stability of populations’ due to epidemic diseases, slave raides, negative net-migration and high levels of infant and child mortality and elaborates on huge differences in population density and distribution within Northern Ghana “*The atmosphere of insecurity in the pre-colonial period led to the crowding of the population into watersheds, and the abandonment of fertile river valleys led to subsequent tsetse infestations*” (Ibid. 2000: 220).¹³ He links the neo-Malthusian perspective directly to politics of population control; interestingly, the major national scientific concern in the Upper East Region, represented by the Navrongo Health Service, includes epidemic diseases, the cultural background of infant mortality, and last but not least family planning studies and implementation (see chapter four).

The political economy debate on poverty in Northern Ghana shows the importance of a wider political context, in which the area was and is embedded. It seems difficult to elude oneself from an interpretation, which stresses exploitation and marginalization of the region. One of the useful arguments, which can be drawn from Plange is that settlers in savannah environments were not exposed to a hostile environment but an environment that offered a number of natural resources, which people made use of to sustain their life. Furthermore, the settlers also shaped their natural environment by creating settlements and fields and using the natural resources. At the same time, a nostalgic view on pre-colonial societies is not helpful; societies in Northern Ghana did not live in isolation but faced challenges in coping with changing political conditions and environmental difficulties.

Natural resources are of crucial importance for the local livelihood, even if it takes new forms like eco-tourism or meets different historical conditions, like the integration into the world market. The local management of natural resources is dealt with at policy level as if it was something innovative. But in fact, it has been the rule before the centralization of resource

¹³ Most authors argue vice versa, means tsetse is made responsible for movements of population.

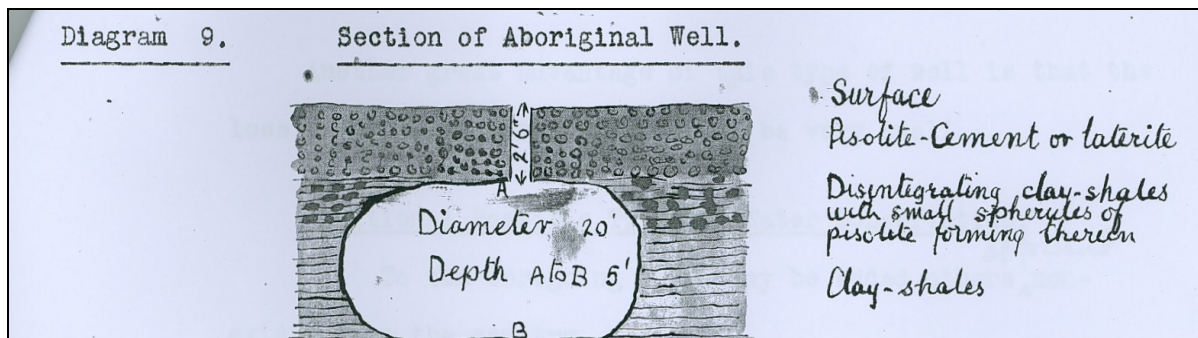
management by the state. It never vanished but was continuously performed by the people, who directly used the natural resources for their livelihood.

3.3. Household water development in Ghana

Water supply facilities belong to the basic components of local infrastructure. As argued before, they are indispensable wherever people decide to settle. Thus, the improvement of water infrastructure does not provide a facility, which has not been there before. Instead, it delivers facilities, which are usually closer, more reliable and of improved water quality. Therefore, when looking for 'non-development' within the water sector, one has to focus on improved water facilities, which either complement or replace existing local facilities. *"Particularly in the northern part of the country [...] the population is assumed to have suffered from shortages and bad quality of drinking water since times immemorial. [...] The water quality was poor as the population used surface water"* (Fuest 2006: 9) but wells were also in use. Wells implicate the use of groundwater and may deliver good quality water if managed appropriately. Also seasonality has an impact on both resource availability and water quality of surface and groundwater water sources. Surely, under normal circumstances, settlements only developed where local people thought natural water sources to be sufficient in terms of quantity and quality – even if their perspective did not reflect present WHO standards. But population numbers as well as environmental conditions are prone to historic changes. An increase in population, for example, may lead to a situation that a present settlement is situated where not sufficient water is available for all its inhabitants. Moreover, the water table may fall and aquifers may get exhausted. For reasons, such as mosquitoes, wild animals or floods, settlements were built at some distance from surface water sources (Mensah 1998: 385). Ensuring security and health gained priority over the reduction of work load for bringing the water to the houses. This is an example of a basic water management principle. Local communities used simple manual techniques to increase local water availability by creating dugouts, small dams, wells and rainwater storage facilities. The knowledge about the hydro cycle and technical means to increase water availability was localized and fragmented, depending on specific geological and hydrological features of the locality and knowledge exchange through contact with other communities and settlements. As a result, the historic pattern of water facilities looked heterogeneous in Northern Ghana. Different technologies were in use; some settlements did not use wells, others did not dam river run off. At the same time, elaborate technologies for digging wells or building dams existed in other places.

A geological survey from 1922 in the Gonja and Dagomba area reports for example on so-called 'aboriginal wells', a type of facility which was almost abandoned by the local population during that time and only discovered coincidentally by the surveyors.

Picture 4 Aboriginal well in Gonja and Dagomba settlements



Source: Kitson (1922: 11)

These wells drained groundwater in an efficient manner and could also be used as rainwater cisterns with a capacity up to 10.000 gallons (45.460 litres). The local people traced the origin of the 'aboriginal wells' back to people who had settled in the region long before them. The structure of the facilities was in relatively good state but due to siltation, most of the wells were not functional. The present settlers did not maintain them (Kitson 1922: 10-11). This example hints at the possibility of knowledge loss and raises awareness for the fact that local water supply systems do not evolve in a linear way but undergo progress and suffer setbacks. Unfortunately, the first written records on the geographic area do not show much concern for the very basic question of where and how people in the region received their household water. And we cannot conclude much from artefacts but mainly depend on assumptions; hence we do not know much about pre-colonial household water supply and management.

Documents tell us about the colonial and post-colonial history of water development in the country (for an excellent review see Bacho 2001b). Although water availability was more of a serious problem in the North, external efforts to increase water availability and water quality as investment in infrastructure started in the South. Further, they display a priority for urban settlements, especially those, which served colonial administration and the European settlements, especially Accra, Kumasi and Sekondi-Takoradi and the so-called resource rich areas of the colony.¹⁴ Dams and filter beds were constructed in Accra and Sekondi in 1911/1912. The situation in Tamale by that time is documented in the annual colonial reports: "the

¹⁴ Plange argued that the natural resources of the South (mining products, plantation crops) should be better summarized as colonial resources in opposition to natural resources (Plange 1979: 6). In his view, the South is not richer in natural resources than the North but only richer in colonial resources.

supply is certainly insufficient. Three new wells have been dug but at present are not satisfactory [...] all wells now in use practically dry up in the dry season. One is kept in reserve for Europeans and I believe it has never altogether dried. A second well is only opened for non-Europeans when others have failed; even at this the water supply is quite insufficient. There is considerable Dysentery, Diarrhoea and Guinea Worm [...] Skin disease is exceptionally common and in large due to want of sufficient water for washing etc." (Armitage 1916). Cape Coast was the first urban settlement to enjoy a potable water system project in 1928. Other urban piped systems followed in Sekondi, Takoradi and other towns along the coast. *"The expansion of the sphere of influence of the British to include the Northern Territories necessitated the development of some basic infrastructure, including potable water supply systems, albeit its peripheral importance."* But *"organised large scale potable water provision in the Northern Territories started with the exploration and systems development in the 1920s..."* (Bacho 2001b: 30). The first severe recommendations to improve the water supply in the Northern Territories came up in 1924 as a result of explorative water surveys. From 1927 onwards, some of these recommendations were implemented in the urban centres of the Northern Territories (Bacho 2001b: 78). Among these household water supplies was rainwater harvesting facilities in government quarters and schools, as well as pumping stations to serve parts of town with European and local elite inhabitants. With the acquisition of a boring plant in 1927, borehole-drilling exercises started in rural areas. Potable water supply management in the colonial period was characterized by (1) centralized provision and management; (2) public financing; (3) focus of individual point sources; (4) multiple water sources; and (5) multiple water uses. The responsible body for the organization of production, distribution and finance was within the Public Works Department (PWD) of the colonial administration, which was in charge of all public infrastructures (Ibid. 2001b: 31). Though the PWD received government money, lack of finance was practically felt by the mid 1930s. Moreover, its work depended too much on foreign experts and imported materials. *"The 1940s can generally be termed as the era of vigorous community development."* (Ibid. 2001b: 34). In 1944, the "Department of Rural Water Development (DRWD)" and the "Department of Rural Water Supply (DRWS)" were installed within the colonial administration; latter belonged to the hydrological branch of the PWD.

Table 7 Household water supply management until 1959

Management body	Public Works Department (Department of Rural Water Development)		Native Authorities/ communities
Water supply	Rural systems	Urban systems	Small town systems

A large number of lined hand dug wells were constructed in the Northern Territories; boreholes introduced in the late 1940s served mainly urban settlements, such as Tamale, Yendi, Wa (Gyau-Boakye and Dapaah-Siakwan 1999 in Fuest 2006: 9-10). By the 1950s, the work of the DRWD had increased the number and variation of rural water facilities. Livestock watering reservoirs were created. They also contributed water for small small-scale irrigation and household purposes. Among these facilities were two open reservoir options: small-scale dams and dugouts as well as filter beds, which were tapped by pipes. The open reservoir option was very prominent for the drier areas in the Northeast and Northwest. Water experts started discussing health aspects of the open reservoir option, such as the spread of water vectors and the contamination of water through livestock. Facilities were fenced and particular watering places were also included in the design.

Other facilities were hand dug wells, boreholes and piped water systems for rural and peri-urban settlements. The occurring problem with the hand-dug wells was their limited and seasonal water holding capacity as well as the collapse due to the soft Birimian soil formation, which was met by the introduction of improved traditional stone wall lining. Native Authorities, the form of local governmental administration by that time, headed these endeavours and showed high engagement (Ibid. 2001b: 35). Despite that it must be stated that *“By the end of the 1948 financial year, over 2.000 hand dug wells and boreholes in the entire Gold Coast Colony were out of use due to lack of maintenance. This was exactly the opposite of the traditional household hand dug wells, which were managed more efficiently.”* (Ibid. 2001b: 35-36). Borehole drilling was heavily constrained by the limited number of local professional drillers, high cost and dependency on imported materials. Thus, the small number of boreholes was mainly concentrated in the government areas, such as Salaga, Tamale (after the 1950/ 1951 Tamale water crisis) and Damongo. Small town water system development began with the Tamale reservoir (completed in 1948), Bolgatanga (opened 1946) and Yendi (opened 1950). Their construction and operation was problematic from day one (see more on this in chapter nine). According to Bacho, Native Authorities showed a good performance in infrastructure delivery despite their severe difficulties in management. When replaced by the

local government system of elective representatives after independence, infrastructure services became weakened because the new system was not as well embedded as the Native Authority system of government (2001b: 39).

After the independence in 1957, water supply services remained a task of central government. Politically, the welfare aspect of water supply and social service provision by the state was stressed. In search of fast economic growth, infrastructure delivery focused on urban centres as well as on industrial and mining regions (Ibid. 2001b: 41). In 1959, both water departments of the PWD were merged to a “Water Supplies Division”, which moved from the PWD to the Ministry of Works and Housing (MWH). *“Different approaches were used in the provision of rural and large urban water supplies and small town water supplies. In the latter case, the small urban communities themselves managed the systems. In the former cases, the Public Works Department and later Water Supply Division managed the systems”* (Ibid. 2001b: 43).

Negotiations with the WHO started in 1959 and resulted in a first Water Sector Restructuring Project and the Ghana Water and Sewerage Act (GoG 1965, Act 310). A para-statal corporation in charge of the entire drinking water supply system was created; it began its work in 1966 (Bacho 2001b: 78). Also other service industries were nationalised and run as corporations. But after the introduction of the Ghana Water and Sewerage Corporation (GWSC), it took another couple of years before the country was opened to the activities of international donors and NGOs, which increased the number of rural water supply facilities (hand dug wells, hand pump fitted boreholes). GWSC performance was still concentrated on service delivery in urban centres. Only from 1974 to 1977, a CIDA program called Upper Region Water Project began to deliver boreholes in rural areas of the North. It was the first project, which contributed substantially to the improvement of rural water supply by delivering 2.600 boreholes equipped with hand pumps. Due to this large number, GWSC decentralised its maintenance by setting up units in each district consisting of a mobile borehole maintenance team. About ten years later, the GWSC started a big hand dug well delivery program, which focussed especially on rural communities in the country. The maintenance of the implemented rural water supply facilities turned out to be problematic and by the early 1990s, a large number lay dysfunctional. One reason was the neglect of rural facilities within the GWSC, which allocated too little of its staff to the management and maintenance of the drinking water supply systems. *“...the financial bottlenecks stemming from the inability of the corporation to function as an independent service providing agency proved a major handicap. The continuing control by each government in the pricing of water*

below the cost of production rendered the financial variability of the corporation fragile.” (Ibid. 2001b: 48). Another problem was the neglect in local management of older water facilities after the implementation of new water facilities (Fuest 2006: 10-11). Hence, the water development measures seem to have been partly contra-productive in the long run and resulted in a further demand in water facility delivery through government and development agencies. But the empirical material of the present study rather suggests that people do not switch completely towards new water sources, when surface sources are available. It can be assumed that the users continuously maintain sources in use and do not always abandon or neglected them. Despite this, local knowledge loss in management practices may occur when water sources loose importance or when good quality water can be withdrawn from new water sources.

To summarize, the rural drinking water supply in Northern Ghana has undergone some remarkable development. The existence of rural ‘non-development’ in water facilities can be stated when considering the Southern and urban bias in early delivery, which was clearly linked to colonist and local elite interest as well as in the Gold Coast government’s and later Ghanaian government’s interest to rapidly increase economic growth of the country by industries and mining in the South. Here, the political economy argument can be applied. The priority of that time was neither the improvement of water supply in the most water poor regions nor the improvement of water quality for the rural population. The latter concerned all rural areas and not only the North.

Bacho abstracted key problems of household water supply management from his historical review, which showed up at all periods, namely (1) inadequate organizational and institutional structures; (2) low revenue capacities and the failure in meeting cost of operation and maintenance; and (3) physical problems due to specific hydro-geological characteristics of the area (Bacho 2001b: 37-41). Further, he summarized opportunities lost in the post-colonial water development, such as the generation of a systematic database on geology and water points, the neglect of reservoir systems as well as rainwater harvesting technologies. The present study will also show that household water supply depends on potable and additional water sources and that the present limited policy focus to drinking water is inadequate.

3.4. The National Community Water and Sanitation Program

Drinking water policy in Ghana is influenced by international policy concepts and frameworks. The most important ones, which presently shape the national water policy, are the Millennium Development Goals (MDGs), the UN comment on the right to water and the community demand driven (CDD) approach of the World Bank. The Structural Adjustment Program (SAP), which the country underwent from 1983 onwards, also left its trace on the drinking water sector. Drinking water policies were translated into crafted institutions, project law, and management manuals. Moreover, the government committed to work towards the progressive realization of the MDGs as well as the human rights agenda on its territory, means that the realization has to be enhanced according to available resources of the country. The MDGs, which were committed at the United Nation Conference in New York in September 2000, stress on the importance of water to fight poverty among other factors (WHO and Unicef 2004). Politicians identified eight development targets, of which four are directly connected to household water. The remaining four targets are indirectly related to water.

Table 8 Millennium Development Goals

Millennium Development Goals	Connection to drinking water	Means to reach MDGs
<ul style="list-style-type: none"> Eradication of extreme hunger and poverty 	Household water use for income generation, reducing women's time for water fetching	<ul style="list-style-type: none"> Higher coverage of improved water points Water treatment on household level Health education Higher coverage of sanitation facilities
<ul style="list-style-type: none"> Reduced child mortality 	Fighting diarrhoea through potable water	
<ul style="list-style-type: none"> Decrease of HIV/ AIDS, malaria and other diseases 	Improvement of health through potable water and improved sanitation facilities	
<ul style="list-style-type: none"> Universal primary education 	Freeing children's time from water fetching	

Source: adapted from WHO/ Unicef (2004)

Water was explicitly mentioned as a human right component only in the year 2000, when the UN Committee on Economic, Social and Cultural Rights brought out a comment, which examined in detail the implication of the human right to health. According to the comment, the access to safe drinking water and adequate sanitation are two crucial components of health and therefore, implicitly also a human right. Two years later, the right to water was claimed more explicitly in the General Comment 15, which was released by the same committee. Since then a human right to water “entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses.” (UN/ Economic and Social

Council 2002: 2). Furthermore, “*any discrimination on the grounds of race, colour, sex, age, language, religion, political or other opinion, national or social origin, property, birth, physical or mental disability, health status [...] sexual orientation and civil, political or other status*” is proscribed to be eradicated by the covenants (Ibid. 2002: 4-5). Because there are also rights in water for secondary uses, which derive from other human rights, the understanding of the right to water is not narrowed down to primary uses. Rather it is attributed to household water uses in general although it declares, “*the priority in the allocation of water must be given to the right to water for personal and domestic uses.*” (Ibid. 2002: 2). Countries, which have signed the legally-binding human right treaty as Ghana did, are now obliged to respect, protect and fulfil the human right agenda. Ghanaian policy makers are obliged to address the improvement of water supply. Despite this, it is important to note that an autonomous human right to water is yet non-existent. “*The human right to water does exist, as water is the most essential element of life. However, [...] this right has not been clearly defined in international law and has not been expressly recognized as fundamental human right. Rather a right of water is interpreted as being an implicit component of either existing fundamental human rights, or is expressly included in non-binding instruments that are designed to achieve specific ends.*” (Scanlon et al. 2004: 12). Local claims of the human right to water gained political significance in Ghana, when the privatization of metropolitan water supply was negotiated (see Eguavoen and Spalthoff 2007) and in the context of environmental havocs by gold mining, especially the poisoning of soil and water resources (Tsuma 2007). This section of the chapter will show how policy makers responded to their commitments and what national policy efforts were made in the area of drinking water to fight poverty. Furthermore, it will already hint at some critical points of the national drinking water program, which will be taken up in later chapters for further discussion.

The drinking water sector in Ghana has undergone some reforms since 1991. Due to an initiative of the World Bank in the context of the SAP, it was differentiated during a Strategy Reform into two sub-sectors, namely the urban drinking water supply and the rural and small town drinking water supply. Urban settlements with more than 50.000 inhabitants fall under the first category and are managed by the Ghana Water Company Limited (GWCL). All others are summarized under rural and small town water supply and are subordinated under a state agency, called Community Water and Sanitation Agency (CWSA). A Community Water and Sanitation Division (CWSD) of the GWSC preceded this agency. The reform of the drinking water sector prescribes several management options, differentiated according to

population numbers as well as the technical water supply facilities. Typical rural supply facilities are hand pumps and wells, whereby piped systems are found in mostly small towns and urban settlements. The categorization according to technical facilities is less relevant than the population number, because practically a part of urban water supply also relies on wells and hand pumps.

Table 9 Structural changes in Ghana's drinking water sector since 1965

Year	1965	1991	1998/99-on-going
Urban water public body	GWSC Ghana Water and Sewerage Company (Act 310)	GWSC	GWCL Ghana Water Company Limited (Act 461)
Rural water public body		CWSD Community Water and Sanitation Division	CWSA Community Water and Sanitation Agency (Act 564)

Source: CWSA

Table 10 Management options for drinking water supply since 1991

Urban settlements (piped systems)	Small towns (piped systems, 2.000-50.000 inhabitants)	Rural settlements (hand pumps, hand dug wells)
State management	State management	Communal management
	Public-private partnerships	
	Communal management	

Source: Field data

This study has investigated the community-based management option. The terminology 'communal management' or 'community-based management' refers so far only to the political categorization of the drinking water sector. The research interest of this study consists of all water facilities, which fall under the responsibility of the NCWSP and its agency CWSA. The concept and paradigm of participation and communal management can be traced back to the 1960s (Schouten and Moriarty 2003, Bacho 2001b). "Ghana has grappled with this approach since 1986, when the cost recovery policy was first introduced and later modified to the user ownership and management policy in 1991." (Ibid. 2001: 5). During the Northern Region Rural Integrated Program (NORRIP), which was funded by CIDA and the Ghanaian government and carried out in the Northern Region starting from 1989, community participation became institutionalized. "To institutionalize the concept of participation in Northern Ghana, NORRIP specified certain binding obligations between

itself and the villages in the project districts.” (Botchway 2000: 139). The project communities were obliged to implement water committees (called Village Water and Health Committees), a hand pump fund, the collection of user fees, local hand pump mechanics, regular/ monthly meetings, and to pay an initial contribution towards their hand pump (Ibid. 2000: 139-140). *“The village was to own, operate and maintain the water supply units. Village ownership of the water supply units was seen as a very important aspect of the whole operational set-up.”* (Ibid. 2000: 138).

Significant restructuring of the Ghanaian water sector has taken place in the 1990s; the legal status and range of responsibilities of water-related organizations have undergone change and reallocation. Completely new organizations were crafted and implemented on national level, such as the Water Resources Commission (WRC) and the CWSA. Other new agencies, such as PURC (Public Utility Regulatory Commission) or EPA (Environmental Protection Agency), have no impact on household water management in rural areas and small towns but operate in urban centres. Urban sanitation and public health activities shifted from state to the District Administrations. Also the property rights of small town water systems were shifted to the DAs for more localized management.

The policy of the NCWSP consists of *“Ownership and Management (O/M) of the water and sanitation facilities by the beneficiary communities and the use of Private Sector to support the process”* (MWH/ CWSA 1998). The Ghanaian policy clearly took up and is supported by the present global policy objectives on drinking water (Engel et al. 2005):

- Water should be treated not only as a public good but also as an economic good.
- Households should pay for improved water service to finance maintenance and operation cost.
- Withdrawal of central government and introduction of public-private partnerships should be promoted to reduce the financial load of the national funds.
- Local participation schemes (decision making processes, management of local water resources and service points) should be encouraged and guided by government agencies.

The threefold objectives of the program strongly reflect the global perspective on potable water provision as they are found in many African drinking water programs of today:

- Provide potable water and improved sanitation services to rural communities and small towns that would contribute towards capital cost and pay for the full operation, maintenance and repair cost of their facilities.
- Ensure sustainability of the facilities through Community Ownership and Management (COM).
- Maximize health benefits by integrating water, sanitation and hygiene promotion interventions.

The uptake of international paradigm for the national drinking water program is not only due to the Ghanaian politicians' perception of them as the 'best way possible' to raise health and hygiene standards in the country but also due to the fact that strong financial dependency on external donors persists. The drastic imbalance between domestic and external sources becomes even more visible when comparing the donor agencies (total 93, 69 %, lead donor DANIDA with 52, 25 % in 2003) with the expenditure of the Government of Ghana (5, 92 %) and the share of the beneficiary communities (0, 03 %).

Table 11 External financial dependency of NCWSP

Donor Agency	2003 Expenditure (Mio Cedis)	%
Sub-Total External support agencies (Donors + NGOs)	235.585, 6	93,7
Sub-Total domestic sources (Government of Ghana, District Assemblies, Beneficiary Communities)	15.821, 7	6,29

Source: MHW/ CWSA (2004: 37)

Especially, the capital share of the water user communities is disappearingly small and financially irrelevant for the program. Thus, even though the NCWSP policy strongly emphasises on the importance of financial participation of the beneficiary communities, their capital contribution can be interpreted as pure means and vehicle of water development policy. The main idea behind this policy is that users will develop a sense of ownership, once they have participated in the financing of their water supply system. This is assumed to result in more concern and better management (for further discussion see chapter six and seven). Experiencing the collapse of water facilities in the 1990s, sustainability in water supplies has become an important policy issue; an increased sense of ownership is thought to serve as way out of the past dilemma of maintenance failure.

The share of the domestic sources has neither risen nor kept stable over the project from 1993 to 2004 but decreased, while External Support Agencies support increased. *“The domestic share of investment in rural water and sanitation declined from over 12 per cent to just below*

4 per cent between 2000 and 2002.” (MWH/ CWSA 2005) The CWSA justifies the decline with the huge demand for costly piped systems in communities, which are not able financially and fail therefore in collecting the 5 % communal contribution. The research for this study was carried out in a small town, where the local fundraising for the piped system failed twice. The financial cost of the community contribution was finally taken over by the District Assembly about ten years after the beginning of the local fundraising (see chapter nine). The local collection of community contributions to apply for new boreholes took up to three years in the research site. Before the local users accumulate the fund of ca. 200 Euro, they have no chance of getting a new water supply facility (see chapters five and seven). Thus, the main practical effect of the 5 % policy is the extension of project periods and the long delay of water supply facility delivery in poor regions and communities of the country. Botchway also states that under the NORRIP, the project management insisted on the payment of the initial contribution (inter alia, the implementation of their institutional framework) despite the fact that many project communities were incapable to meet their contractual agreement. As a result, the delivery of water supply delayed, newly drilled boreholes were not equipped with hand pumps, or newly installed hand pump were ‘disabled’, means made non-operational by de-installing the handle and pump rods until the full payment was delivered to NORRIP. Further, project cost increased due to delay in project cycle (Botchway 2000: 144-145). Further, one can argue that the involvement and domination of external donors in infrastructure delivery reduces the capacities and responsibilities of the national government and Ghanaian state in the long run. The problem of the dependency on external donors has already been recognized at policy level. According to the Strategic Investment Plan, the government share should be increased to 30 % of the program cost until 2015, while DAs and user communities should continue participating with their 5 % share each (MWH/ CWSA 2004: 38).

Although the MDGs provided some orientation for the latest Strategic Investment Plan¹⁵ of the drinking water sector, the fulfilment of the MDG targets would still not be of significant impact for poverty alleviation in Ghana. *“The adoption of the Millennium Development Goals and the elaboration of the Ghana Poverty Reduction Strategy transformed this routine review of progress into a re-assessment of the targets in the plan. [...] To achieve the MDG target by 2015, Ghana needs to reduce the un-served 56, 67 per cent of the rural population by a half*

¹⁵ Three SIPs have been launched so far. The first SIP (1993) covered the period from 1994 to 2004, the second SIP (1998) the period from 1999 to 2008. It revised the first version with data from implementation.

(that is, 26, 84 per cent)). The 2015 target for rural water coverage is thus 73, 2 per cent. [...] It is believed that a significant impact on poverty requires a minimum coverage of 85 per cent. This requires that the MDG target for water be increased about 16 per cent” (Ibid. 2004: 3-4).¹⁶

The declared target of the NCWSP lies in the expansion of improved water points. The target criteria include 20 litres of water per capita per day all through the year and within 500 metres radius, not serving more than 300 persons per water point. These standards are interpreted as minimum basic service, which 85 % of the rural population should be able to avail in 2015. The rural communities requesting improved water facility are expected by the NCWSP policy to provide 5 % to 10% of the cost for the new facility. Project law of NGOs operating in Ghana differs in respect to these numbers within this range for their set their own regulations. NGOs are expected to conform to CWSA standards but CWSA has no mandate to sanction NGOs, which operate with other or no standards (compare chapter five.).

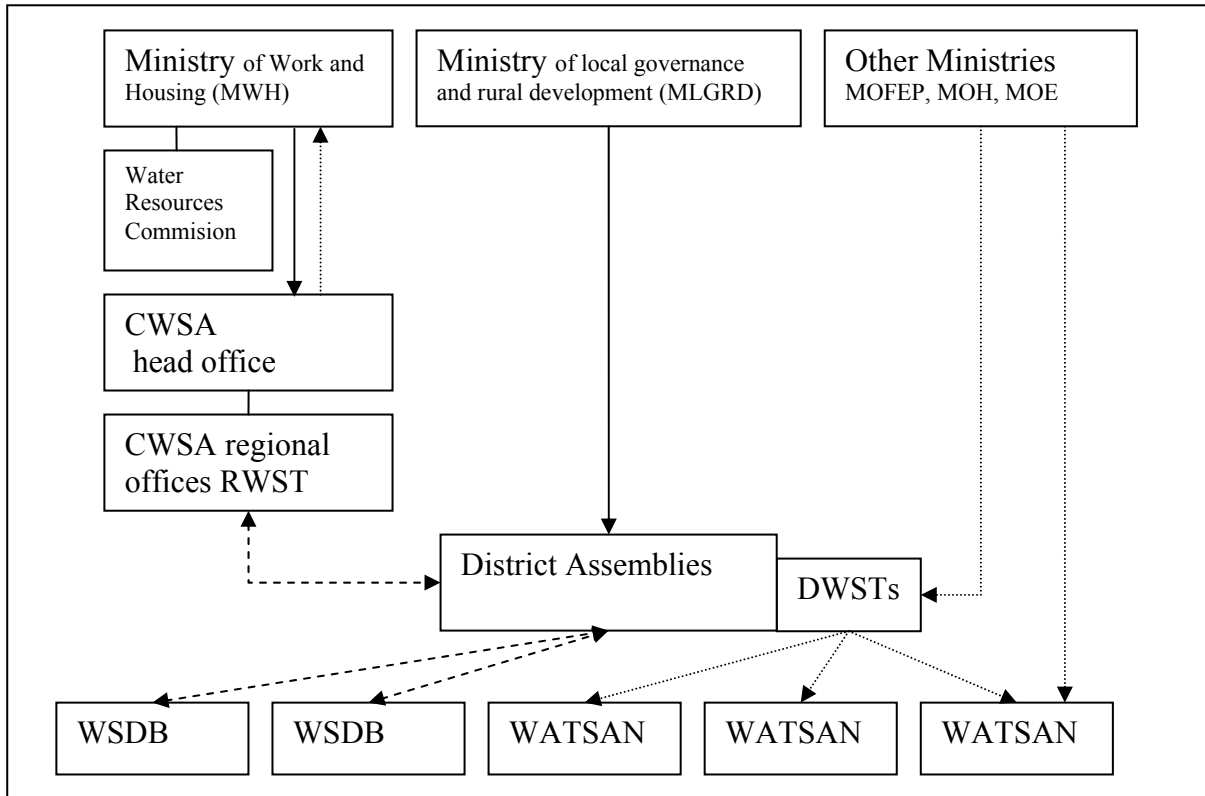
The CWSA holds the mandate to develop strategies for the water and sanitation sector, to recommend policies and to set standards for rural and small town water supply systems and sanitation facilities (GoG 1998, Act 564). The most recent “Small Towns Sector Policy” from May 2004, which was designed by CWSA, communicates in its vision, that “*CWSA shall [...] endeavour to provide basic water supply and sanitation facilities to small towns which are prepared to meet the strategic requirements of the NCWSP*” (MWH/ CWSA 2004). The formal organizational framework for the NCWSP comprises the Water Resources Commission (WRC), which was established for regulating and managing national utilization of water resources and to coordinate water policies (GoG 1996, Act 522) and the Ministry of Works and Housing (MWH) having the overall responsibility for the water and sanitation sector as well as the CWSA.¹⁷ Five other ministries support the NCWSP: the Ministry of Local Government and Rural Development (MLGRD), the Ministry of Health (MoH), the Ministry of Education, the Ministry of Environment, Sciences and Technology, and the Ministry of Finance and Economic Planning (MoFEP). The national CWSA delegates the practical application of the strategy to its Regional Offices (RWSTs), District Water and Sanitation Teams (DWSTs) attached to the District Administrations, local user based Water

¹⁶ Sanitation can reach only 64, 6 per cent coverage by applying the MDG target. It has therefore to be increased by 30 % to reach the 85 % coverage in the country.

¹⁷ The ministry was recently renamed in Ministry of Water Resources, Works and Housing. One of its units is still called Public Works Department but this department is not any longer responsible for water resource planning.

and Sanitation Committees (WATSANs) and local user based Water and Sanitation Development Boards (WSDBs).

Box 4 Organizational framework of rural and peri-urban drinking water sector



Source: field data

The regional offices of CWSA act as supervisor, facilitator and consultant for the different District Administrations in their region. They let and manage contracts at the regional level to consultants and contractors. For the District Administrations have the mandate to make contracts, they give out permissions and allocate money for water and sanitation projects at the district level. They are also supposed to inaugurate water boards and confirm the by laws created by such boards. All areas in the district, which are not under a water board, are under an administrative unit within the district administration called DWST. The officers play an important role during the provision and allocation of water points and the handing over to the user communities but subsequently only support pump communities when the users communicate demand.

WATSANs are referred here as pump committees because local water users don't utilize the official terminology. WSDBs are often simply called water board and are the communal body for the management of small town water systems. The collected data suggests that WATSANs

are only pump committees. In small towns, only the water board was in charge of the operation and maintenance of the piped system whilst pump committees manage the hand pumps outside the catchment of the piped system and no committees exist for the standpipes of the piped systems. But various ways of organization and cooperation between WATSANS and WSDB were observed in other small towns (see, e.g. Youkhana 2005).

After her analysis of policy documents and evaluations, Fuest acknowledges the results and success of ten years of NCWSP in Ghana in relation to the countrywide rehabilitation of old, dysfunctional facilities and the delivery of new water supply facilities. Also the institutional changes are judged positively because they led to functional new organizations and institutions (Fuest 2006: 79). But her review also identified a number of constraints in the conceptualisation and implementation of NCWSP, namely, (1) the staying behind targets in number of delivered facilities and sustainability of facilities; (2) the exclusion of poor communities due to financial requirements and weak position; (3) institutional pluralism and inconsistency; and (4) the occurrence of elite capture of water facilities (Ibid. 2006a: 79-81). Another weakness, which one could add, lies in the thinking and planning along existing water sectors as well as the neglect of a holistic approach to household water supply.

The NCWSP relies on a project approach; particular donors and NGOs are active in some regions and districts (Fuest 2006: 29). As a result, there is a compartmentalization of the program implementation, which implicates a compartmentalization of donor law, project law and project implementation guidelines. The research for this study is mainly confined to the Upper East Region, which belongs to the CIDA compartment which stretches over three Northern Regions. CIDA is not the only donor in that area but it is the most visible and active foreign donor of rural and small town water supply and the crafting of management institutions in Northern Ghana.

4. Institutional changes in Nankane socio-political organization

P ɔka ka kuuri waaf ɔ ɲmaara zuo.
A woman can not do anything without the consent of the man.¹⁸

Yidaana ka tare Abila.
The compound head is never Mr. Small.¹⁹

4.1. Colonial sources and social research in Northern Ghana

Northern Ghana has for a long time been of interest for social anthropologists. The first systematic ethnographical descriptions come from the diaries of the colonial district commissioners, as diary writing was a duty from 1913 onwards as part of the colonial administration (Kröger 2003). One famous example is the report by Cardinall, who travelled through the Northern Territories (Cardinall 1969, originally 1920). The White Fathers, a Catholic Mission operating in the region also left ethnographic reports and documentation.

One of the most important authors of that time was Captain R.S. Rattray, who had graduated in Social Anthropology from Oxford University before entering the colonial service. His ethnographical records, which were published in 1932 under the title “The tribes of Ashanti Hinterland”, are of great value for this study because they focus mainly on the Nankane and thus provide the most detailed set of any ethnographic records available today. Rattray’s other reward consist of the first linguistic documentation of the local vocabulary and grammar, which provided material for the “Die Gurenne-Sprache of Northern Ghana” by Ludwig Rapp from 1966. Rattray, who signed his letters and records with ‘colonial anthropologist’, enjoyed a special reputation among his colleagues from the colonial administration. Some of them felt offended because Rattray ignored all existing and documented knowledge about the local communities collected by them and led no doubt arise about his conviction to be the only qualified person in this field (Lentz 1998, e.g. PRAAD Accra ADM 56/1/148 and ADM 56/1/227). Despite this, Rattray’s reports and publications (including his interpretation and misunderstanding of the data) contributed substantially to the knowledge base of the colonial administration and served the colonial enterprise as well as the documentation and the subsequent determination (writing-up) of customary law.

¹⁸ Gurne proverb documented in Nsoh (undated:102)

¹⁹ Gurne proverb documented in Rapp (1966: 109)

Other academic records about the ethnography of Northern Ghana also started during colonialism but were publicly financed enterprises. A number of recognized anthropologists wrote their main works about groups in Northern Ghana. Among the most recognized is Meyer-Fortes work “Dynamics of clanship among the Tallensi” from 1945. Jack and Ester Goody have also conducted extensive field research on the Dagara and Kusase (e.g. Goody 1954). Their empirical data contributed substantially to theories in political anthropology. In 1951, Manoukian summarized the available ethnographies from the Northern Territories for Forde’s “Ethnographic Survey of Africa”, which led to further popularity of the geographic area as a research site. Dittmer worked on chieftaincy and titles among the north-western neighbours of the Nankane, which show many ethnographic similarities (Dittmer 1961). He based his argument on a study by Tauxier, who wrote ethnography on Gurme people in Haute-Volta (“*Études Soudanaises: Nouvelles Notes sur le Mossi et le Gourounsi*” from 1924). Some ethnographic literature about the Kassena is also available. But generally, comparatively little has been written on Kassena-Nankane (compare Laube 2006: 50). Tripp spent one and half a year in a Nankane settlement during the mid 1970s, which was identified as Sirigu during the research (Tripp 1978). His work proved valuable for historic comparison. Kost and Callenius worked in Nankane settlements in the early 1990s (Kost and Callenius 1994). Laube recorded ethnographical details in the same district among Builsa, Kassena and Nankane while undertaking research on irrigation management (Laube 2006).

Old records by officers of the colonial administration and early anthropologists draw a picture of a local society, which seemed static and not much exposed to historical changes. Only marginal comments hint towards changes, which the society had undergone with the arrival of the British in 1902 and the introduction of the colonial system. Visible changes manifested in material culture, the introduction of colonial infrastructure, and the application of innovative technologies (e.g. Rattray 1932, Manoukian 1951); but certainly, Kassena-Nankana society also underwent deep changes in its history. Northern Ghana experienced phases of invasion through the Mossi Empire, Trans-Sahara trade and pre-colonial slave raids; the latter had a severe impact on the demography of the area (Perby 2004). Although the Catholic missionaries operated in Navrongo since 1906, their influence on the research site began only about 50 years later due to the remoteness of the village. The impact of the colonial administration was also rather marginal. The next centre of administration was Navrongo and the colonial policy of indirect rule introduced by Lugard was not showing much effect on the rural areas of the periphery. Despite this the continuation of local institutions became

contested (Lentz 1998). Examples of processes of change in Northern Ghana are for example provided by Kröger (1978), Goody (1954), Lentz (1995), Mendonsa (2001) as well as Kröger and Meier (2003). According to Kröger (2003), there are about 1.000 ethnographical and ethnological publications on Northern Ghana. While numerous ethnographic studies continued among other socio-linguistic groups in Northern Ghana (in Germany e.g. Lentz among Dagara, Kröger and Schott among Builsa, Riehl among Tallensi), Nankane moved somehow out of the focus. Thus, there are large time gaps on Nankane ethnographic records, making continuous reconstruction of local changes a difficult task.

Pre-colonial changes, which the society had gone through and incorporated are not recorded or documented and therefore lost to our knowledge, if not kept in communal memory as oral history. Socio-political institutions, such as settlement pattern, kinship organization, leadership titles and religious practices as described in the early ethnographies are still found almost unchanged in the present-day Nankane villages. Local material culture documented on pictures from the first ethnographic records still exists in present compounds. Insofar, on the one hand, while strong continuities can be stated, on the other hand, numberless institutional and non-institutional innovations have been incorporated into socio-political organization and daily routine. Many visible changes can be observed as well as a number of deep changes identified, which elude the first sight. Such deep changes concern institutions in the narrow sense, such as rules, leadership positions, norms, roles or routines. But institutions in the wider sense also belong to such a change. These include local knowledge or belief systems.

The Navrongo Health Service updates a demographic database in a three-month cycle in the district, which contains demographic data of Sirigu.²⁰ The publications related to their health campaigns provide information on the socio-cultural context of present-day Nankane society whenever it is of relevance for health interventions. They shed light on particular aspects, which could not be covered by my own research.

The problem is to identify reliable and useful markers of local institutional change, which could give a meaningful insight on processes going on in the research area and explain how and why some institutional set-ups and practices continue while others undergo change. This chapter questions the changes in social-political institutions and their trends in the field site. This is because local water law is but one component of local law and institutions. Changes

²⁰ Unfortunately for this research, their research clusters are not coherent with administrative borders between villages. Therefore, the database was not very useful to e.g. investigate the exact population or compound number and specific demographic variables.

and continuities in water management do not happen in isolation from other changes in society. Institutional changes, which may not show an obvious co-relationship, may still be co-related indirectly. The empirical literature has identified, for example, the fear of witchcraft or the reproduction of gender roles as crucial factors contributing to local water management (examples quoted in Cleaver 2003).

The next part of this chapter (4.2.) will introduce the ethnographic context. After that, the ethnographic description of the socio-political organization of Nankane society and some changes it has undergone begins (4.3.- 4.5.). The chapter ends with a conclusion.

4.2. The research site

4.2.1. Kassena-Nankana

The Upper East Region with a population of ca 917.000 inhabitants is considered as one among the poorest regions in Ghana. It is mainly rural in character. Its six districts host several socio-linguistic groups. The districts are either named after their district capital or after the groups most prevalent within the district. Hence, the Kassena-Nankana district is populated by two groups, the Kassena and the Nankane, which speak different languages but show many ethnographic similarities. District borders as well as the national border between Ghana and Burkina Faso cut across the area, where Kassena and Nankane live (Kasem and Frafra distribution on map 2)²¹. Kassem belongs to the Gur languages, while Nankane (in Burkina Faso called Ninkāre) is categorized as a Mole-Dagbane dialect of it. Especially the East-Kassena and Nankane share characteristics in socio-political organization and belief system. Because Kassena and Nankane villages are situated next to each other, the people are connected over social networks through marriage, neighbourhood and friendship. They share the same facilities such as markets, means of transport, public infrastructure, water sources etc. Consequently, both groups have a good or at least basic knowledge of their neighbour's language.

In ethnographic publications, the population is often referred to as one tribe (in older publications) or ethnic group called Kassena-Nankana. Other reference terms in use categorize the local population differently according to their ethnographic or historical similarities and divergences. One such term is *Gureŋa* (also *Guriŋa*, Gurense, Gurunsi), which was used to name groups with linguistic similarities, namely Gur dialects (Mossi,

²¹ Kassena-Nankana are found in Nahouri province/ Central -Southern region of Burkina Faso.

Dagomba, Mamprusi) but also included groups of the Mole Dagbane dialect (e.g. Nankane, Dagara, Builsa, Kusase). The term was often used with a negative connotation. Sometimes it was used as self-reference with a strong positive connotation (Dittmer 1961: 1). The villagers in Sirigu, which is a Nankane settlement referred to themselves as Nankane, *Gureŋa* or Frafra without preference or different meaning. The term Frafra is thought to originate in a greeting “*fara fara*” (which was not common in the village) and turned into a group name by the British. Several linguistic groups of the Upper East Region are summarized under that term, including the Tallensi. Villagers spoke of Nankane, when referring to their language in opposition to Frafra spoken in Bolgatanga, which differs in pronunciation and vocabulary. As Dittmer stated local variation belongs to Gurunsi culture, means that the societies summarized under this terminology showed general ethnographic similarities, which differed in detail (Ibid. 1961: 3). Due to historical changes in perception and description, it is cumbersome to define exact ethnical boundaries in Northern Ghana. Moreover, it is of little value for the present study.

This study will make use of the term Nankane (also spelled Nankanse, Nankanni in the literature) because it is the most localized concept. The term Nankane describes a socio-linguistic group rather than an ethnic concept. Ethnographically, Nankane and East Kassena will be thought of as a group without strict spatial and social boundaries – but different languages.²²

4.2.2. The Kassena-Nankana district

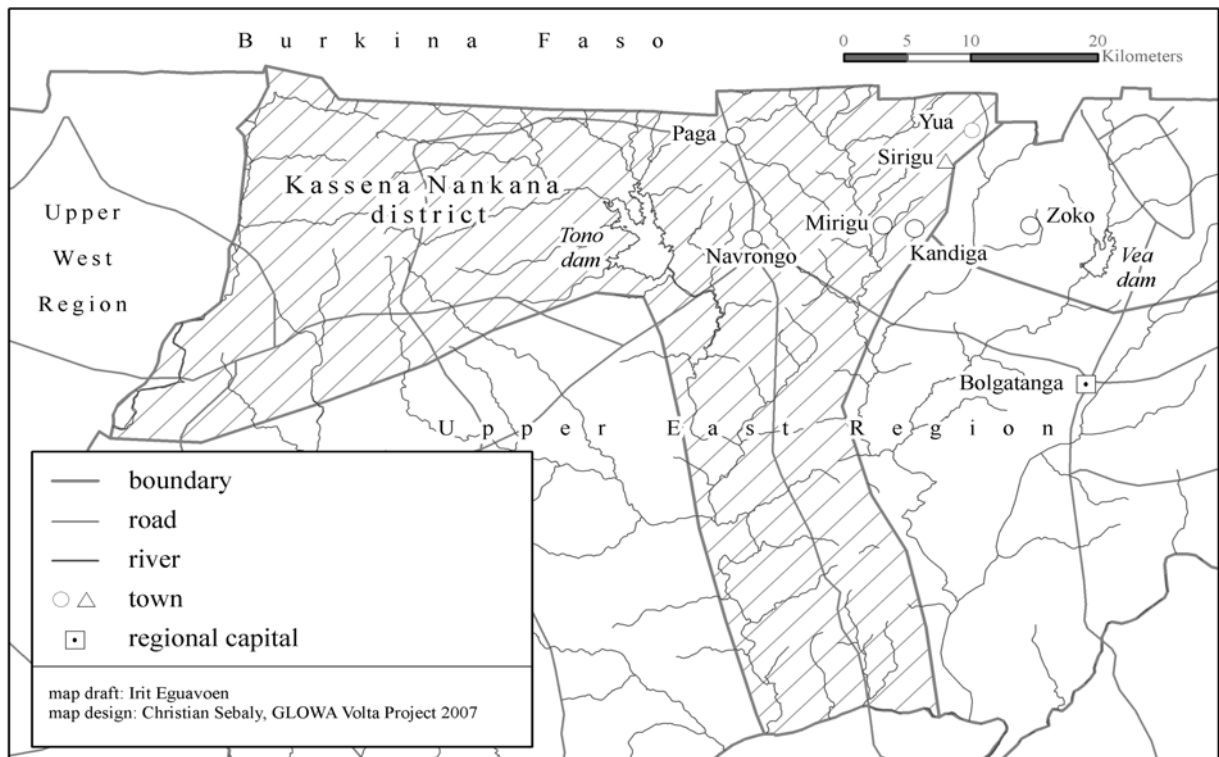
The Upper East Region of Ghana is organized into six different districts. The Kassena-Nankana district with its district capital Navrongo has a population of ca. 150.000 inhabitants, most of them living in rural settings and 151 communities (DA Kassena-Nankana 2004). There is not a clear categorization of villages. Sometimes the same local community is recorded as village and village sub-section. The dispersed settlement pattern leads to smooth transition between local communities where individual compounds are categorized as belonging to either one or the other village. Sometimes, the differentiation follows language patterns of the inhabitants. Kinship also plays a role because some lineages are counted to one village whilst others belong to the next one. The population density of 92 persons per km² is

²² Many languages in Northern Ghana show similarities, e.g. it was possible to communicate in a Kusase-speaking place with knowledge of Nankane. This is not the case between Nankane and Kassem, which use a completely different vocabulary.

higher than the national average. In some parts of the district a density of 104 persons per km² was recorded.

The area of Kassena-Nankana district covers about 1.674 km² and mainly consists of semi-arid scrubland. In the northern and eastern parts of the district, Savannah ochrosols are prevalent; whilst in the rest of the district groundwater laterite is found. The latter soil type is less appropriate for agriculture. Generally, the soil quality is poor. Dense vegetation is limited to areas close to the rivers and in forest reserves. The average altitude is about 1.000 meters above the mean sea level. Some hills are situated in the western part of the district, the highest of them being the Zambao with 360 meters.

Map 6 Kassena-Nankana district and the location of Sirigu



The largest irrigation scheme of Ghana is located close to Navrongo. It draws its water from the Tono reservoir, which is fed by a tributary of Asibelika River, also called Tono River. Its construction period lasted 10 years, 1975 to 1985. It not only supplies the urban centres of the western part of Upper East Region with vegetables but also produces large quantities of tomatoes for the southern parts of the country (see Laube 2006).

Studies on the socio-cultural context of the district have stated a “*climate of traditionalism*” in the rural sites of the districts (e.g. Mensch et al. 1999). This is perhaps due to a high number of followers of local religion, which are referred to as ‘Traditionalists’. It is predominantly characterized by cultural practices usually associated with tradition and classified as backward by outsiders and Southerners; examples include e.g. female genital mutilation and beliefs in spirit children. The arrangement of teenage marriages, the patriarchal structure and the marginalized status of women in the society are other such practices, which are less appreciated by Western and South-Ghanaian views. Other indicators for the evadable backwardness in development terms are substantiated with demographic data collected in Kassena-Nankana district.

But empirical data also indicate changes going on which may have an impact on the social structure of the societies in the district, such as increasing schooling rates, especially for girls, the spread of book religions, the local acceptance of health campaigns or the increasing number of local associations and organizations promoting economic development, participatory and gender-balanced community decision making.

The district is administered by a District Administration (DA), like all other districts in Ghana, which has its seat in Navrongo. Kassena-Nankana is a rural district, being in charge of rural areas as well as for small towns. In the course of decentralization in Ghana starting from 1988, responsibilities, decision-making powers and financial resources have been delegated to the districts. To the tasks, which were delegated to the DA, belong general administration, basic education, primary health care and health protection, housing and town planning as well as environment and public sanitation. The decentralization has shifted almost all responsibilities of the latter to the district level, including water and sanitation, refuse collection and disposal, and environmental protection. (Environmental protection is met at central government, regional and district level.) For these tasks, money from a district assembly’s common fund is made available.

Theoretically, the population of the district elects the members of the District Assembly (70 %) and the remaining 30 % are appointed after consultation with interest groups and stakeholders at the district level. Practically, the identification of assemblymen and assemblywomen from rural areas is rather an outcome of negotiations between community and local authorities, and more of an appointment than formal election.

The district administration is supported by locally based Area Councils representing village clusters or small towns and locally based Unit Committees, which represent villages or village sections. In practice, only the assemblymen system is fully realized in the district, while the work of Area Councils is often dormant. The Unit Committees could often not be fully established at the local level. This is perhaps because the establishment did not meet a local need for such an institution. The proposed purposes and tasks of the Unit Committees were already allocated to several local and long-life institutions, such as sectional leaders or councils of elders.

4.2.3. Research village

The village Sirigu is situated directly abutting to Burkina Faso. The nearest town from the village is the district capital Navrongo, which is ca 28 km away. In terms of public transportation (trotros, taxis) the nearest town is Bolgatanga, the capital of the neighbouring district. Even though it lies at a distance of more than 30 km, many inhabitants of Sirigu consider it as the closest town because of its better infrastructure.

The inhabitants of Sirigu (called Siriba, sing. Sira) belong to the Nankane group. They are homogenous in that aspect, apart from women who moved to Sirigu after marriage and some government workers from other regions of Ghana. Because of its proximity to Burkina Faso and due to the fact that Nankane also live on the other side of the open border, there is transboundary mobility and vital social networks. Siriba additionally speak several local languages, such as Hausa or Kassem but many adults do not have any or only limited skills in English, which is the official language of Ghana.

With a population of about 8.000 to 8.500 people, Sirigu is classified both as village and small town according to the context.²³ It is one of the largest settlements of the district but not recognized as such (DA Kassena-Nankana 2004) due to its large geographical extension and the external perception of its sub-sections as independent villages. The inhabitants themselves call it a village (village and *timpika*) due to its highly rural character with its widely scattered compound houses and surrounding fields, which are connected through small footpaths. The market and a Mission area show some urban characteristics. Both areas are concentrated at one place (compare map 1). Sirigu could as well be categorized as a peri-urban settlement.

²³ Population numbers are highly political because Sirigu competes with Mirigu and Kandiga to become the district capital of the Kassena-Nankana East district, which will be established soon. The DA in Navrongo does not give out any official number, which could fuel the conflict. Population numbers stated by supporters of Sirigu are higher than those used by the supporters of the other villages.

Generally, the presentation of the settlement as a conglomerate of smaller settlement, a village or a small town is context specific.

The landscape in and around Sirigu is mainly flat and its dominant vegetation are single standing trees, such as Neem, Baobab, Mahogany, Accacia Albide and Ebony and waste grass land or land without any vegetation. A village sub-section of Sirigu, Tangasiya, is named after a hill in the south central part of the village. Around this area and in village sections close to the border with Burkina Faso, some big natural stone formations characterize the landscape. A network of rivers and small streams crosses the village.

The village has gained some popularity hosting from an eco-tourism project. The Sirigu “Women Organization for Pottery and Art (SWOPA)” runs a workshop and a small visitor’s centre. Signs indicate the visitor’s centre along the roadsides between Bolgatanga and Navrongo. Also the orphanage “Mother of Mercy Babies Home” of Sirigu is known all over the district.

Picture 5 SWOPA compound



There are a number of primary schools as well as one junior secondary school provided by the Ghanaian government in Sirigu, which run service beyond their capacity. The Sirigu Secondary School, which is managed by the community, enjoys a good reputation and draws students from all over the district. Additionally, there is a private primary school and private nursery, as well as a second nursery provided by the Catholic Mission in cooperation with an NGO.

A small public health clinic and a maternity centre are situated at the Mission area. The nurses at the clinic get support by local health volunteers who help during vaccination or health education campaigns.

The Catholic community in Sirigu seems strong. The mission itself stood abandoned for years due to some serious land conflict between the mission and the local community, even though it is the seat and centre of the parish (compare case study on Mission dam, chapter five). Presently, two priests live there. Two other Christian communities (Deeper Life, Pentecostal Church) and two Moslem communities operate in the village. Moreover, most inhabitants of Sirigu are Traditionalists (for district statistics, see next chapter).

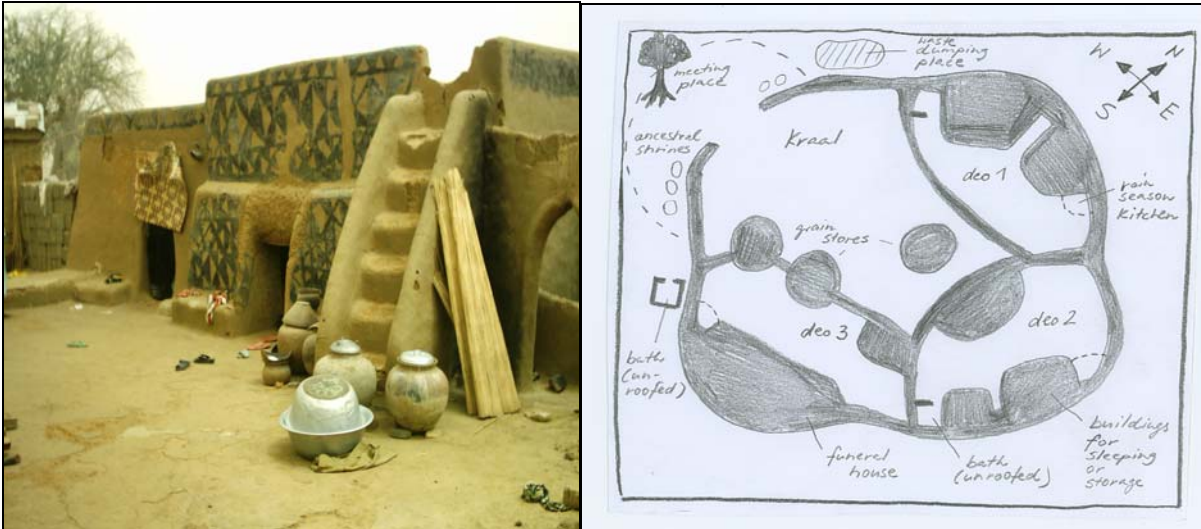
Poverty in Sirigu is severe and visible. Bicycles, the main means of transportation and livestock are considered as most precious property; the price of market food items is much lower than in Bolgatanga. Many trade items (industrial and food items) are considered too costly to find costumers in Sirigu and are therefore not sold in the market. Many young people migrate to the South; some to extend their education and many for the need to earn their living and return to their families only during the sowing time, when each hand is needed. The out-migration rate from Kassena-Nankana district was 14 per 1.000 inhabitants in 2000, which was stated to be a low number in comparison to other years. Most migrants moved to Ashanti Region (34, 4 %), about 22, 1 % went o other localities in Upper East Region; there was a general trend to move to Southern Regions of the country (Codjoe 2004: 104). “...*the majority (46, 7 %) of the migrants go to look for work, while about 15 percent each go for school and marital reasons. A significant proportion (4, 1%) [...] temporary migrate mainly to Southern Ghana to farm during the lean farming season in the north*” (Ibid. 2004: 105).

4.3. Kinship, settlement and residence

Kassena-Nankane homesteads are famous for their clay architecture and wall decorations and became an object of several photo documentations (e.g. Klages 1953, Courtney –Clarke 1994). Siriba live in compound houses, so called *yia* (sing. *yire*), clay made homesteads for extended families with several sub-units called *detto* (sing. *deo*) grouping around a commonly used kraal for the livestock. Each *deo* is a household, having an own yard, stores for millet, buildings for living and economic purposes, including a rainy season kitchen. The yards and the kraal are distinguished by clay walls, which have to be climbed across to enter the yards. Ancestral shrines are situated at the Western part of the compound, next to the entrance. English-speaking Nankane use the words ‘compound’, ‘compound house’, and ‘house’ synonymously when referring to *yire*. Therefore, it will be handled the same way also in the

study. Architecture and inhabitants of a compound house change continuously.²⁴ The field called *semane* surrounds the compound houses. Compound fields are distinguished from bush farms (sing. *va'am*), which are located at a distance of few kilometres from the compound house. The fields belong to a *yire* but may be farmed collectively or by single *detto* (see chapter six).

Picture 6 Compound house and general floor plan



Source: field notes
(right)²⁵

A typical household comprises a man with his wife and his children. Polygamous families may occupy more yards according to the number of wives. They form several households in this case. The households of a compound are related to each other via patrilineal descent. Because virilocality is practiced, the households of the sons are attached to their fathers whereby married daughters join their husbands in the compound of their husband's father. Other people might inhabit the compound house, such as for example divorced daughters returning to their father's house or foster children. Ideally, the eldest man of the compound house acts as compound head (*yidaana*, pl. *yidaama*). The eldest woman is the mistress of the

²⁴ Clay walls and buildings have to be broken down and constructed anew all few years because of their short life span. New constructions are always adapted to the present needs of their inhabitants. Compound houses undergo compound fission when they grow too large or the inhabitants decide not to live in a common house any longer. Yards, buildings or whole compounds can be abandoned and weather because its inhabitants died or migrated. Because of the effort the maintenance of clay houses demand cement structures and zinc roofs are increasingly integrated into the compound house architecture, while other typical characteristics, such as hip-high doors, round forms, window-less buildings, wooden stairs and wall paintings are sometimes replaced by modern styles. For architectural change in Northern Ghana see Kaya (1997). In the village, the hip-high doors were explained to originate from the period of the slave raids to secure the inhabitants of the houses against invaders. This provides a good example of local adaptability to a changing political environment.

²⁵ The clay vessels (sing. *d ɔk ɔ*) in front of this house are used to store water. They are covered with metal plates and put on stones or sand. The water in such clay pots keeps a cool temperature.

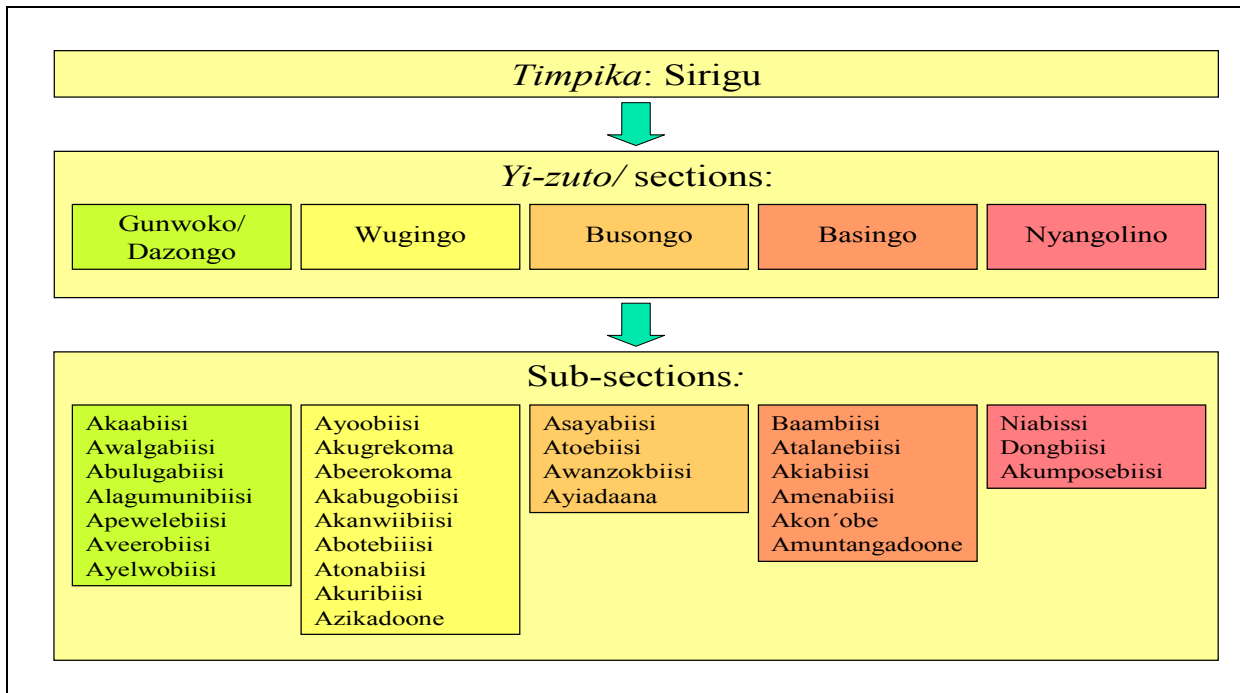
compound (*deodaana*).²⁶ The man is the head of the household or the households (also *yidaana*) in case he is married to several wives. If no man is present in the house the *yidaana* is a man from a related compound house. Women are never *yidaama* – even if they head a household practically or live alone. A single widowed lady was amused during the compound interviews: “*Whether I am the yidaana?* [laughter] *Yes, I am somehow.* [laughter] *My yidaana lives over there* [pointing at the next compound]. *It is my husband’s brother.*”²⁷ This has to do with the ancestral rituals, which only men can perform for the house. Also in compounds, where the inhabitants follow Christian faith (and ancestral rituals are of no or less importance), the *yidaana* is a man. Moreover, the representation of a compound in public is a male domain because local councils, such as elders comprise only men. Men in migration remain the *yidaama* of their compound houses while absent; their male relatives may replace them meanwhile.

A village section or *yi-zuto* (head houses, sing. *yi-zuo*) unites a number of compound houses, which form clusters according to patrilinear lineages, recognizable at their ending - *biisi* or – *kzma*, which mean ‘children of’ and follow the name of an ancestor. In English, these groups are referred to as sub-sections. Each section conglomerates four to nine patrilineages making up 29 sub-sections in the village. English-speaking Siriba use the term ‘clan’, probably because there is no Nankane term to name the single patrilineages. *Yi-zuto* form the biggest exogamous units in the village (Rattray 1932, Tripp 1978: 33). These sub-sections defined by descent groups have to be distinguished from geographic village sub-sections, which often carry names, which refer to landscape features. Due to the lack of strict geographic borders and intra-village migration, both categories are not necessarily as congruent as is the case at the level of the *yi-zuto*, which are at the same time understood as social and geographic units. As Lentz showed for the Upper West Region, social and geographic borders constantly undergo changes in understanding and definition (Lentz 1998). Water sources may also contribute to the understanding of borders; for example, one compound house may belong to a particular patrilineage and geographic village section but fetch water in the neighbouring village section. According to the context, villagers refer to either their section of residence or the name of their water user community, such as “*We live in Abeleteo [sub-section of Gunwoko] and belong to Atonadoone [sub-section of Dazongo] pump community.*”

²⁶ According to Rapp (1960:169), *deodaana* may refer to the mistress of the compound as well as the male owner of the household (= household head); German: *Hausbesitzer, Hauptfrau des Anwesens*.

²⁷ Interview summary, compound interviews Sirigu/ Abeleteo, March 2006. This indicates the difficulty of coherence between local and scientific concepts. The lady is the practical household head but not the categorical one in the local understanding because this compound was a one household compound.

Box 5 Sectional division of Sirigu



Source: WSDB (2005), field notes²⁸

Kassena-Nankane society is patrilineally organized as is manifested in e.g. residence pattern, marriage prohibitions or rules of inheritance. But an anthropological study among West Kassena indicates that matrilinearity also plays a role when considering social networks and kinship relationships across the villages. Such inter-village networks may secure the livelihood in times of food shortages (Cassiman 2000).

Ancestors and the care for their spirits occupy a large part of local thinking and acting, because they may have a direct impact on the lives and living conditions of their descendants (for details on local Traditionalist belief, see chapter five). It is rare to meet people who have completely abandoned their belief in the powers of the ancestors, even when they attend church. Every person has a guarding ancestral spirit (*segere*) representing a real but distant ancestor, which accompanies him or her during the whole life. Keeping an ancestral shrine in front of the compound house is not only a sign of respect for the dead parental generation, but ancestors also function as contact point for all kind of requests and as source of information about present-day events. Ancestors are thought to have positive as well as negative impact on the living, usually directly coupled with the person's behaviour. Thus, ancestors may sanction or assist human behaviour. Ancestors can be addressed by the *yidaana* but their voices have to

²⁸ The WDSB chairman wrote up the list after the consultation of the *nabia*, who reported all their sub-sections. During the field research, the data was validated and the level differently categorized and corrected.

be translated by a soothsayer to learn about their anger, their requests and their claims. As mentioned above, ordinary women may not address the ancestral spirits directly but are in need of a man to do it on their behalf; except when women are soothsayers.

4.4. Leadership

Sirigu covers a very large area²⁹ and can be differentiated into six village sections (Gunwoko, Basingo, Busongo, Nangolino, Wuingo and Dazongo).³⁰ About 750 compound houses belong to Sirigu.³¹ Most households in Kassena-Nankana district (58, 2 %) comprised five to nine inhabitants, about 15, 5 % included four people, and 11, 9 % had 10 to 14 household members in 2000 (Codjoe 2004: 108). *Yi-zuto* are not only geographic and social units but also political ones, which form administrative entities in the so-called traditional system of leadership as well as in the national administration.

The leaders of the patrilineages, the chieftaincy system and the titleholders are summarized as traditional leaders. Each section is under the leadership of a sectional chief (*naba*) who is appointed by the *Sirigu naba* (Sirigu village chief) from a circle of predestined families.³² The *Sirigu naba* is sometimes referred to as paramount chief, who also acts as the *naba* of Gunwoko. Each *naba* relies on a circle of elders for consultation and advice. The old men assembled in this circle are known as *yi-zuo kiima*, the elders of the 'head houses'. The particular circle of elders supporting the *Sirigu naba* in his work is named *nabia*. Elders of all sections are assembled in it and the titles of importance include *tindaana*, *saadaana* and *baga*.

'Young chiefs' (*k ɔma nabduma*, sing. *k ɔma naba*), often misleadingly translated as sub-chiefs, originally don't belong to the chieftaincy system but root in work organizers of young men (see chapter six). Apart from Nyangolino, a number of them can be found in each village section³³. Because of some personnel overlapping with other offices, there is some confusion about their status. The Nankane and Gurne word *tindaana* (pl. *tindaama*) has undergone some changes in spelling by adapting it to the English pronunciation.³⁴ The title is given to a man

²⁹ Tripp (1978) speaks of 27 km² and more than 600 compound houses.

³⁰ Those village sections appear sometimes as single, independent villages in the literature.

³¹ Estimation based on local Polio emergency maps and water user community data (committee survey).

³² The exception is the section Dazongo, which is in this context assigned to Gunwoko. Because of that, some people speak of only 5 village sections.

³³ Five in Gunwoko, two in Dazongo, two in Busongo, three in Wuingo, four in Basingo.

³⁴ The original Gurne spelling is '*teŋdaana*'. *Teŋa* is the English term for 'land' or 'earth'. In the word *tindaana* is has the clear connotation of land. Bacho's explanation is meagre. "*tendana (Land Priest) is also an important institution, as they are, literally owners of the land.*" (Bacho 2001a: 137). The second part of the word *-daana* is found in other Nankan vocabulary. It has the double meaning of first 'owner' and second 'responsible'. Hence

of the community, who is then spiritually in charge of land in the section. The title does not implicate land ownership as such (additional to the family plots). The most appropriate translation was provided by Fortes: 'custodian of the land' (Fortes 1945). *Tindaama* act as facilitators of land transaction, which take place within the community. They sacrifice for the wellbeing of the community and worship the local gods at shrines (*tingana*, sing. *tingane*) under their charge. Also each *yidaana* does that at shrines in front of his compound house as far as he is convinced in the positive effects this ritual will have on his farmland. Like the *yidaana* performs rituals for his family land, the *tindaana* performs rituals for the land of his communal members in the same *yi-zuo* (or in case of the *Sirigu tindaana* for the entire village). In older days, the *tindaama* also decided about the beginning and end of farming cycles and the crops cultivated (Tripp 1978: 43). Many other functions are listed in the literature (see Dittmer 1961). Some authors have stressed the importance of 'tindanas' on household water management in Northern Ghana without usually giving the reader any insight of how this importance is practically manifested (Bacho 2001a, Fuest 2006).

Male and female soothsayers (*baga*, pl. *bageba*³⁵) are considered to be very powerful because it is them who can connect directly to the gods and ancestral spirits, and deliver their messages. He or she announces the successor of a *tindaana* or a *saadaana*, as well as the possible successor of a *naba*. The *baga* delivers ancestral instructions for rituals to *tindaama*, act as juridical instance by applying oracles, and treat all kind of local diseases. Several *bageba* operate within one section. In Busongo alone, seven *bageba* operate. The medical function of the *bageba* is either not distinctive in the old days or overseen by Tripp.³⁶

Bageba play a key role in the political arena and contribute to a balance of power between the particular title and office holders. Because their number is high, they offer a variety of fora, which are strategically selected by the elders to enforce decisions-making and the

tindaana means literally nothing more than owner of the land. The close relationship between property and responsibility has found entry into the language. Different people and referring to land ownership stated, "We are all *tindaama*." Hence, it is a question of scale. Each *yidaana* is also *tindaana* of his land but the sectional *tindaana* is the general custodian of all the land within the village section.

³⁵ Sometimes they are also referred to as *bakoligo*, which is derived from *bakoligodaana* ('owner of the bag *bakoligo*', which is a regalia of the *bageba*). One of the most recognized *bageba* in the village is a woman. (When the *Sirigu naba* fell sick, he went to her for medical and spiritual treatment and spent months in her compound.) The ethnographic literature does not mention female *bageba*.

³⁶ Allotey summarized: "The medical system consists of the *vuru* (soothsayer) [Nankane: *baga*] who are the guardians of the spiritual well-being of the people of the Kassena Nankana district and the *tindana* (traditional healer) who provide physical healing. [...] The soothsayer is usually able to provide a 'preliminary diagnosis' of an ailment and recommend the type of traditional healer that should be consulted. The traditional healer usually specialize in particular areas of healing" (Allotey 1999: 154). This record contradicts ethnographic findings in the literature and own research. It suggests that Allotey had mixed the terms *tindaana* and *tiindaana*, latter which can be translated as 'owner of medicine' and is not a leadership title.

legitimization of their decisions. One could claim therefore, that forum shopping is a historical political strategy in Nankane society. Compound heads, section elders as well as chiefs may choose the forum for decision-making and ancestral guidance to some extent according to the desired outcome of negotiation, inter alia, consultation. *Bageba*, for example, enjoy different kinds of reputation concerning their expertise, or outcome of consultation (also depending on the ancestral God they consult). Thus, the selection of a *baga* for a particular purpose may already imply some expectation of outcome.

Saadaama (sing. *saadaana*) are spiritually in charge of rituals, which ensure enough rain and raining periods as needed in the farming calendar. Not all sections have their own titleholder. One of them in Basingo (from the old *naba yire*) functions as Sirigu *saadaana* for the well being of the whole village. Although the village title was vacant during the time of research, its future holder had already been determined by the *baga* and was about to be ritually established after the end of funeral rites for his father, the deceased *naba* of Basingo. *Saadaama* have neither been investigated nor even mentioned in the available literature on drinking water, which was surprising because their existence was already reported in Rattray (1932), Dittmer (1961) and Cardinall (1969).

The representatives of the government system of leadership are the three assemblymen. They represent the village in the District Assembly in Navrongo. Each of them was in charge for two sections (Dazongo/ Wuingo, Gunwoko/ Basingo, Busongo/ Nyangolino).³⁷ During the time of research, two assemblymen stood for the ruling party NPP and one for the opposition party NDC. There was no present overlap between traditional titleholders and assemblymen. Practically, the role of the Unit Committees is very weak though they got formally established as local decision-making body in the course of national decentralization attempts. The existing Sirigu Area Council is rather dysfunctional and dormant.

Decisions are usually taken within lineages and *yi-zuto*. The *yidaama* of a lineage or the *yi-zuo kiima* of a sub-section debate and decide. These fora imply a male decision-making authority. Most of the *yidaama* are elder men. Women only have indirect impact on the decision-making by channelling interest through male relatives or affines. Conflicts are

³⁷ The local communities do not necessarily elect assemblymen. Data from Sirigu as well as from other small towns in the region suggest that elders or the chief executive of a district may also appoint a person to be assemblymen/ assemblywomen. In the village two assembly men reported to have been elected among several candidates while the third reported to have received an appointment by the section elders (which he then was obliged to follow although he was not happy with it.)

handed over to the *Sirigu naba* and his *nabia* only when the issue concerns several sections or is of great interest to the village, while decisions concerning only a few compounds or individuals are negotiated and decided on the lowest level possible, e.g. the family, the compound house, the lineage or the sub-section.

During the past years, a police station has come up at the market, to which cases are reported. Usually, the cases are recorded and the suspect is imprisoned but later the case is not followed up within the juridical system of state courts but transferred back to local authorities because villagers withdraw their report. Local authorities supervise negotiations between the conflicting parties and determine sanctions. Often, cases are settled, even when a serious crime, such as murder or grievous body harm was committed. Typical sanctions are pragmatic, such as payment of compensation and the performance of rituals to conciliate the ancestral spirits, which were offended by the bloodshed. Some men, who committed rape, for example, were not arrested but put in foot chains, which hindered their movement and restricted them from committing more attacks. These men are also attached with a social stigma.

The hierarchical order of the chieftaincy proves to be less hierarchical when seeing the interplay between the existing institutions of traditional leadership as well as the interplay between traditional system of leadership and government system of leadership. The *Sirigu naba* appoints the *naba* but not without the consultation of his *nabia* and a particularly selected *baga*. Descent predestined a number of candidates, and it is the *baga* who tells the *nabia*, who the ancestral gods have chosen and who should be appointed. But also the *baga* and the *Sirigu naba* have undergone such appointment, as well as *tindaama* and *saadaama*. It seems that a lot of power is in the hands of particular *bageba* but the elders and *nabduma* decide which *baga* will be consulted for what purpose.

The traditional system of leadership and the government system of leadership are loosely connected through consultation practices in both directions. An important decision at the village level, which is approached to the *Sirigu naba*, will lead to the assembly of the *nabia* and an invitation of the three assembly men. Otherwise, decisions, which concern Sirigu at the district level, such as the allocation of infrastructure, result in meetings, which include at least a representative of the chief's house. The ideal decision-making is finding a consensus or majority decision, which includes all community leaders. Within the traditional system of leadership, no single position is automatically the most powerful one. Political leadership is

rather decentralized. Ideally, many decision-making institutions and authorities are involved in a decision-making process, which is of interest for the whole village. Practically, it is more fragmented as will be seen in later chapters. Inclusion and exclusion of formally defined decision-makers during the process of decision-making as well as channeling of information also happens.

Of social importance are further a large number of youth and women associations, which were organized in the recent years according to village sections or religious orientation on initiative of assembly men and church leaders, e.g. Nyangolino Women Association, Christian Mothers Association, Wugingo Youth against HIV/ Aids. Their leaders are involved in some communal decision-making (typically 'community meetings' convoked by development agencies). There are numerous other groups and associations ranging from funeral associations, farmer associations, money saving circles to professional groups (cattle traders, food sellers etc.), some of which work cross-sectional. One of the registered and locally based NGOs, the Sirigu Development Association, was rather dormant during the time of research. The other registered NGO, the Sirigu Women Association for Pottery and Art runs successfully a visitor centre and promotes local art and architecture.

The societies in Northern Ghana, which did not belong to pre-colonial empires, were often summarized as acephalous societies, stateless societies, and tribes without rulers or decentralized societies. It was assumed that they only fell under the leadership of a chief during colonial administration. They provided classical empirical examples for the categorization of such political systems (Meyer-Fortes and Evans Pritchard 1940, Horton 1971, Middleton and Tait 1958, Sigrist 1994). Northern Ghanaian societies were characterized by little concentration of authority, authority roles rather limited to sectors of life, authority roles not being a full time occupation, and relatively small units for conflict settling and rule making (Horton summarized in Der 2001: 37). Der argues, "*the people of the non-centralized areas of the Upper West and Upper East Regions of Northern Ghana were neither acephalous nor stateless. They were not people without rulers, for the institution of chiefship was widespread among them in the pre-colonial period.*" (Ibid: 2001: 37). "*It was latter-day social anthropologists who, basing their views mainly on the colonial structure of administration and theoretical constructs, put forward the idea of European-made chiefs in Northern Ghana.*" (Ibid. 2001: 59). Chiefdoms in Kassena-Nankane area already existed, when the British arrived in Navrongo in 1902. One of them was Sirigu (Ibid. 2001: 56 based on historical sources). According to the historical sources, the standing of the chiefs was

rather weak at this time. The British enforced the chieftaincy system by co-opting the chiefs in their colonial administration. Chiefs were expected to provide laborers, carriers, wood and water from their villages – all means, which further undermined the chief's political popularity and authority over their villages. The British introduced a hierarchy among the chiefs through the award of medallions. Such a hierarchy between paramount chiefs, sub-chiefs and headmen was formerly unknown and wrongly interpreted as the British introduction of chieftaincy by social anthropologists (Ibid. 2001: 58).

In the research village, chieftaincy is referred to as a traditional system of leadership. Presently, it forms an important feature of local leadership among Nankane communities. Chieftaincy was both an innovation deriving from Mossi state in Ouagadougou and Naliergo as well as a much later innovation, which was introduced during colonial times by the British administration (Tripp 1978: 38ff.). Siriba tell that the man who installed first chieftaincy in Sirigu was residing in Lengo, about 25 km on the other side of the border with Burkina Faso. In the 1970s it was reported that “*chieftaincy (naam) [...] is a borrowed institution of certain age and, until recently, of relatively minor importance.*” (Ibid.1978: 38). Although the present-day chieftaincy system in Sirigu displays hierarchy, it is still not a centralized and hierarchical system of leadership.³⁸ At the village level, it rather contributes a part to a patchwork and networks of socio-political institutions and several layers of territorial leadership, which constrain the monopolization of power. Its importance has obviously increased during the last 30 years. Presently, the *Sirigu naba* acts as the central village representative. The introduction of the sectional *nabduma* was due to British attempts to extend the chieftaincy system of the South to the areas in the North of the colony. Some lineage heads, which were part of the elders, became *nabduma* under the British administration and were appointed by the village *naba*. Still, they could only be appointed from a predestined circle of elders and thus served as heads of their lineages. The titles *tindaana*, *saadaana* and *baga*, were also attached to descent groups, usually larger segments formed by several lineages (as e.g. the *yi-zuto* in Sirigu). They were understood as mainly spiritual offices by the British and were kept in place. The *Sirigu naba* although highly respected was thought by some Siriba as not presenting the true chief of the village, but only the appointed paramount chief – relating his position to the colonial intervention. Another

³⁸ It is e.g. the privilege of the *Sirigu naba* to wear a red fez as regalia. One sectional *naba* also does but ensures that the *Sirigu naba* never sees him with it. Other hierarchical forms of behaviour concern rituals for greeting and rituals of speech.

naba yire (chief's house) in Basingo was thought to be the originally more powerful or more authentic one.

Several representatives of the Ghanaian national administration were established in the village. The district assembly, the assembly men and the unit committees were introduced during the decentralization process, which started in 1988. The socio-political processes, which led to the present-day leadership patchwork, are partly induced changes by external agents and state agencies, which have been taken up by the Nankane society and adapted to fit the socio-political set-up. Despite this, continuities can be observed. The socio-political system was based on decentralized descent-oriented leadership and remained decentralized in character. The number of decision-making bodies and offices in the village increased and new source of legitimacy, such as democratic elections, occurred. In present-day Sirigu, the political arena is more diverse than a century ago; so are the legal options. Not only leadership position, titles and political decision-making form part of the local political arena, but also positions and organizations, which are not usually understood as political institutions, such as development brokers, the priest or the regional parish council. It is a polycephalous political arena. Power is distributed in a decentralized manner among diverse actors and groups of actors. Innovative offices are established next to the existing ones. This resulted in the diversification of the political arena, which is characteristic for local change.

4.5. Life cycle

The next paragraphs continue to examine the social institutions of Kassena-Nankane society by discussion on-going changes in social organization and age-based stratification. Before a child is born, the parents have to endure periods of specific taboos; in fact, miscarriages and difficult deliveries are attributed to the violation of such taboos. Ancestral spirits of the compound are worshipped to support smooth delivery of the child. Kassena-Nankane society did not know professional birth attendants until the launching of a training program for traditional birth attendants (Allotey 1999). After delivery mother and child stay isolated inside the house for three to four days depending on the sex of the child but once this time has passed, the mother takes up her usual domestic duties but some food taboos are still required. As during pregnancy she consumes only hot water and food until her body has fully recovered from the delivery (compare also Rattray 1969: 133). This diminishes the danger of her acquiring infections.

Later, the child is presented to its *segere*. “At the shrine of a guardian spirit is a pot containing roots soaked in water. Some of this water is given to the infant to drink. [...] Water [flour water] is continually given to the *segere* until the child is about three years old” (Rattray 1932: 103-104). In Christian families, baptism replaces these rituals. At times, both Traditionalist and Christian rituals are performed for the child to ensure spiritual support from both sides.

Local belief includes the conviction that children may be reincarnations of the ancestors or of children, which had died recently. Infant mortality is high in the district; a study from 1995 identified infant mortality rates and maternal mortality rates to be the highest in Ghana. Infant mortality cases, which could not be traced back to particular health problems, and therefore are suspected to be infanticides, are relatively numerous with up to 27 % of deaths. In a more recent study conducted in the district with a sample of 245 pregnant women, 44 suffered from peri-natal deaths. Five of the 24 children, who survived the birth but died later, died due to infanticides. That means, 20, 8 % of infants died by infanticides (Allotey and Reidpath 2001: 1008-1009).

Not all children are welcome. Some children may be suspected to be a spirit child bringing evil into the family. Spirit children (sing. *kinkiriko*³⁹) are perceived as punishment sent from the ancestors. In English, villagers described such children as “dwarfs”. The Nankane word for ‘dwarf’ *deggere* is closely associated with impurity.⁴⁰ Twins are automatically suspected to be of evil and dangerous nature. Physical and mental handicaps of the baby may also lead to suspicion within the family.⁴¹ The death of a mother, difficult pregnancies, children conceived during sexual intercourse outside the compound, or a series of unfortunate events, which haunt the compound after the child’s birth are local indicators for the determination of spirit children. During interviews, villagers told that spirit children constantly cry and “*even at an early age when most children cannot control the movement of their necks, spirit children can turn away*” to avoid people staring at them (Ibid. 2001: 1009). The *bagegba* are consulted in such a situation and sacrifices are made to avert the sending of a spirit child. In some cases, children categorized as spirit children were poisoned or brought back to the *tingane* (sacred forest) and marooned because they were seen as belonging to the uncivilized

³⁹ *Kinkirega*, pl. *kinkirese* are elves or fairies (in German: Elfen, Feen). The word is also used as an insult for a twin. It can also mean gorilla. *Kinkirego* is the term for a bush spirit of a gorilla (Rapp 1966: 184).

⁴⁰ *Degge* = be dirty, impure, *deggero* = dirt, impurity, dirtiness; (Rapp 1966: 167).

⁴¹ Most cases concern babies born with a “*very large or very small heads (hydro, micro and anencephale), feet pointing in the wrong direction, (talipes), lumps in the back (spina bifida), teeth at birth, dislocated or broken limb.*” (Allotey and Reidpath 2001: 1009).

world of the ancestral spirits. (More on the dichotomy of civilized and wild world is elaborated in chapter five.)

When the Catholic Mission came to the village in 1965, nuns were concerned about such infanticides and started to care for a handful of children, who were brought to them by relatives, who wanted to protect them. Their views on spirit children had changed due to new knowledge and a new normative system, which appreciates life as God-given and condemns any threat to it. This was the origin of the orphanage in the village. The children stayed first with the sisters until a building was constructed for them. Some years ago, a young British volunteer founded an NGO after her stay in Sirigu to support the orphanage.⁴² Presently, children live there for different reasons. Some were brought to the orphanage because they were foundlings. Others are born by unmarried young mothers who cannot take care of them by their own means. Some were sent because their families were too poor. Children, who are categorized as spirit children and endangered by their families, are also brought to the orphanage. However, children living in the orphanage face hostility by some villagers, who accuse them to have killed their parents. They are attached with a stigma.⁴³

Discussions with midwives indicated that infanticides were still practiced in the village. Some people perceived it as the correct thing to do under some circumstances.⁴⁴ Others, such as most Christians and Muslims as well as some Traditionalists condemn the custom. The necessary care of a person, who is not able to contribute any work, draws resources (food, labour) from the household. But it is important to state that *“Locally, infants are not killed because they have physical abnormalities. The children are killed because they are [spirit children]. It happens to be the case that physical abnormalities are diagnostic for [spirit children.]”* (Allotey and Reidpath 2001: 1011). Adults with disabilities are not obviously

⁴² The NGO Afrikids has grown prosperous within a few years and supports many projects in the Upper East Region, especially projects which support mothers and children. For information see www.afrikids.org

⁴³ Interestingly, some families started showing interest in their daughters, when they had reached adolescence, causing family ties to be rehabilitated. One motivation could be the additional labour force, which a young woman may provide for the house or the prospect of receiving bride wealth for her. Their stigma then disappeared or weakened.

⁴⁴ On one hand side, the state of nutrition, medical treatment and health conditions of children is generally low and child mortality occurs regularly. Children categorized as spirit children or suffering from physical handicaps may get less attention and affection by their families, which worsens their living conditions in comparison to the other children of the family, which result in higher probability of early death (without taking action of infanticide). On the other hand, the most common causes for infanticides mentioned in the literature are reflected in emic views (Allotey and Reidpath 2001: 1011).

stigmatized and indeed they do participate in social and economic activities as far as possible. Mentally disturbed adults were treated with indulgence.

When girls are about eight years old, they are taught domestic activities by their mothers; likewise, men from their house train boys by exposing them to the farm work, livestock care, and handicraft. School authorities try to increase attendance by creating more incentives for the parents to send their children. For instance, families whose daughters attend school on a regular basis receive food donations; all students are provided with a cooked meal.⁴⁵ School attendance increases but there are many young girls who attend only once in a while because they have to perform many household duties. The boys also show school attendance irregularity.

Male and female lifecycle show different patterns, especially when considering the transition to adulthood but have started to assimilate slowly. While male adolescence has been rather continuous in its character, female adolescence has proved to be a relatively recent phenomenon, induced by development interventions, especially health campaigns, the growing importance of book religions, and the extensions of the primary and secondary education facilities to remote rural areas (Mensch et al. 1999).

The transition from childhood to womanhood was and is determined by the ritual of female circumcision, which was considered an almost universal practice in Northern Ghana, including both the physical excision and the training and teaching of the newly circumcised women. It was a "*fundamental feature of the transition to adulthood [...] in fact, a girl was considered unmarriageable if she had not undergone the procedure*" (Ibid. 1999). The change of status entails the connectedness of the young woman to the spiritual world - allowing her to participate in particular funeral rites, which were denied to her before. Excision is practiced shortly after the onset of the first menstruation and the wedding is arranged not long after the circumcision. Because the status of adulthood is reached with marriage, the girls hardly face a transition period between childhood and adulthood.

Status change to male adulthood is rather a serial transition. Adolescent boys get wider responsibilities for grazing cattle and small plots of land allocated. They start joining adult men in meetings without yet having the right to fully participate in the discussions. The period of male adolescence also includes periods of labor migration down South. It is further

⁴⁵ Food for Education Program of the American Catholic Relief Service.

characterized by a period of little exit to women until marriage. Male adolescence is prolonged though the enormous financial efforts, which a young men has to undergo before receiving a wife. The male pattern increasingly includes secondary and tertiary education and labor migration.

In Kassena-Nankane society, premarital sexuality is not sanctioned but female pre-circumcision sexual activity is a target of mockery and a source of humiliation for the girl.⁴⁶ But some protestant churches preach total abstinence before marriage and contribute to a new perspective of adolescence sexuality turning abstinence into a value. Such perspectives are supported by the national anti-HIV campaign, which places emphasis on pre-marital abstinence as preventive strategy rather than on the use of condoms.

While marriage follows an exogamous pattern, premarital courtship can also be endogamous. Exogamy is still practiced – maybe in a less strict way then before. Premarital fertility is low. Presumably, it has increased due to prolonged adolescence and postponed wedding age. Children born from premarital relationship are kept by the unmarried mothers and belong to her patrilineage (see also Rattray 1932). It is not a shameful situation; a number of single mothers and their families rather ensured during the research that it would be a good thing because this child remains as a belonging to her patrilineage even when she marries. It cannot be taken away from her in case of divorce.

Despite the fact, that female circumcision seems to have been a local practice only since the middle of the 20th century, it was and is a norm in Kassena-Nankane society. Women, who did not undergo the procedure, are confronted with constant mockery to an extent, which can make the woman's life miserable. *"Babies born to uncircumcised women were called zankabri bia (clitoris babies) and were treated with disdain in society, as they were considered stubborn. These are things most women can't stand or take in our society."* (local woman quoted in Mensch et al. 1999: 103). The government of Ghana outlawed female circumcision in 1994/95. Health campaigns were initiated to fight the practice, which was stigmatized as backward, superstitious and unhealthy. The Female Genital Mutilation (FGM) campaign in Kassena- Nakana district made use of the Woman Associations to address the local population. The *Sirigu naba* supported the campaign. The campaign achieved some success as the district numbers in 1995 showed that only 25% of women from 15 to 19 years,

⁴⁶ The *nuuse peere* (hand washing) ritual was reported in this context (Rattray 1932: 155). It is not sure, whether it is still practiced in some families.

were circumcised, while in the age group 35 years circumcision was still a norm with a rate of 94 % (Mensch et al. 1999). However, the success is doubtful and scepticism remained part of the local discourse. The reduced number of circumcisions in the village was also due to the recent death of the woman, who was most popular for conducting circumcision. The eradication (whether sustainable or not) was thus a result from development intervention, weak local opposition against the eradication campaign and constraint practicalities, which coincidentally met at that point in time. Some villagers suspected that some young women would still undergo the procedure when about to get married and the FGM campaign team had left the village for good. It is also possible that the FGM campaign will show long-term impact among Christians and Muslims, among which the participation in the campaign was high and condemnation of FGM was understood as a symbol of progress and modernity. Meanwhile, the trend concerning male circumcision has evolved into an “*almost mirror image*” (Mensch et al. 1999) being propagated by the Ghanaian government as well as by religious communities as being modern, healthy, sexually attractive and a sign of faith. It is gaining popularity in the area.

There is no local institution, which took over the functions of the ritual, which female circumcision embodied (education of girls, preparation for womanhood, and marker of womanhood). As a result, people from the district perceive the transition from childhood to womanhood as diffuse. For example, with the decline in female circumcision rates, it has become unclear as to when a girl is old enough for pre-marital courtship. The local population held this responsible for the increase in the number of pregnancies among unmarried girls. Female lifecycles embrace increasingly a period of adolescence (from onset of first menstruation to delayed marriage), which was not known in rural Kassena-Nankane society before. Formal education targets a different set of knowledge than the institutionalized education happening in the context of circumcision.

A man is considered a full adult only when married. Only a man, who has a wife and a child is allowed to build a house and may become a *yidaana* of his compound, when his father or senior brother dies. Because women move to their husband’s house, they are understood as women after marriage but further they have to undergo a number of stages before their adult status is strengthened. It is only after the young wife has stayed a period with her mother-in-law and established herself in the new compound house that her husband will provide her an own *deo* within the compound. Her adult status increases with time (Cassiman 2000, Kost and Callenius 1994).

Nankane weddings can be rather described by the sequence of events than a singular event, including repetitive approaches to the girl's parents, the exchange of gifts, and working on the father-in-law's fields. Only after negotiation and at least partial payment of the bride wealth, the marriage is fully recognized and the wife moves to her husband's compound. Among Christians, the bride wealth is of secondary importance after the Christian wedding. Marriages can be realized in practice, children be legitimately born and the adult status reached before the bride wealth is completely paid. As in Kasem, there is no noun such as 'marriage' but nouns used to describe it. Although Kasem and Nankane language differ, the same concept of marriage is reflected in the vocabulary. In Kasem, marriage is a matter of gender perspective. Men 'eat' women (*baaro di kaane*), when entering the marriage, while women 'enter' men (*kaane zo baaro*) (Cassiman 2000). The same descriptions are found in Nankane (*di pokka* versus *zoo baaro*).

The marital age for girls has increased in comparison with historical records (Cardinall 1926, Rattray 1932) and within the last decades.⁴⁷ Observations and conversations suggest that many local people still perceive a young age for girls (ca. 13-15 years) as appropriate for marriage. Arranged teenage marriages are rather the norm. Sometimes, early marriage is associated with the poverty of the family. In this case her father's household not only reduces the need to take care of an additional member but also "*collects the cattle*" (received the bride wealth) to support the remaining family members. Formal education has led to an increasing group of young women, whose time of marriage has postponed to an older age. Statistics about the percentage of women who attend school in the district clearly show increase in enrolment both in Primary as well as in Junior Secondary Schools.⁴⁸

Polygamy contradicts the Christian norm system and has therefore been abandoned by a part of the population. However, it is still popular among young Muslims and Traditionalists. Divorce happens often; if no children were born in the marriage, the bride wealth is paid back to the husband and the marriage is resolved this way. If children are there, they remain with the father. The divorce has serious implication for the mother-child relationship; according to customary law, children are counted to their patrilineage, they remain in their father's compound after divorce whilst their mothers either return to their father's house or move

⁴⁷ In 1996, about 21, 8 % of women between 18 and 19 years were married in the age of 18, while the percentage of women between 40 to 44 years, who stated to have been married by the age of 18 was bigger, counting about 27, 2 %. In 1996, 55,1 % of the women aged between 20 and 24 were married, while for the 40 to 44 years old ones, the number of 66, 3 % was higher (Mensch et al. 1999).

⁴⁸ In 1996, 68, 4 % of the women between 15 and 19 years old were schooling at primary, while only 24, 4 % of the women between 35 and 39 ever did (Mensch et al. 1999).

away. In a polygamous household the other wife or another woman of the compound will attend to the child but it may also happen that the child is neglected because there are no appropriate persons in the house to take care of it. The contact between mother and child stops until the child is grown; it may reestablish the contact. A divorced woman usually becomes a childless woman.

Widows, too, cannot claim much right to their children according to the customary law. According to ethnography from the 1930s, women do not inherit land or property from the deceased husband. All children born during the marriage belong to the husband's patrilineage. This also includes future children of the widow, even when she remarries (called *pokkooredia*, 'widow wedding'). Such women are called *kiima poka/ poya* (wife/ women of a ghost). If the woman is beyond childbearing age, the heir, the husband's brother is supposed to support her (Rattray 1932). Widows observed during the present research, lived in various situations not always reflecting the customary arrangement. Some stay with their children in compound houses on their own and farm fields given to them by the husband's family. Others are involved in non-farm activities. Among Muslims and Christians, widow wedding is no longer practiced. Women rather stand on their own to sustain themselves and their children, or get support from the adult children or community welfare. This depends very much on the age and physical strength of the widow. Widowers can still rely on the work force of their adolescent children, who continue live in their household anyway.

Villagers desire to have many children but the idea of how to reach that aim differs among men and women. The Navrongo Family Planning Project started in 1994. Already in 1997, the total fertility rate declined about 0, 5 % in comparison to communities not participating in the project (Bawah et al. 1999: 54). Notably, gender relations were touched and challenged by the project. Whether they changed is yet uncertain. Local fertility regulations based mainly on agreements between men and women aiming to space childbirth through abstinence during the long weaning period. Focus group discussions conducted by the project revealed that men's priorities are children and sex, whereby it is women who are interested in having longer intervals to recover and to ensure the well being of their children. This divergent interest between men and women may lead to breaking of the agreement or even domestic violence against the women. Reproductive medicine is therefore attractive to women, also because women can apply it without the consent of their husbands. "*Because the control over women in Navrongo [and the district] is still complete, and their status as property is so*

deeply rooted, the potential exists for women's independent action in regulating fertility to upset the existing social contract that defines gender relations." (Bawah et al.1999: 62).

Usually, social status and (male) political bargaining power increase with seniority. Younger people are expected to treat their seniors with respect. Funerals in Kassena-Nankana district are important events and may be very large and costly if the deceased was old or even a holder of a title in the traditional systems of leadership. The corpse is usually kept in a special building of the compound for a day and then brought by a procession to the ancestral grave, which has the form of an underground cave. One distinguishes 'fresh' and 'old' funerals; the 'fresh one' being the actual burial and the 'old one' being the celebration, where also so-called war dances may be performed (Abasi 1995).

4.6. Conclusion

Even though the local community has been exposed to a number of development interventions, the socio-political organization remained in place. The foundation of the political system continues to be the authority of the *yidaama* at several levels (household, compound, *yi-zuto*, and village). Local political institutions are multi-purpose. The establishment of the national system of administration provided additional offices and a formal link to the District Administration. Consequently, the political arena has diversified over time.

Most development projects did not target institutional change as such but instead the improvement of single development indices. Other development interventions aiming at structural changes, such as the strengthening of women, have proved to be difficult to practice. Although women received a public voice, their bargaining position within society and confidence has not grown much. Gender relations, which are codified in socio-political institutions, could not just be swept aside by a single target project. The changes, which have an impact on social-political institutions in the long run, such as shifts in life cycle or the changing relationship between young and old members of society, are results of a number of interrelated local factors and externally introduced programs or infrastructure. They are not always foreseen or intended.

Norms and local practices are a matter of contestation and negotiation among villagers. A number of semi-autonomous fields within the local arena define their own understanding of what is right and wrong, what is appropriate to do and what unnecessary or out-dated. Several

religious communities constitute such fields but also households or families, or local political organizations. Individuals belong to several of such semi-autonomous fields and may internalize various as well as contradictory normative versions. In practice, several versions are translated into action at individual, household and compound level. Pluralism in views, constestation of norms and diversification in institutions can be further explained with an on-going fragmentation of local knowledge. Here, we can observe an age-divide. Gaps in the intergenerational knowledge transfer, religious belonging, migration experience, and literacy as means for acquiring access to information are crucial factors contributing to this fragmentation. Individual knowledge determines the repertoire of legal and normative options, which a person can activate in a particular situation.

Certainly, the dispersed settlement pattern, long distances between sections of the village as well as the isolation of parts of the settlement in rainy season when streams cut off the ways encourage decentral forms or political organization. The lack of strict territorial borders and the link to descent as organizing principle opens up the ground for negotiation as well as for options in decision-making. Any central authority would find it difficult to keep control over such a large village. One could argue that because this pattern remains, also decentrality as main organizing principle remains but I believe one should not push this argument too far. The importance of knowledge and constested knowledge is most obvious in the case of the infanticides caused by the belief in spirit children. Here, the local categorization of the social and natural environment (including, rules and regulations) has a significant impact on household size and infant survival. We will come back to local categorizations of the natural environment in the next chapter.

5. Knowledge systems on water resources and water supply

*“Those on top, they talk paper. On the ground it looks different.”*⁴⁹

*“Neither scientific expertise nor local knowledge can, of course, claim to be uniquely true or objective. Rather, different people [...] start from different assumptions, perceptions, values, interest and knowledges.”*⁵⁰

5.1. Environmental knowledge

The Northern part of Ghana is classified as water poor or suffering from water shortage or even from water scarcity. Such view is supported by the general perception of natural resource degradation. *“Further north [in Upper East Region particularly], population density is extremely high and landscapes are almost entirely anthropogenic...”, “environmental degradation is occurring across the north virtually unchecked. [...] Overall biodiversity is being lost at a far greater rate than individual trees and habitats have yet to be classified in terms of priority for protection.”* (Blench 2004: 2, 9). This chapter will elaborate on local water availability by questioning what different knowledge systems on water exist. It shows that different knowledge systems on water resources and household water supply exist; it also presents the contradictory statements on water availability resulting from these different perspectives.

The knowledge on water resources can be categorized in three areas of knowledge, namely (1) geo-hydrological and natural science knowledge; (2) cultural knowledge; and (3) hybrid knowledge deriving from both (1) and (2). In his attempt to outline an antiessentialist Political Ecology, Escobar differentiates regimes of nature, which can be linked to these areas of knowledge to some extent (Escobar 1999). In what he calls the capitalist nature, nature and society are conceptually distinguished from each other. In Western societies, nature is perceived mainly as a commodity produced by the mediation of labour. Consequently, *“[c]apitalist nature is uniform, legible, manageable, harvestable...”* (Ibid. 1999: 7). Derived from Foucault's idea of governmentality, which describes the strong interference and impact of state (or other) experts on many aspects of every-day's life of their governed subjects (as well as environmental objects) on the base of a particular knowledge system, Escobar develops a research agenda taking more into consideration *“the ways in which nature has been governmentalized – made the object of expert knowledge, regularized, simplified and*

⁴⁹ Mr. W. Abane (DWST Kassena-Nankana district), interview notes, 03.02.2006.

⁵⁰ Berkhout et al. (2003: 3).

disciplined, managed and planned for” (Ibid. 1999: 6). Even though Western expert knowledge mainly derives from natural sciences, it is selective and agenda-driven in character. Typical examples for governmentality in NRM are colonial policies regarding agriculture, forestry or wild life, inter alia, present resource planning and conservation policies, such as the work of the Ghanaian Water Resources Commission, which seeks for political advice based on scientific data provided by the GLOWA-Volta project. Cultural knowledge is attached to the organic regime of nature presented by Escobar. Typical attributes of this regime are the lack of an ontological nature – society dichotomy; biophysical, human and supernatural (or non-living, living and supernatural) form three interlinked spheres of society. Such linkages may imply systems of categorizations and classification, boundary settings, mechanisms for upkeeping the order between the three, or kinship allegories (Ibid. 1999) and manifest practically in norms, rules, procedures and rituals, means they may be institutionalized. It is misleading to attach the area of scientific knowledge only to Western and cultural knowledge to local non-Western communities solely because local knowledge in rural Africa may embrace scientific knowledge and may therefore be hybrid.

It has often been stated that the global freshwater resources are depleting and therefore more efficient resource management was needed. Another often made point is that the patterns of water use and consumption must change on a global level. The resource freshwater is globally distributed in a very uneven manner. It is 65 % of the Asian population, 27 % of people in Africa but only 2 % of people living in Europe and North America, who are not served with clean freshwater (UNESCO 2003: 109). The idea behind improving water management in semi-arid Africa is not nourished by global fears for a depleting resource. It is rather the vision to make larger quantities of clean water available for those who are not sufficiently supplied yet and the assumption, that the economic potential of small water amounts is not yet fully tapped. This perception fuels research and development activities; improving access to clean water is understood to be the main challenge in relation to drinking water.

Table 12 Access to drinking water supply (coverage data global versus Africa) in 2000

	Global	Africa
Urban water supply	94%	85%
Rural water supply	71%	47%
Total water supply	82%	62%

Source: Gleick et al. 2002

The water scarcity narrative is omnipresent in drinking water policies concerned with Sub-Saharan Africa. At the same time, a number of researchers allude to the fact that such water scarcity is not necessarily empirical. Water scarcity is interwoven in a complex interplay of ecological, socio-political, temporal and anthropogenic dimensions. Natural water availability depends on biophysical and ecological factors and can, of course, be subject to temporal or cyclical changes. But water availability is not just a natural phenomenon. The distribution of the naturally available water among users determines water availability at a social level. Finally, the anthropogenic dimension includes socio-political, institutional and geo-hydrological factors because water availability also depends on technologies for withdrawal, damming up, transport or distribution (Metha 2000: 4-5). Hence, it is the anthropogenic dimension, which is directly concerned with water resources management. *“Real scarcity is an environmental and social problem with biophysical and social manifestations. [...] scarcity can also be ‘manufactured’ both due to anthropogenic interventions [...] or due to discursive constructions.”* (Ibid. 2000: 5).

Semi-arid savannah environments are characterized by stressful conditions, which impact on human beings, such as nutritional deficiencies, fluctuations in the availability of energy, endemic diseases, excessive heat load and fluctuations in the availability of water (Weiner 1980: 431). Such conditions and variation in water availability do not automatically carry the connotation of being problematic. The crucial issue is how societies living in such an environment handle them. From an anthropological point of view, it is also of interest, how people perceive and categorize their natural environment, how they shape it and how they try to influence weather events and resource availability. The regulation of conservation, exploitation and allocation of local natural resources may have institutionalised but may also be manifested in ad hoc and self-regulated action. Moreover; it may be quite selective as can be seen from the management of other natural resources *“Local communities [in Northern Ghana] conserve some things and destroy others; sacred groves persist but the bush is burnt and the animals hunted out. Furthermore, the rules are highly diverse and vary from region to region.”* (Blench and Dendo 2004: 10). Inhabitants of semi-arid environments have to deal with natural conditions in two ways. First of all, they have to handle water stress at individual physiological level. Second, they have to cope with their environment at social level by creating forms of organization and livelihood, which responds to the environment and its

water resource availability. Human physiological adaptability to water stress is very limited.⁵¹ Therefore, adaptability at social level seems even more important.

Water availability can be judged from different perspectives, which may come to contradictory results. It is not total empirical fact. Crucial is not only which water sources are potentially available in the natural environment but also which ones can be practically tapped. Groundwater resources provide a good example of such contradictory perspectives. From a geo-hydrologist perspective, deep aquifers may be existent for centuries whilst it is of no relevance for local people as long as no lifting technology opens up the resource. From a hydrological point of view, water availability may decrease because the resource is now consumed or over-used whilst water availability increased for the people using it due to opening up of the formerly inaccessible resource. This chapter traces the answers to the questions: (1) what different knowledge systems on the subject of water availability exist and how do perspectives differ? (2) How has local water availability changed since the introduction of drilling and water lifting technologies in the village?

The chapter begins with the exploration of the geo-hydrological knowledge system at global, national and local scale (5.2) and then shifts to the water development and present state of local water supply (5.3.). The subsequent paragraph presents the cultural knowledge system and hybrid forms of local knowledge (5.4.) before is followed by a conclusion.

5.2. Databases on water resources and household water supply

5.2.1. The national database on drinking water coverage

Natural science data provides the hydro-geological and climatic facts on resource availability. The first geo-hydrological surveys in the Northern Territories were conducted in the 1920s to explore local groundwater potentials. In the course of this exercise, existing water sources and facilities were documented for the Public Works Department. Continuous rainfall data charts of Tamale as well as reports on the state of some local water supply systems were attached to

⁵¹ “Man’s ability to adapt or counter dehydration is confirmed to a relative small saving of water output by diminishing the urine output [...]. There are no reserve stores of water in the body and the water obtained from the oxidation of food and body tissue, about 400 ml/ day, is not sufficient to provide both the water lost by insensible skin evaporation and the ‘obligatory’ urinary output. [but] even when water is available it is quite possible for the heavily sweating subject [...] not to drink as much as he is losing. This phenomenon termed ‘voluntary dehydration’, may account to a 3-5 % decrease in body weight, quite sufficient to produce a demonstrable limitation on working performance” through the reduction of blood volume. “Unpalatability of the drinking water may also lead to discouragement of drinking and so intensify voluntary dehydration” (Weiner 1980: 432-433).

the colonial annual reports given to the British Parliament and cover a time period from 1909 onwards (e.g. Armitage 1917, Ibid. 1919). Rainfall data sets from other locations, such as from Navrongo, sit in the National Archive in Accra, and regional archives, such as in Tamale and Bolgatanga in the form of scattered documents. In the mid 1960s, A “Land and Water Survey in the Upper and Northern Regions” of Ghana was conducted in the context of the United Nations Development Programme (FAO/ UNDP 1968). It gives little insight on the subject of household water but made clear statements on the degradation of the natural environment by listing anthropogenic processes, being (1) clearing of land; (2) livestock grazing; (3) gathering fuelwood and settlement construction; and (4) bush burning (Rose-Innes 1964 quoted in Songsore 2000). Since then, several hydro-geological surveys and assessments were conducted (the probably most recent one being CIDA et al. 2006); the unit of analysis has shifted from political/ administrative units to geo-hydrological entities, such as the river basins, or catchment areas.

Presently, there are different water indices in use, which try to determine water availability (for a summary and critical discussion see Gleick 2003, Osei-Asare 2005: 3-6). Usually, they integrate hydrological datasets with social science data and econometric data, as the Water Poverty Index (WPI), which was developed in 2000 at the British Centre for Ecology and Hydrology. The index can be applied on different scales, such as community, water basin or national level and it is an index composed out of five variables (resource, access, capacity, use, environment), which are first graded separately on a scale and then added up to result in the WPI. It can be used to monitor development in water resources management over the years According to such calculations; Ghana’s national WPI is ca. 45 of 100 (Sullivan et al. 2002). Looking at only one component of the index, freshwater availability, one has to state that *“In 1955, per capita available renewable freshwater was 9.204m³. This declined to 3.529 m³ in 1990. [...] These macro-level statistics classifies Ghana as water-abundant.”* But *“projected per capita renewable freshwater availability by 2025 will decline to 1.400m³ [per annum], which is within the water stress range.”* (Osei-Asare 2005: 9). These projected values of decline represent the whole country, irrespective to its different climatic zones and various water situations. Thus, water scarcity at national level in Ghana is still a projection not an empirical fact yet – even though we have good reasons to assume the validity of the projection.

It was stated, that despite the rich historical documentation of colonial and post-colonial household water supply and management in Ghana, very little historical knowledge exists

among water experts even though “*The in-depth knowledge deriving from a systematic review could really lead to sound policy formulation and programme design*” (Bacho 2001b: 69). The raw material for such knowledge generation exists in the form of archival material, but the files are scattered all over the country and most of the material is not yet analysed systematically. In the course of the NCWSP starting from 1994, DWSTs and CWSA began to build up a database on existing wells and hand pump-fitted boreholes but this database lacks completeness. Water supply provided by government programmes and big donor agencies is well documented, but small international or national NGOs often operate without the knowledge of the responsible DWSTs and CWSA regional offices:

“We [the CWSA regional offices] are supposed to be organizing each quarter one district level meeting all stakeholders to come around at the district level. We are there, the NGOs or other stakeholders are around, the district is around so we can discuss. We review to what we did and we look forward to what and who is doing what and at where. So we avoid this whole thing of competition and whatever. Now, the reality on the ground is that many of the NGOS we are unsure of what their motives are and also their level of accountability to where the funding is coming from sometimes [...] where there is no accountability at all. So people don’t want anyone to [see] their operations otherwise you go to some of the meetings and you go behind them. Let’s just take World Vision, for instance, which is a mighty NGO. They totally undermine everyone else in the system. [...] some of the [bore-] holes, we have said that they have started [...] the minimum [...] yield should be 18, 5 litres of water in a minute. World Vision was just nine litres, eight litres, seven litres, they are constructing and putting a hand pump and going away. They never have time to revisit to be confronted with the problem they have created. They keep messing it up that way. CWSA is the one allowed to clean up the mess and correct it. [...] I didn’t know what can I do, for instance, and it becomes sensitive for me to go out and see CWSA was a police man over the NGOs [...] I [don’t want] this. So, you would call them to meetings and stress the need and remind them of the requirements, they are saying yes, they get out and do what they want to do. You are limited. You want to press, they start to give the impression that they have some funding to assist needy communities and CWSA is seen as an obstacle to their participation. In our environment that is a very negative signal to the donors [...] CWSA has its own institutional weakness, there is no doubt, very limited staff. Major bilateral, multilateral donors are dealing with us. But the space created and the circumstances and the way we operate does not become very attractive to small NGOs, like World Vision, Unicef, the Water Aid type of groups. They find it a bit, let me call it, too formal. We become unattractive for them to deal with and particularly also if they have limited funding. Water Aid [has] not really much so they give out a small bit to a group like New Energy, small overhead cost, they can focus and do three, four, five, ten hand dug wells. [...] That is enough for a small division like New Energy. If you like to, if you come as a donor talking about five, ten hand dug wells with CWSA, when for instance CIDA is now talking about 700 boreholes, I am just trying to give some scales to measure...”⁵²

⁵² Mr. W. Y. Dogoli (regional director of CWSA/ Northern Region), 11.06.2004; very similar statements were made by the Navrongo DWST staff members (Mr. Abubakari, Mr. Ibrahim, Mr. W. Abane, Mrs. V. Asuliwone, Mr. C. Ohene Eyan (DWST members), 03.02.2006 and the regional director of CWSA/ UER, interview transcription 2006;

Apart from illustrating the limited mandate of CWSA in relation to sanction capabilities to ensure the implementation of their water development guidelines, the quotations indicate clearly the interplay of knowledge and control over water facilities. Keeping a current and complete data base is perceived by national water experts as the first step of exercising power and control over the various actors and interest groups in the water sector. The smaller the water development project is the easier it is for the project to sneak in the field without the consultation, monitoring or even notice of the CWSA. This is problematic because the agency is only able to show activity and to govern what it knows and what it has recorded. Unofficial NGO activity does not only cause eventual difficulties in water supply but also undermines state authority.

Besides unofficial NGO activity (which, of course, may as well be in consensus with NCWSP guidelines), local well-digging exercises or dugout creation are not included in the DWST database. As a result, the database on existing facilities is fragmented; for the complete dataset on existing water facilities in Sirigu, for example, data had to be integrated from (1) the CWSA/ DWST database in Navrongo, which indicated the existence of boreholes provided by the Mission but contained no additional information, (2) from drilling reports archived at the office of the Dioceses in Bolgatanga, and (3) from field observations, which led to the 'discovery' of an improved hand dug well provided by the NGO Rural Aid (which the DWST was not aware of) and (4) the inventory of simple hand dug wells, dug outs and small reservoirs, which are excluded from the CWSA/ DWST database. A project colleague, Nicola Martin, identified GPS points of boreholes in the village and subsequently created a map, which excluded small reservoirs and part of the boreholes. I recorded facilities but did not make use of a GPS because its use seemed irrelevant for my study. The CWSA/ DWST database neither operates with GPS data. The documented names of the facilities derive from their location in a village or village section, without indicating the local name or village subsection and they are also attached to an administrative code.⁵³ Therefore, it was hard to identify particular facilities in the field and compare the different datasets. It seems that the performance as well as the importance, which the single regional CWSA offices attach to the completeness of the database varies largely.

⁵³ A typical code for a borehole is e.g. 455A- 48RB, indicating the location on a grid map of Ghana as kept by CWSA and DWSTs as well as its number and the fact that it is a rehabilitated borehole (either hand pump or newly drilled borehole) which replaced hand pump 455A-48. Typically, it is only stated in the documents that is is a borehole in e.g. Dazongo and I had to find out which of the several ones in Dazongo.

“The records are available. All the details are available. When I was the regional director in Upper West we got all of this and added this to our database so that it helps us, we really capture every number in respect of coverage like who has and who does not have [...] And if there was a problem within those wells we could go into our database and be able to know which well are you talking about, what is the type of problem, what can you do. Some regional offices are weaker but in this region, I only got here [Northern Region] in 2002 to realize no one has ever bothered trying to know about a list about what facilities were delivered before 1998 before CWSA came. And that’s a strong, very strong [problem] to our system. Just now, we have started doing it trying to identify all those boreholes that were grown by whoever in the system before 1994.”⁵⁴

Scaling up this insight to the national CWSA database, it is little surprising to read that *“the figures provided by the national actors need to be treated with some caution and that the CWSA was in fact incapable to generate consistent figures.”* (Fuest 2006: 44). The causes for the inconsistent and incomplete data on water supply coverage are (1) different standards of data collection; (2) personal interest of enumerators, who may manipulate information to the advantage of their home communities (MHW/ CWSA 2004: 26); (3) high dynamics in water supply provision and failure; (4) high mobility of people, seasonal migration and the use of outdated demographic data (Fuest 2006: 45); (5) the reluctance of NGOs and donors to inform DWSTs or CWSA on their activities; (6) the lack of a legal CWSA mandate to permit rural water provision activities and to sanction NGO activities, if they operate not according to CWSA standards; (7) the ignorance of non-improved but well maintained water points and alternative water facilities; and (8) the lack of mobility, funds and equipment of DWSTs (for a detailed discussion of CWSA water supply coverage data see Fuest 2006).

Table 13 Percentage of population with access to safe drinking water in Ghana

Year	1970	1975	1980	1985	1990	1994	2000
Urban	86	86	72	93	63	70	87
Rural	-	14	33	39	-	49	49
Total	35	35	45	56	21	56	64

Source: Gleick et al. 2002

Statistics presented as in the tables 12, 13 and 14 draw the curtain over the insecurity deriving from knowledge gaps about the factual state of water supply coverage. Only the comparison of several sources reveals that the data depends highly on the methodology of data collection, on the data sources reviewed and also on the interest of the presenting agency.

⁵⁴ Mr. W.Y. Dogoli (regional director CWSA/ Northern region), interview transcription, 11.06.2004

Table 14 Inconsistent statistics on improved water coverage

Year	Access to improved/safe water supply ⁽¹⁾			References	Sources
	Overall	Urban areas	Rural areas		
1975 ⁽²⁾	-	86%	14%	International Monetary Fund, 2000	Multiple sources (GSS, IMF, World Bank)
1985 ⁽²⁾	-	57%	40%	International Monetary Fund, 2000	Multiple sources (GSS, IMF, World Bank)
1988	-	84%	28%	World Health Organisation and UNICEF, 2004	Ghana demographic and health survey 1988
1990	-	83%	43%	World Health Organisation and UNICEF, 2000	WHO-UNICEF Joint Monitoring Programme - Report 2000
	-	90%	29%	Food and Agriculture Organization (FAO), 1995	Multiple sources (WRI, World Bank, GSS) 1990-1993
1992	51%	79%	35%	Centre for Policy Analysis (CEPA), Sowa NK, 2002	Ghana living standard survey (GLSS) 3, 1992
1993	-	76%	46%	Asare, 2004	Ministry of Work and Housing, 1998
	-	88%	47%	World Health Organisation and UNICEF, 2004	Ghana demographic and health survey (DHS) 1993
1995 ⁽²⁾	-	76%	46%	International Monetary Fund, 2000	Multiple sources (GSS, IMF, World Bank)
	-	84%	50%	World Health Organisation and UNICEF, 2004	UNICEF Multiple Indicator Cluster survey (MICS) 1995
1997	67%	91%	53%	Centre for Policy Analysis (CEPA), Sowa NK, 2002	Core Welfare Indicator Questionnaire (CWIQ) reports 1997
	62%	85%	51%	International Monetary Fund, 2005	Core Welfare Indicator Questionnaire (CWIQ) reports 1997-2003
1998	-	93%	55%	World Health Organisation and UNICEF, 2004	Ghana demographic and health survey 1998
1998-99	61%	79%	48%	World Bank (Africa Region), 2003	Ghana living standard survey (GLSS) 4, 1998-99
2000	-	92%	62%	World Health Organisation and UNICEF, 2004	Estimates from multiple data for 2000
	-	87%	49%	World Health Organisation and UNICEF, 2000	WHO-UNICEF Joint Monitoring Programme - Report 2000
	-	70%	40%	United Nations (UN), 2004	WHO/UNICEF Personal communication & Ghana MDGs report 2002
2002	79%	93%	68%	URL UNICEF	Multiple sources (UNICEF, WHO, MICS, DHS) for 2002
2003	74%	87%	63%	International Monetary Fund, 2005	Core Welfare Indicator Questionnaire (CWIQ) reports 1997-2003
	-	-	46%	International Monetary Fund and Ghana NDPC, 2004	Core Welfare Indicator Questionnaire (CWIQ) reports 1997-2003

Notes
(1) : Expressed in % of population for specified area.
(2) : Values taken from IMF actually represent year range (i.e. 1970-75, 1980-85 and 1990-95)

Definition of improved/safe access
CWSA :
- All-year-round potable water supply of 20 litres per capita per day for point source services and 45 litres per day for small towns (piped schemes).
- The facility should be within 500 m walking distance from the farthest house in the community and should serve 300 persons per borehole/standpipe and 150 for hand dug wells.
WHO-UNICEF :
- Availability of at least 20 litres per person per day from an "improved" source within 1 km of the user's dwelling.
- An "improved" source is one that is likely to provide "safe" water, such as household connection, public standpipe, borehole, protected dug well, protected spring, rainwater collection (N.B.: Current information does not allow to establish a relationship between access to safe water and access to improved sources, but WHO and UNICEF are

Source: CIDA et.al. (2006: 6)

For example, the International Monetary Fund released two different numbers of rural coverage for the year 2003, 63 % and 46 % respectively, while relying on the same data source; for an external reader, the difference between the values is hard to understand. One could ask why it is even important to keep such statistics, to constantly present coverage data as well as to uphold the impression that the numbers are reliable when they are obviously not. This leads back to governmentality, the creation of expert knowledge, the selective attitude of recording and administrating, and the agenda behind it, which is clearly linked to the state's interest to acquire financial resources from external donors to respond to its political commitment concerning increase of drinking water coverage, as well as the donor's need to justify its activities.

5.2.2. GLOWA- Volta database on local water resources and coverage

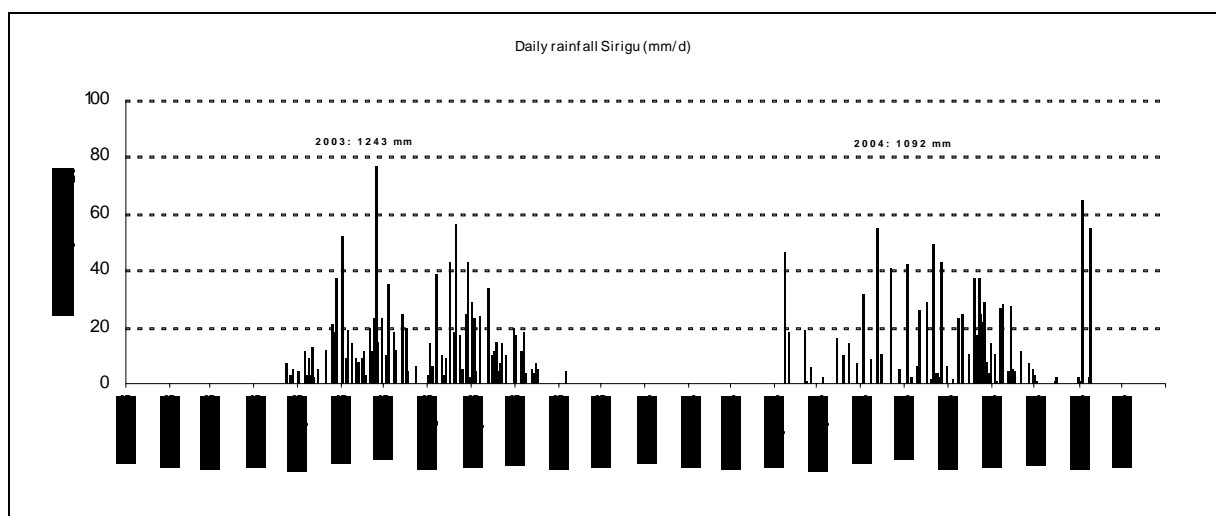
The concept of household water security, which was used by other researchers in the GLOWA Volta project, contains a notion of water availability, accessibility, and usage as

well as water quality.⁵⁵ Households enjoy water security, when they obtain the required quantity but also the required quality of water for health and hygiene as well as for productive activities. Water availability “*alone does not ensure household water security at a given point in time. Water availability is affected to a large extent by environmental factors...*” (Osei-Asare 2005: 3) but also by the way people manage the resource. According to Osei-Asare, water usage is understood in terms of rights, water rights respectively. Water security is not a total fact but undergoes seasonal or timely variation. A survey among all water committees in the village Sirigu was conducted to investigate accessibility, usage and water quality from the user’s perspective. The survey results were completed with field observations, informal conversation and a case study (see chapter eight).

Due to the GLOWA-Volta database, the picture of local hydro-geological conditions in the research village is much more precise than the national database. There are three seasons distinguished by the people in the research area: raining season from June till September, Harmattan from November till middle of February and the hot season starting in February reaching the highest temperatures around March and April. May and October are mediate periods between the raining and dry season. Rainfall patterns vary considerably within two following years and within the village. Monthly rainfall data collected in Navrongo from 1961 to 2004 shows that 2002 and 2004 were comparatively dry years with about 10 % less rainfall than average (which is 988 mm/ y), whilst 2003 was a wet year with 15 % precipitation above average (Martin 2006: 16). The rainfall data also shows that there was a wet decade in the 1960s, which was followed by two drier decades in the 1970s to 1980s. “*Rainfall trends in the past ten years are less clear.*” (Ibid. 2006: 17). There are two types of precipitation in the research area. The first is rainstorms, which affect only a localized area (20-50 km²), which are intensive and last often less than one hour to two hours. The second type is rain resulting from squall lines, which fall on a larger area and may take up to four hours (Friesen 2002, Martin 2006: 16-17). Thus, main characteristics of local precipitation are seasonality, inter-annual variability of total rainfall as well as high spatial and temporal variability (Ibid. 2006: 48).

⁵⁵ “*Water accessibility considers water as a commodity and ensures that households have full or firm control of the available water.*” (Osei-Asare 2005: 3-4)

Box 6 Rainfall data Sirigu



Source: Nicola Martin

According to my field diary, the first rains in Sirigu fell 2004 around 20th of April what was considered by the farmers as very early and a good sign. The data from the rain collector dates the first rains about two weeks earlier, which may have to do with the different location of the observations within the same village. The previous year, the first rainfalls were recorded for the middle of April but showed then a rather regular pattern, which indicated the final onset of the raining season. In 2004, the rains started heavily but then stayed away for a number of weeks. The reliable determination of the onset of the raining season is of crucial importance for farmers and subject of investigation and modelling within the project (Laux and Kunstmann 2006). During the research, many farmers complained of seed and seedling loss within the last years because they had started sowing too early.

Rainwater is also used for the household, washing and bathing purpose in particular. Different to water requirements for farming, it is not a matter of calculation. Rainwater is collected in basins and other small vessels for immediate usage but it is not stored in cisterns. Only the Mission building and the SWOPA compound are equipped with such a facility for their own household water provision (mainly watering of gardens).

The Atankwidi, which passes by the village in the East (compare map 1), displays a typical run-off regime for streams in the region. *“...the first rainfall events of the year do not result in river run-off, but are consumed by evaporation and the replenishment of soil moisture. Further into the rainy season, river run-off increases rapidly in response to rain fall events and drops back to pre-event levels within less than 48 h. After the end of the rainy season, river flow quickly ceases so that the Atankwidi River is dry from the end of October until the*

beginning of the next rainy season.” (Martin 2006: 51). Although surface water has ceased, there is still water remaining in the sandy layer of the riverbed. Here, local streams differ from each other in relation to the time period, in which such water is available. Local people report that the Zokko River (= Atankwidi River) “*holds water all year long*” whilst smaller streams “*hold water only for some shorter time in dry season*” in their riverbed. Particular places of the river bed are identified as good fetching places; some have a name.⁵⁶ From a geo-hydrological point of view, the water is stored in the alluvial aquifer of Atankwidi, which is located in about three meters depth along some lower lying parts of the river. It is not groundwater for „*streams and groundwater are not connected at any time of the year, with the regional groundwater levels much below the bottom of the streams. This is the case [...] for areas around Sirigu.*” (Ibid. 2006: 43).

No hydrological data was available for one of the two existing small reservoirs, which is called Mission Dam. Its reservoir covers a larger area than the Busongo Dam reservoir, which is better documented. The Busongo Dam reservoir is situated at the lowest point of a ca. 40 ha catchment area and had a surface area of ca. 14.400 m² and a maximum volume of approximately 25.000 m³ in 1998/ 1999 (Smilde 1999).⁵⁷ Since then, a part of the reservoir has been dug out and the dam construction improved to increase its water storage capacity. It was stated in project publications, that the typical small reservoirs in the region display a high surface area to volume ratios, means in fact, they loose more water through evaporation than they store for usage (Rodgers et al. 2007: 301, based on Liebe 2002).

Other surface water sources are much smaller rain fed dugouts, which villagers created, which were constructed by the government in the 1960s, or which came into existence of a road-building project and without the application of hydrologic planning. None of these water-harvesting facilities in the village holds water longer than November.

Even though household water in the Volta basin originates from both surface and groundwater sources, the groundwater production has gained importance for household water provision in the Volta basin over the past decades. The withdrawal through hand pump fitted boreholes has strongly increased from 1971 to 2001 (from 1, 5 Mega m³/y to 61 Mega m³/y). The water amounts withdrawn through hand-dug wells are smaller but not to neglect (12 Mega m³/ y). Moreover, the groundwater withdrawal through piped schemes recently displays raising

⁵⁶ Compound interviews in Abeleto in March 2006, field notes.

⁵⁷ Numbers vary considerably as Boiten talks of 27 ha catchment, 1, 5 ha surface and 20.000 m³ storage capacity (Boiten undated).

numbers (Martin and Van de Giesen 2005: 242). “*Groundwater consumption reaches 25 to 50 liters per capita per day (lcd) in most of the Upper West and Upper East Regions of Ghana...*” (Ibid. 2005: 243). The water supply facilities under investigation are mainly hand-pump fitted boreholes, wells and groundwater-based piped water systems, which provide water for household use. Different to the alarming global statistics, the groundwater extraction numbers for the basin and its Northern part make up only one to ca. five percent of the groundwater recharge. There is hence no point in forecasting an over-exploitation of the groundwater resources, although such problem may emerge at some localities without having any impact on basin or sub-basin level (Ibid. 2005: 245). The expansion of groundwater production may be one feasible response to increasing water requirements in the Volta River basin, especially for irrigation purpose.

The groundwater table in many areas of the village is too low to serve hand dug wells. A number of existing wells does not hold water in dry season for the past two to three decades and were therefore abandoned. Local people always stressed in conversations and interviews that the groundwater situation is worse than in surrounding villages, which are able to produce dry season vegetables in gardens, which are watered by shallow wells. From geological maps, which were produced from the research area, it is obvious, that a large part of Sirigu displays different geologic and soil qualities than neighbouring villages. The groundwater potential of Northern Ghana was estimated to be good to moderate.⁵⁸ Its underground layer consists of mainly of Berimian granitoids, metasediments and metavolcanics (Martin 2006: 6). The main soil type is Lixisols, which is sandy loam with a high content of clay close to the surface (Ibid. 2006: 14-15); clay is an important natural resource for the local communities. Groundwater is stored in either shallow temporary aquifers, the regolith aquifer and in some areas also in the fracture aquifer (apart from the before mentioned alluvial aquifer). The most shallow groundwater tables in the Atankwidi catchment are found in some elevated areas, as “*the elevated area between Kandiga and Sirigu. An explanation could be a combination of high recharge rates and low lateral hydraulic conductivities.*” (Ibid. 2006: 47, 37).

Two kinds of wells are spread all over the Ghanaian side of the Atankwidi catchment. Traditional hand dug wells can be distinguished from improved hand dug wells. Simple or so-called traditional hand dug wells appear in clusters (indicating good geo-hydrological

⁵⁸ Groundwater potential is here understood as a function of accessibility (depending on success rates in borehole drilling), exploitability (yield and extraction depth of boreholes) and supply reliability (stored water quantity in aquifer, mobility to the well and quantity of recharge in non-drought years) (Martin and Van de Giesen 2005).

conditions for digging exercises), have a depth of 1, 5 to 14 meters and make up 60 % of the wells. Local water users constructed them manually. Their construction may date back to the 1920s. Most of them were constructed more than 20 years ago. 70% of them dry up completely in dry season. Simple hand dug wells tap mostly water from both shallow temporary aquifers (Ibid. 2006: 20, 47). In Sirigu, two clusters of functional wells were identified. One is situated in the village section Dazongo and the other in the section Nyangolino. The first cluster supplies water only in raining season and its water is not used for human consumption. The second acts as single source for household water supply during dry season, when the nearby stream had dried off. Some simple hand dug wells showed some signs of improvement, e.g. a wall was preventing livestock from falling into the well (compare pictures 2 and 14). Some single standing wells in the village were abandoned due to the closeness of a borehole, which drained the water from the well. One held water due to its location next to the Busongo Dam reservoir but was rarely used.

Picture 7 Simple hand dug wells in Nyangolino



Improved hand dug wells are constructed with non-local materials, such as pre-fabricated cement tubes and built in the context of development interventions of the recent years. In the Ghanaian part of the Atankwidi catchment, such wells are distributed all over the area and do not form clusters. Their depth is about six to eight meters. Only 40 % of them were reported to fall dry during dry season, which may have to do with the fact that they tap the regolith aquifer. One third was equipped with a hand-pump. Due to the better water quality in improved hand dug wells, 97 % of them were used for drinking whilst only 60 % of the traditional wells were used for such purpose (Ibid. 2006: 20-21, 45). In Sirigu, only two improved hand dug wells existed. One of them was equipped with a hand pump.

The Upper East Region of Ghana shows a high density of hand pump fitted boreholes; on the Ghanaian side of the Atankwidi catchment alone about 120 boreholes are situated (Martin 2006: 20). During the time of research, water provision of the village heavily depended on 27 boreholes. They are equipped with hand pumps; one of them was mechanized and run with electricity. The provision with boreholes in Sirigu can be summarized in three phases. The first nine boreholes were constructed in the middle 1970s by CIDA and although they are situated in five of the six village sections, they concentrated in the more central parts of the village (Gunwoko and Dazongo, Mission land and market site respectively). Their depth was 17 to 29 meters (25, 56 meters average). The second construction phase took place in 1993 under the leadership of the Catholic Dioceses in Bolgatanga and Dutch funding by CEBEMO. This time, the geographic radius of water supply extended to frontier areas, such as Amuntanga in the North of the village. The primary school and the market area also received improved water supply. The third provision phase was characterized by the involvement of the state agencies and national water provision programs, such as COWAP/ CWSA and later CWSA II as its follow up. During 1998 and 1999, half of the CIDA boreholes were replaced by drilling a second borehole close by, which was much deeper (45 to 50 meters). According to the villagers, the CIDA boreholes had dried up but CWSA notes in its documentation that the pumps broke down. The borehole yield was claimed to be good to fair. One of the boreholes at the market area dried up completely and its hand pump was capped and not replaced. Since then, additional boreholes were allocated and drilled in several parts of the village following the demand-driven approach of the NCWSP.

During the time of research, the potable water supply in the village depended on 27 hand pump fitted boreholes, one mechanized borehole and one improved hand dug well. (The second improved hand dug well was dysfunctional.) Almost all facilities are used for household water provision of the surrounding compound houses. Only the mechanized borehole for the orphanage and the pump in the yard of the SWOPA run visitor centre are purely institutional boreholes.⁵⁹ Boreholes of schools provide water for the school as well as for the inhabitants of compounds around it.

The size of the user groups of hand pumps fitted boreholes (pump communities) varies greatly. In the smallest pump community Gunwoko Pontengo, only eight compounds share a pump. In the largest pump community Basingo Asudoone, eighty-five are forced to do so

⁵⁹ Boreholes, which are attached to a government or public buildings (schools, police, district administration, NGOs, churches) are referred to as "*institutional boreholes*" in Ghana.

even though they can rely on a second old and very low yielding pump. A second pump community, Dazongo Zitadoone, also managed two hand pumps. For a newly drilled borehole at the market, no formal user community was yet established. The two institutional boreholes were not included in the following calculations because the majority of questions during the committee survey were not applicable to them.⁶⁰

Table 15 Boreholes and pump communities in Sirigu

Water user groups	No. of pump communities	No. of boreholes
Pump communities managing one hand pump	20	20
Pump communities managing two hand pumps	2	4
Institutional boreholes (no compounds)	2	2
No pump community established yet	-	1
None (High yield borehole for small town water system, not yet in use)	-	(1)
Total:	24	27 (+ 1 unused)

Source: Water facility inventory, Sirigu 2004/ 2005

The average number of compounds fetching from a borehole is ca. 40 compounds but this average does not indicate anything meaningful due to different sizes of compound houses (number of its inhabitants), their uneven spatial distribution, the limited accessibility to the hand pumps in wet season and double/ triple membership of compounds in different pump communities. Interestingly, in the local perspective, also the number of up to 40 compounds is seen as a feasible number of member compounds for a pump community. Attempts to receive a new borehole in pump communities smaller than that are rather motivated by geographical constraints, e.g. being cut off from the borehole in wet season, long walking distances to the pump or the requirement to provide a public building with water. But if the number of member compounds exceeds a number of 40, the water users are considered to be too many and the waiting times to be too long.

Generally, the distances between compound houses and the boreholes in Sirigu were considered as “*not all that far*” in one third of the pump communities. In the two other thirds, some members have to pass a longer distance to fetch water. Exceptional long distances of a mile or more usually apply only to one or two compound houses per pump community. Distance to the borehole was not only expressed to be problematic for fetching water but also because livestock would not return from far water sources before sunset and may get lost by theft, which was a serious problem. The all year accessibility to the borehole is a constraint in

⁶⁰ Water supply inventory in Sirigu, March 2004 and water committee survey in Sirigu, September to December 2005.

more than half of the pump communities for seasonal streams cut off the way to the hand pump in wet season. A typical strategy of concerned compounds is therefore to hold a regular all year membership in several pump communities. Another strategy is to skip back to unimproved water sources because water as such is abundant in wet season. Generally, the water quality from hand pumps in Sirigu is good but contaminations of borehole water with small, living insects occurred at half of the hand pumps from time to time or seasonally.

Statistically, Sirigu can be judged as sufficiently provided with hand pumps - even when excluding other water facilities from the calculation, such as improved hand dug wells. This is reflected in official investment plans, which state that no additional boreholes and hand dug wells are required for Kassena-Nankana district until 2010 (GoG/ MWH/ CWSA 2004). From a local user's perspective, the situation looks somewhat different (see below). One water expert in Accra summarized "*Upper East Region is an engineer's nightmare. The houses are so scattered that statistical calculations do not tell anything meaningful about the water provision rate.*"⁶¹ All other interviewed water experts shared his view. "*If you see the official statistics they calculate 98 % coverage in K.N. district. It is not so.*" explained members of the DWST in Navrongo, who were not yet informed about the ca. one year old CWSA Strategic Investment Plan.⁶² Due to the dispersed settlement pattern, the provision with boreholes is below the official statistics. When one divides population and hand pump, the coverage is very good but accessibility is not always given due to long distances between compound clusters. Population number thus is not a good criterion in the regional context. Distance should also be one according to the DWST members; therefore, their team also allocates boreholes to communities with population numbers far below the required 300 water users (means a small number of users have to acquire the same 5 % cost as initial contribution as a much larger user community). Moreover, even the number of member compounds within a pump community is not always a good indicator for provision rates. Other variables are water usage and additional water users. For example, the Amuntanga and Market Square pump communities were simply incomparable despite their similar number of members (30 and 34 compound houses) because of their location at a marginal area versus the central market site of the village. For a more meaningful evaluation of provision rates and local potable water availability, multiple sources of information, such as statistical data, field data and the elaboration on local perceptions of water availability have to be utilized.

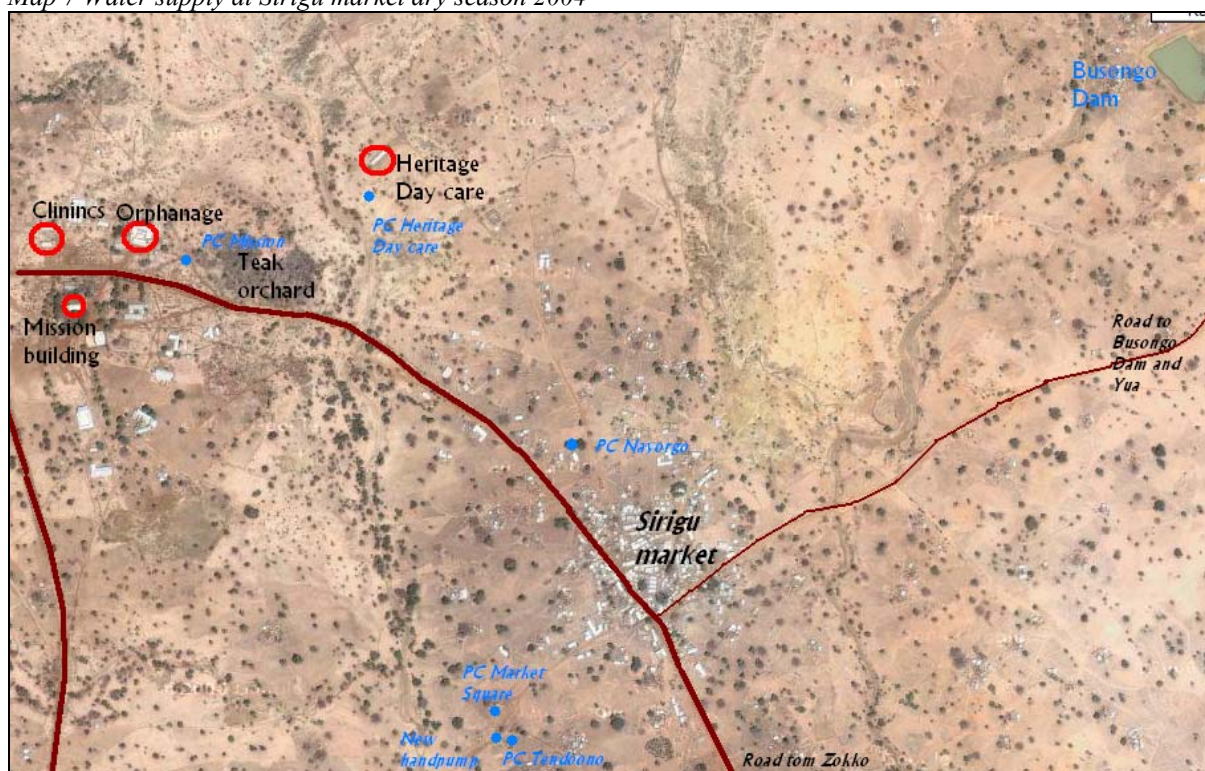
⁶¹ Informal conversation with Mr. H. Bawah (Water Consultant), March 2006.

⁶² DWST Kassena-Nankana district, interview, 03.02.2006, quotation by Mr. C. Ohene-Eyan.

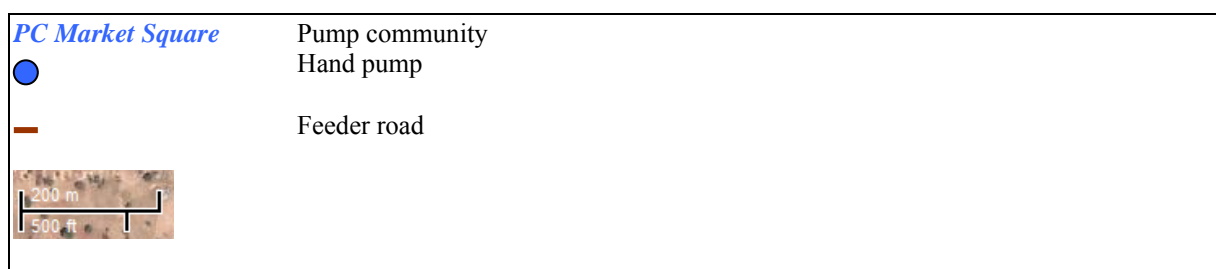
What can surely be stated is that dry season local water availability has been considerably increasing since the mid 1970s. Seasonality in water availability as a main characteristic of savannah environment and shaping factor of local livelihood has faded because a large number of reliable dry season water points were created for household uses. This means not only, that a determining ecological factor has changed and quasi reversed in the past decades. It also implies that the globally stated resource depletion and decline is not observable from the local perspective; instead the observed trend is reverse. Looking at a larger local level, such as the Atankwidi catchment, total water availability has rather been stable due to total rainfall numbers and sustainable groundwater resources. This hints at problems of perspectives on resource availability when applying different scales and disciplinary perspectives. Moreover, it obviously shows severe human impact on their environmental conditions. Limited resource availability is only one part of occurring local water shortage. Local water rights and restricted access to hand pumps are other factors, which may contribute to local water shortage (see chapter seven).

A stream is tangent to the market area in its West and South while another passes in its North. Both dry completely up for a few months of the year. Market people use surface water from the streams, from the Busongo Dam and from the Mission Dam for constructing market stalls or for other non-consumptive uses (compare maps 1 and below). Five hand pumps are used for market activities; a sixth borehole was added in November 2004. Hand pumps provide water to households living in the market as well as water for commercial uses. Three of them are located in only a ten to twenty meters distance to each other and form a cluster. One is situated at the other side of the market and two are located outside the market in some hundred meters distance. Only the new hand pump and the pump of the Market Square pump community are accessible to non-members of the pump community and not locked during market days. The old small town water system, which operated until 1989, had more water outlets, usually in form of four headed standpipes, meaning that the water was easier to draw at this time. Bottleneck of water provision then was the pumping of groundwater into the piped scheme, which often failed due to diesel shortage. Moreover, the system never provided 24-hour supplies but water was delivered only by the hour.

Map 7 Water supply at Sirigu market dry season 2004



Source: google maps images, add-ins by author



Hence, talking in resource terms, also water availability in the market has never been better than nowadays because it is now four hand pumps located near the market which provide potable water for the market in 24 hours supply. But other factors also have to be considered; the number of traders and customers as well as the number of inhabitants of the market site has increased over the past decades. Consequently, the demand for water has grown. Changes in local perceptions of water quality led to the decrease in use of surface water as an alternative to groundwater. Not all hand pumps are accessible for all potential users. Withdrawal capacities of the hand pumps are clearly limited even though they are in use up to 24 hours a day during dry season (if access is not restricted by locking times). Here again, not only environmental factors play into resource availability but also institutions, local preferences and technology.

5.4. Cultural knowledge on the local environment

Linguistic studies, the spatial organization of the settlement, rituals, offices and customs can serve as indicators for local environmental knowledge and concepts. This is because such knowledge has institutionalized through the continuous exposure to a particular natural environment and routine to cope with it. Further, investigation was based on focus-group discussion and interviews with villagers, which reflect individual but also cultural ways of thinking about natural resources and their management.

People do not only make practical use of their environment. They furthermore attach meaning to it. The simplest reference to the natural environment is names. Many individual and geographical Nankane names refer to features of the natural environment, such as landscape characteristics or local animals. Atanga, Akuliga or Abando ('Hill', 'River', or 'Lizard') were popular names in the research site.⁶³ The suffix *-doone* as used to refer to village sections, such as Atonadoone, Asudoone, means strand or bank and indicates the closeness to a stream.

Many African societies differentiate between spheres of the wild versus spheres of the civilization. It is often the bush or forest, which is perceived as an opposed category to the settlement and manifests in the strict geographic stratification into the village, including a mediate zone between the settlement and the wild forest with a particular set of rules attached to each sphere. The wild is often equipped with attributes such as being dangerous, non-controlled, chaotic, inhabited with animals and spiritual beings (who may carry human-like traits) but also with attributes such as fertility or wisdom. A concept of nature in the western understanding is often non-existent (Luig and Van Oppen 1995) and the organic nature regime persists (Escobar 1999). Local concepts in Northern Ghana mainly build first on the concept of *teŋ*, which refers to the territory of the settlement, particular territories under the spiritual guidance of a *tendaana*, as well as to shrines and second on a dichotomy of the civilized and the wild, inter alia, the settlement and the uncultivated, unsettled land (compare Riehl and Averbeck 1994 for Tallensi, Lentz 1998 for Dagara, Mather 2003 for Kusasi).

“The practice and rites of traditional religion among the Kassena-Nankana people of northern Ghana are common and extremely significant” was indicated by recent demographic

⁶³ In Nankane, the prefix A- indicates a person. Therefore almost local names start with A- and Christian names with A- are very popular. Attaching the A- is used as the mode of localizing foreign names. Names can also describe individual characteristics, such as Akabange ('does not know'), Amiziah ('knows the place'), or Akabotebala ('does not want this/ it to be going that way').

data (Doctor et al. undated). Local Traditionalist religion⁶⁴ offers the opportunity to trace local concepts of natural environment, ideas of relationships and interdependences between people and nature as well as the local perception of weather events and natural resources. The following descriptions are based on older ethnographic literature on Northern Ghanaian societies, which was compared with the data from the present study.

Religious life in the village is heterogeneous. Still, Traditionalists form the largest proportion in the village.⁶⁵ Often, followers of several religions are found within one compound and are sometimes distinguished according to generation. The older generation tends to be rather Traditionalist whereby the younger ones rather belong to book religions. On district level, women tend to join book religions rather than men; this was explained with male responsibility for ancestral rituals (Ibid. undated). Biographies sometimes embrace the membership of several religious communities, which followed chronologically or even synchronously.⁶⁶ Syncretism of various degrees is widespread. According to Nankane Traditionalist belief, the earth goddess *Teɲ'gono* is said to be the wife of the heavenly God *Winne*. "*The trees [growing in a sacred grove] are children of the Earth and of Yini [Winne].*" (Rattray 1932: 320); present Traditionalist villagers expressed their view in a very similar manner using allegories of the family. Central to Traditionalists and Non-Traditionalists was the "*heavenly father Winne*"; but whilst for Traditionalists, the earth constitutes the complementary part to God; for the Christians it was God's son Jesus who was the crucial reference.

As was pointed out for Kusase shrines, the enshrinement of gods is "*part of an overall strategy of domestication, of integrating land and spiritual forces with human communities*", "*Enshrinement bidges the divide between the 'wild' and the 'house', giving the opportunity to influence the spiritual causes of physical events and circumstances*" (Mather 2003: 40-41). Land shrines are the most constant features of changing landscapes, natural features as well as anthropogenic outcomes, for example, in cases where a tree grew large due to human protection and conservation. "*The tree is a product of the dwelling of*

⁶⁴ English speaking villagers refer to its followers as "*Traditionalists*". The study makes use of their terminology.

⁶⁵ This impression is supported by demographic data from two samples, which were taken in the district in 1999 and 2003. The analysis showed that 1999, 41% of the women were Traditionalists, and that this number had decreased in 2003. The average number for men from both sample years was 62%. The numbers for Nankane were significantly higher than the numbers generated for Kassena-Nankana in general and explained with the lower education level of Nankane (Doctor et al. undated).

⁶⁶ In the district, "*within each religious group, the highest switching rates are observed among Muslims, followed by traditionalists and Christians in that order.*" (Doctor et al. undated).

ancestors; it embodies their lives and action, providing a constant reminder to the living that the spaces in which they move were created by others [...they are] landmarks for local histories” (Ibid. 2003: 40). Further, they provide orientation on one’s topographical position, if one knows which god/ *teŋ* is associated with which descent group, inter alia, with which level of socio-political organization.

Sacred groves, which host such shrines in Northern Ghana, are sometimes referred to as component of local water conservation practice. What can be recognized from satellite images is that at some river beds, the trees next to it were not cut whilst other river banks are not marked by vegetation (compare e.g. the dry riverbeds in map 6). To my knowledge, no detailed study investigated this aspect yet. Societies in Northern Ghana share a belief system, which concerns trees and sacred groves. Such groves were also documented for the South of the country (e.g. Luig 1995) as well as for places in Benin (Siebert 2004). In the research site, such groves (sing. *tingane*) exist but are of small size, sometimes consisting only of a small number of trees or even a single standing tree. Each *tingane* has a particular name and a *tendaana* in charge of it. Sacred groves are not special in relation to tree species or tree density but only because they serve as ritual places. They can be moved from a place to another, if necessary. In such a case, special rituals have to be performed. An example for such a move was the *tingane*, which was situated within the Mission Dam reservoir and then moved because it stood under water when the reservoir was filled (see Mission Dam story below).

Reviewing literature on sacred groves in Northern Ghana and based on own data collection, Blench argues that it is very unlikely that sacred groves are relics of forests. Their composition was characterized by rather young trees, which included ‘now-rare species’ but also common savannah species, which typically grow near by settlements (Blench and Dendo 2004: 3). A *tingane* may serve as habitat of small mammals and reptiles. Moreover birds live on fruits and insects, which are rare in the savannah environment. A number of medical plants may grow in sacred groves; but its role as habitat for rare plants and animals depends heavily on the size of the grove. Data collection in Sirigu does not show sacred groves to be a valuable reserve for wildlife. The *tingane* on the hill in Gunwoko (which is, by the way, used by the Christians to perform once a year the special mass to remind of the Sermon of the Mount) carries some potential due to its size but no data was gathered on its flora and fauna. Healers have to travel to far Southern forests to harvest medical plants, which once grew in the village. Only one wild reptile and different kind of snakes were observed during the field

period close to a teak orchard, which did not serve as sacred grove but provided wood resources for construction. Most common institutions of sacred grove management in Northern Ghana are the restricted access, the prohibition of firewood cutting, of collecting of medical plants and of hunting within the grove.⁶⁷ The spread of book religions had no impact on the local management of sacred groves because people did not see it as a contradiction in their knowledge system (Ibid. 2004: 4-6).

For all other trees outside the grove, an open-access situation was stated (Ibid. 2004: 6). When an orchard was planted in Sirigu in the context of development intervention, a local person was appointed as custodian of the orchard. His role was ambiguous. People thought it was illegitimate for him to control the resource. *“He is doing like it is his private trees. But they are for everybody.”* Individuals could claim only trees planted very near their compound house. In many part of Northern Ghana, some trees species are not cut for firewood, such as Monkey Guava and Baobab, which was explained with spirits, which live within those trees (Ibid. 2004: 6). Such explanation was not met in Sirigu although people explained some mental illness as being a consequence of *“cutting a wrong tree down South”*. From their point of view, Baobab was simple not feasible as firewood due to its low fuel value: *“It is like paper when you burn it. It is such a large but useless tree.”* No use was also made of dead Baobab wood but its leaves and fruits were gathered. Interesting for natural resources management is further, that from the local point of view, original savannah species (like Baobab, Shea) are distinguished clearly from exotic species (like Mango or Neem). Savannah species belonged to the ‘bush’ - a place, which was locally perceived as wild and threatening. *“A consequence of that belief is that wild tree species should not be planted as this would mix two categories that should be kept distinct. Most people in the region believe that misfortune will fall upon anyone for planting species of trees that already grow in the bush. This belief was originally responsible for strong resistance to planting any type of tree, and even mangoes and cashews were excluded.”* (Blench and Dendo 2004: 6). In Sirigu, as in other places of the region, exotic species are nowadays accepted but local people do still not plant savannah species on their own initiative. A number of NGOs involve in deforestation; the NABIO deforestation project was active in the village. When a tree is planted on individual initiative, the use rights in the tree are private. No local institution was observed in the village,

⁶⁷ Use rights, which determine access to the resources within the grove varied from society to society. *“The single most common rule is that only adult males are allowed within groves at the time of sacrifice and those who enter without permission will be afflicted with a disease or even die.”* (Blench and Dendo 2004: 5).

which was comparable to the Dagomba 'tree chiefs' (Blench and Dendo 2004: 7). Bush fires were set everywhere in the village and on the fields, assumingly to increase soil fertility.

Rain in Nankane is called *saa* (pl. *saase*); it can also be understood as storm and thunder – weather events, which are occur locally in combination. The heaven is the 'rain place' and the heavenly beings or spirits are the 'rain place people'. It was not sure, whether the term *saala* for 'human being' is also derived from the word *saa* or is of another linguistic origin. More obvious seems the idiomatic relation between power (*saarega*) and heaven (*saazuo*), because heaven is the seat of the strongest power *Winne*. Not surprisingly, other weather events in wet season show a strong linguistic reference to rain. Rain is perceived as being purifying and life giving, which is linguistically reflected in the word *saalego*, which describes a ritual purification of the land after it was polluted by, for example, blood shed.

Box 7 Nankane vocabulary – rain

<i>Saa; pl. saase</i>	Rain, thunder, storm
<i>Saa n yeti a ni.</i>	Rain is going to fall (today).
<i>Saa n kuuti.</i>	Rain starts - 'rain crawls'
<i>Saa n niiri.</i>	Rain falls.
<i>Saa nyaggera</i>	Sheet lightening – 'rain lightening'
<i>Sakuggere, pl. sakuga</i>	Hail – 'rain stone/ rain ball'
<i>Saatasa, pl. saatasega</i>	To thunder / thunder - 'rain shouting'
<i>Saazuo</i>	Heaven - 'rain place'
<i>Saazuosaazuo</i>	Heaven, above - 'rain place rain place'
<i>Saazuodomma</i>	Heavenly beings - 'rain place people'
<i>Saadaana</i>	Custodian of rain - 'rainlord'
<i>Siggesaa, Sig'sa</i>	First rain after dry season – 'stepping down of rain'
<i>Sig'sa burega ko'om</i>	Ritual after the first rains - 'stepping down rain sows water'
<i>Saarega</i>	power (German: Macht)
<i>Saala, saaleba</i>	Human being
<i>Saale teṇa</i>	Purifying the land after bloodshed
<i>Saalego</i>	Cleaning, e.g <i>teṇa saalego</i> , cleaning/ purifying the land

Sources: Rapp (1966), Mr. S. Asamah, field notes

From ethnographic records but also villagers' statements about rain, it seems that rain is equipped with some traits of living beings. Although rain is not explicitly imagined to be a living thing, it possesses some characteristics, which allow the people to communicate with it. For example, rain may hear noises. Furthermore, rain can be hurt, such as by beating it, and can this way be driven away. According to Cardinal (1969), too abundant rain can be threatened by the *duatu* (Kasem for the custodian of rain) or *saadaana* with knives and stone axes and hoes. In Nankane, the stone utensils are called *saa-kugli*.⁶⁸ Cardinal further reports how people have stood on top of their roofs to shout against the rain, which endangered the

⁶⁸ Probably 'rain stones' from *kuggere* = stones, ball (Rapp 1966: 188)

harvest. “*The rain listened and came not*” (Ibid. 1969: 27). Tripp reported the opposite. Loud noises, drumming and shouting were prohibited in the research village during harvest season to avoid rain storms to come (Tripp 1978: 74). Thunder, which usually accompanies the heavy rainfalls, is called *saatasa* (‘rain shouting’).

Kassena-Nankane people know a custodian of rain, the *saadaana* (see previous chapter). Cardinall writes, for instance, “*Rain is in possession of a man just as it is the earth. He is duatu, saa-daana [...] in Kassena, Nankanni [...] I do not envy him his lot. A duatu at Navrongo in 1918 had quite a bad time when the rain failed. First many presents were brought to him for sacrifice, but the rain came not. The people considered he was responsible, and tied him up until it would fall – a Kassena ties a man up in no gentle manner. Still rain came not. They then ceased to give him food. At last rain came*” (Cardinall 1969: 26). The interview with the up-coming Sirigu *saadaana*⁶⁹ could not reveal much detail about the present day activities of a *saadaana*. But it helped to learn about the present status of this title. Most of the young people were not aware of the existence of *saadaama* and such title in their village despite *saadaama*’s operations in the village. *Saadaama* are consulted to ask for rain, to support drilling exercises, dam and well building activities by praying as well as they perform rituals for villagers, which died from thunder and lightening before the burial. It used to be the whole community, represented by their elders, who called the *saadaama* and prayed for rain. Until today, it is village sections and not individuals, who approach the *saadaama*. Several *saadaama* sacrifice to different Gods. The God in the compound house of the interview partners is a stone, which was found in Amuntanga by their grandparents when they dug for it after hearing noise coming from the ground. The stone is kept in the compound house and serves as address for sacrifices because it is understood to be the seat of the God *saa*.

“*It is not one person who comes to ask for the rains but it is the whole Sirigu community who comes together to our father to ask for rain when it is not raining. The work of our father was to go and seek some Gods before he comes back to sacrifice the God saa and it will give rains. The people will always come together and discuss with him and he goes out to consult the soothsayers and know why it is not raining. But the [present] community leaders are no more united. They do not mind about the poor rains for there is now money, whether it rains or not, they will get food to eat. So, they do not have time for the God again. He cannot also go out alone to know what is happening that is why he is also sitting.*” Despite the impression that the importance of the *saadaama* decreased, “*It is still happening people come and we consult the God for rains. Yes, the saadaana beg their Gods and tingane and God will forgive*

⁶⁹ The former *saadaana* died in 2000 and his funeral rites had still to be performed before his son could be officially installed as new *saadaana*.

*them and have pity on them and give more rains and the wells and dams will have enough water.” “No human being can just talk straight with the dead so we go to consult the бага to in turn tell us what our ancestors want or what is happening before we come back to sacrifice.”*⁷⁰

The element water is attached to the attributes of strength and purity. The first attribute is usually attached to the use of flour water for consumption and also as offering to the ancestral spirits. Here it is the mixture of red millet and water, which is perceived as giving strength. Purity is meant in a literal sense when washing something or somebody with water but also in the spiritual sense when water used for offerings.

Water spirits, who inhabit dugouts and rivers, are imagined to live below the riverbed in a world similar to the visible world. They are highly respected both as being delivering good fortune as well as devastation. Water spirits can be asked for help and pacified with sacrifices (Cardinall 1969: 34-35). Their presence results in a number of taboos, which are applied to the water sources (Bacho 2001b: 25-26). In Nankane, their shrines are called *kulebaggere* or *kulebaga* ('river shrine') and usually attached to a *tingane*. A recent study on sacred groves in the district revealed, "In the Navrongo area, several groves were recorded with streams running through the center of them and in some cases the water was considered to be a sacred feature." (Blench and Dendo 2004: 4). I did not come across any narration of water spirits in Sirigu.

The Nankane terms for wells vary depending on their location inside or outside a riverbed. Both types of wells look different, tap different aquifers and are managed differently (see chapter six and seven). Streams and rivers are categorized according to their size, their lengths and surface water holding capacity.

⁷⁰ Mr. A. Asinsagbo (Sirigu *saadaana*) and Mr. A. Akonwake (his senior brother), translated interview transcription, 26.01.2005.

Box 8 Nankane vocabulary - water sources

<i>Ko'om zia</i>	Water source – 'water place'
<i>Kuldaa, pl. kuldaase</i>	Little stream only in raining season
<i>Kuliga, pl. kulsu</i>	River, bigger stream
<i>Kulwoko</i>	Long river
<i>Bɔka</i>	Smaller stream
<i>Buliga</i>	Hand dug well tapping regolith aquifer
<i>Mɔgre, mɔge kate</i>	Dam, reservoir, 'big/ forced river'? (<i>kate</i> = 1. big, important or 2. to drive away)
<i>Loa, pl. loose</i>	Shallow well in riverbed tapping alluvial aquifer, alluvial well
<i>Gongo peliga</i>	Water pipes - 'white skin' (Rapp: <i>gongo</i> = skin, but also book, paper, letter)
<i>Pumpi</i>	Standpipe, hand pump
<i>Beengo, pl. beemo</i>	still water, pond, lake
<i>Bo bongo</i>	swampland

Sources: Rapp (1966), Mr. S. Asamah, field notes

The ritual calendar reflects the presence or absence of rain and the resulting changes of seasons. Most rituals are performed from the beginning of the farming season in April (onset of raining season) until November, when the harvest is over. They are agricultural rituals. Outside the farming period, the festival season takes place. It is the time to perform 'old funerals' with war dances, weddings, harvest rituals and Christian holidays.

Table 16 Ritual calendar

Months	Ritual	Performer	Address	Purpose
January	Festival season: old funerals, harvest rituals etc.			
February				
March				
April	<i>Sig'sa burega ko'om</i>	Section elders	Ancestors of section, <i>Winne</i>	Asking for prosperity
May	(after the first rain)	<i>Yidaana</i>	Ancestors of the compound	
June				
July	<i>Sig'sa burega ko'om</i>	Section elders	Ancestors of section	Thanks and asking for prosperity
	(before millet harvest)	<i>Yidaana</i>	Ancestors of the compound	
August	<i>Sig'sa burega ko'om</i>	Section elders	Ancestors of section	Thanks and asking for prosperity
	(after harvest of naara, when first millet beer is available)	<i>Yidaana</i>	Ancestors of the compound	
September				
October	<i>Tingana</i>	<i>tendaana</i>	Ancestors of the section, <i>Winne</i>	Thanksgiving
November	Sacrifices after harvest of late and red millet	All men of the section		
December	Festival season: Christmas, New Year, old funerals etc.			

Source: field notes

Rattray (1932: 318, 320) recorded rituals called *sig'sa burega ko'om* ('first rain sows water'), which were conducted by the elders of the village section just after the first rains had fallen.

The group of section elders meet and one pours flour water (in this case water mixed with grinded millet seeds, the same seeds as used for sowing) on a *tingane* of their section by asking for prosperity in the new farming season. After that, the elders return to their compound and proceed the same way addressing their compound shrines. Hence, it is the same ritual in essence, which is performed on section and compound level. Rattray also participated in a *sig'sa burega ko'om*, which was organized because the rainfall was not sufficient for sowing early millet. That suggests that the ritual can be repeated in case that the requests are not answered. The same *sig'sa burega ko'om* repeats, when the first millet is about to be harvested. During this second *sig'sa burega ko'om*, it is the first ripe seeds, which are grinded for the flour water (*naara pala ko'om*, 'new early millet water'). Thanksgiving for the farming seasons are included into the requests for future prosperity. After the harvest of late and red millet, men gather with offerings (animals, beer) at their sectional *tingane* to thank the ancestors and God for the harvest. Rattray (1932: 319) describes it as a third *sig'sa burega ko'om*. Today, these rituals are still performed regularly by *yidaama* and *tendaama*. It is very exceptional for a compound not to perform it due to the abandonment of Traditionalist belief. Some younger male Christians stated that the rituals would be performed as long as their old *yidaana* is still alive but that they do not intent to continue with it once they will hold their position. Christian Thanksgiving fits into this tradition without provoking contradictions. Also here, both rituals are performed side by side and merge to some extent.

5.5. Local discourses on water availability

One reason for the warm welcome at my arrival was the unspoken hope that I would contribute to a better water situation in the village. Although I tried to clear up this misunderstanding, many people preferred to uphold their idea and they were full of gratitude for my efforts in "*tum tuni ko'om*" (doing water work), especially, when a new borehole was drilled in 2005 to feed the new small town water system.

Water and weather issues form a substantial part of local conversations and debates. Standard phrases, which I heard many times, were "*We are suffering from water here.*" or "*We really have a water problem in this village.*" The local population compared their own water situation with the one in surrounding villages and concluded that they face much bigger water problems. Their observation is correct insofar as the next villages have small reservoirs; to where Siriba drive their livestock. People in neighbouring villages, such as Mirigu, also farm

dry season gardens, which are irrigated by shallow wells, whilst this practice is not feasible due to deeper groundwater table in the research site.

The first outcome of the focus group discussion with the Sirigu *nabduma* (section elders) was the clear and undisputed statement that the village seriously lacks permanent surface water sources.⁷¹ The old men argued that such sources are urgently needed for livestock watering and for decreasing the pressure at the hand pumps, which the women suffer from when fetching for the households. They listed a number of local and development effort of past decades to construct such water harvesting facilities, but also reported their frequent failure. Severe disappointment was expressed towards the national government, which undertook some half-hearted attempts to stabilize breached dams and to create new facilities. Villages frequently told that they saw activities going on, such as construction site equipment, which was brought to the sites but then remained unused for many months. They thought that construction work was done in a “*sluttish way*” and therefore did not lead to any improvement of the situation. Rumours went around on project money, which disappeared in mysterious channels and private pockets of politicians and construction companies. Villagers seemed disillusioned by politician’s talk and said “*there is a lot of discussion and talking but in the end, it is like we don’t belong to this world.*”⁷²

The second outcome was that the water situation looks very different in the sub-sections. A part of the village sub-sections experience water shortage. This is due to a high number of users, low pumping yield or a combination of both. Others sub-sections are better provided. Later, women used the same argument even though they stressed first on the crowded hand pumps and then argued for more small reservoirs; this did not seem to be a matter of gender priorities but of closeness to the subject due to gendered labour distribution. Also for the women, the lack of reservoirs and resulting crowded hand pumps was problematic and an increase in surface water perceived as possible way out.

In Northern Ghana, local strategies to create additional water sources are the scoping of river beds, the digging of wells and the damming of streams. In times of water scarcity, household ration their water and mutual sharing systems gain importance (Bacho 2001b: 28). “*Men are involved mostly in the development of water sources, such as the digging of wells, deepening*

⁷¹ Sirigu *nabduma* (thirteen elders), focus group discussion, notes, 21.04.2004.

⁷² There were several statements like this. This particular quotation was recorded in Nyangolino when discussing the failure of creating an operational dam in Nyangolino, which is a comparatively remote section close to the border to Burkina Faso.

and widening a natural reservoir or bridging a stream to serve as temporary reservoir during the dry season.” (Ibid. 2001b: 27). Such collective activities take place in dry season, when the farming season is over and sufficient work force is available. Out-migration of men in this season reduces the capability of a local community to undertake such community work. The mobilization of work force also depends on local leadership. Especially young men, who should perform such tasks for the community, do not always feel committed to the traditional system of leadership.

“I am put in charge of Dazongo and all its surroundings. But the main problem of water that disturbs me now is that of the well which we want to dig for the primary school. Had we organized ourselves, it would only take us a day or two to finish up what is left. The youth do not want to lift a stone to help the community. We the elders are also weak. So I am feeling very sorry for my kids in the primary school. Really, the problem of water affecting my community is very acute. And here is the case; those who would have been around to help me dig out this well are all travelled. All my three boys live in Kumasi. The rest who are around cannot even lend for themselves. So, you see, we elders are dying of both hunger and thirst. Due to this, we don’t even have the right senses to preach tradition to the younger generation. In short, the main problem facing me is the well. I can’t request for a well for my pupils and refuse to dig it to the required depth. And if I don’t tell you this and keep it alone, it will do me great harm.”⁷³

Villagers told about past efforts to enhance water availability. They showed me sites, where they had tried to create additional water sources. In Dazongo Zitadoone, for example, men presented a well, which they had dug; but it turned out to have little water from day one and collapsed a few weeks after its construction. It was unsure, whether a rehabilitation of the well would be advisable due to uncertainties concerning the water table. People of the same section also led me to the bed of a stream to make me see the place where the small dam they had created, was washed away with the first river flow.

It was told that when a technical inspection team came to Sirigu to check for possible sites for a small reservoir, one of the assembly men, who led them around showed the inspection team only one place close to his compound and neglected sites, other villagers took into consideration. Due to the inappropriateness of the presented site, the reservoir project was abandoned and the district funds went into other village development projects.

Water shortage in the local perspective is not understood as resource scarcity as such. Not acting in a united way and personal agendas were made responsible for the failure in acquiring funds for water projects. Further, it relates to technical limitations. For example, a scarcity of

⁷³ Mr. A. Aboyuure (*tindaana* of Dazongo), translated interview transcription, 18.05.04

groundwater was never stressed and groundwater was not perceived as a resource with quantitative limitations. Instead, the technical weakness of the pumps or the depth of the well was debated. Nobody told that there was not enough run off, which could be dammed up but all criticised the technical failures in doing so. Similarly, rainfall was not judged as too little in terms of quantity but was accused for occurring at undesired points in time, in an undesirable pattern and of being hard to predict. Some villagers thought of the lack of storage facilities. For the local people, water shortage also does not mean necessarily that too little water is available. But in their view, the required effort to receive water for livestock and households is too high in terms of distance (livestock) and time (crowded pumps). Their view on local water availability and water shortage resembles the concept of water scarcity, which was elaborated by Metha (2000). It is not a total fact, which is determined by the natural environment but rather a result of multiple factors, including technical, institutional and social factors.

Thus, the local water problem is less having enough of the resource offered by the environment but of a water shortage, which is caused by the incapacity to either tap existing resources or make them usable for longer periods of time to bridge the dry season. This view is shaped by the regular experience of resource abundance in wet season. Another important factor contributing to the local perception are the large Tono and Vea irrigation schemes in the same district, which illustrate that a lot of water is available in the region once one avoids it to run through one's hand.

Even though statistically well provided with hand pumps, there are seven clusters of compounds, which collectively seek to become a project community of the NCWSP program. Not surprisingly, it was in pump communities, whose member compounds covered the largest geographic areas, where such tendency of separation is observable. In such pump communities, meeting a crowded hand pump, being cut off in raining season and passing long distances is the most probable scenario.

The local discourse contains more than one voice and more than one way of thinking. Villagers refer to different knowledge systems at individual and at communal level. The issues debated may be seen from various angles, leading to an entirely different story of the same subject. Local and global natural science knowledge is part of the local discourse; some people referred to climate change and declining global water resources. Natural science knowledge and cultural knowledge appears in hybrid forms. The discourse is not only

polyphone but may also relate matters and local concerns, which seem to stand in no co-relation at first sight, as illustrated by the story of the rehabilitation of the Mission Dam reservoir.

Box 9 Case study: The Mission Dam reservoir – land rights, Gods and people

Numerous attempts had been initiated and realized to rehabilitate the technical structure of the dam. The repeatedly failure of the small reservoir provoked different patterns of explanation, which give an insight on the relationship of land and water, of spiritual and technical knowledge, as well as on social relationships.

The origin of individual land rights lay in the reclaim of land. Once the bush was rode and cleared for cultivation, it became private property. Unused land is considered communal land and under the decision-making of the local elders. Private land is not sold but inherited from the father or given out as land tenure, including farming rights and/or settling rights. In case that the tenant gives up his homestead on the land, the rights fall back to the land owner.

The first attempts of dam construction were told to originate in the Mission's interest to create a permanent surface water facility to support the construction of Mission buildings in the early 1970s.. A number of villagers were not happy about the construction of the Mission Dam because their bush farms were located on the respective land. For these farmers only held farming rights as land tenants, they had to return their land to the land owners, who did not mind the construction of the dam but instead encouraged it because they welcomed an additional surface water source in their near neighbourhood. The land was made available for the construction and the Mission Dam did not meet any hurdle during the construction process. *"the elderly [who are land owners in Dazongo...] They never opposed to it but accepted it with all gratitude. They [villagers and Construction Company] were able to construct it and it lasted for just one year."*⁷⁴ Then the reservoir failed; there was not enough water accumulated in it to bridge the dry season, leakages occurred, and the walls of the dam were washed out. Parts of them collapsed and the water flooded the surrounding area with its feeder roads.

Since then, the villagers with their elders were not involved in any reasoning to improve the performance of the Mission Dam. *"There was no consultation between the Christians and the Traditionalists"* to solve the problem together.⁷⁵ The Missionaries and some educated people from the village blamed the Construction Company for the breakage and according to rumours; a minister embezzled a large share of the money for the construction. Thus, for the missionaries, it was a reasonable thing to pursue more money and invite more constructors to patch the dam walls. They did not see any need to consult the local elders for advice. In sharp contrast, the elders saw the need for consultation. Their strategy to improve the performance of the dam would have included a visit of a *baga*, who ask the ancestral Gods for instructions and the implementation of their instructions by the *tindaana*. For the missionaries never came, the elders could not start this procedure.

*"The Gods are angry. They [the missionaries] had never consulted anybody to plead with the Gods concerning the dam. [...] When they started they were moving the right path [...] but coming to some time, it seems Father [the priest...] thought that the land was now fully for him."*⁷⁶

At the reservoir site, a *tingane* for the God Asaane was situated. The Dazongo *tindaana* moved the sacrifice stones and shifted them and the shrine to a dry place outside the reservoir. He explained that the power of the *tingane* was not damaged by this shift, because it was accompanied by the necessary rituals. According to him, the new *tingane* is as powerful as the old one. His view on the shift is rather pragmatic: *"Can you sacrifice under water?"* Despite this shift, the Catholics and the priests still refer to the reservoir as seat of Asaane.

*"It was one day that a leakage of the dam was mended. The water gathered in the dam and it lasted nine months and leaked again. [...] the Christians gathered one day and prayed and shouted to drive out the God of the dam. They considered Asaane to be an evil spirit and attributed every leakage of the dam to him. After that incident, it was four days, the spirit grew wild and made the dam to leak and the water gushed out."*⁷⁷

⁷⁴ Mr. A. Aboyuure (*tindaana* of Dazongo), translated interview transcription, 18.05.04

⁷⁵ Ibid.

⁷⁶ Ibid.

⁷⁷ Ibid.

Widespread and various rumour in Sirigu offers another interpretation of the failure of the reservoir. The rumour was carried from persons to person without regard of religious affiliation. According to the Catholic assembly man of Dazongo and Wugingo, the local explanation is as follows: *“Our people said the ancestors they did not allow the place for them to put the dam there. [...] But the Gods are not happy. So, they [the constructors] have to go and consult the Gods and come back to do sacrifices before they can put the dam. [...] as Christians they don't consult before putting the dam. That is the way how the dam has been breaking all through always and always.”* *“If you want to build a dam you have to consult a senior person who is a sub-chief [a naba] And they have to call each another to the chief's house [Sirigu naba yire] to hold a meeting and discuss then after discussing they will tell the [sectional] tindaana to acquire land for that like a dam. You have to sit in a meeting and send a message to the tindaana. So they want to make the dam and if it is okay for the tindaana, then it is okay for them. And if they see that this place will be a problem place, they will ask to go to another site and make the dam.”*⁷⁸

My Catholic field assistant provided a more mysterious version: *“It seems the God there is a strong God, who was not permitting them to put up the dam so they are going to destroy him and his children. People normally say, if you get there in the night, you hear a baby cry and then somebody will haunt. An old person. You can see the person and hear the baby cry. There was some belief like that but [...] when the water comes it will wash off the whole thing again. That is when they believe all those certain things like this. So they were even saying if they don't come and bring a white person to come and sacrifice, the place it will never wet. So that was the belief. Actually, I don't know, is it true?”*⁷⁹

When the Catholic leaders as well as the traditional leaders of Dazongo and Gunwoko called people for communal work at the dam site, nobody showed up. Although the people of Dazongo and Abeleto definitely benefit most from the dam, many did not see sense in supporting such project with their labour. Traditionalists believe that the dam will never work as long as Asaane is annoyed. (Whether the anger is due to the shift of his shrine, the praying-out of the Christians at the dam or due to lack of consultation and is somehow blurred.) According to the most common interpretation, things have not gone the way they should have and the God is angry and before Asaane's satisfaction, the reservoir will never hold sufficient water. This was the usual explanation given for the refusal to contribute labour. This view is partly shared by members of the Christian community.

Other justifications for the refusal to work relate to a current land conflict over the Mission land. The conflict escalated so far that the Sirigu Mission, which is the centre of the parish, as well as the Sister's Convent got abandoned by the Diocese; priests and nuns moved to Bolgatanga because they felt unsafe and under treat when some villagers beat up the priest and the local catechist. During the second field stay in 2004/ 2005 the situation between members of one local family, the priest and the Local Parish Council were characterized by severe tension; the priest in office neither came to celebrate mass (he rotates between churches of the parish), nor blessed the communion bread, which led to disappointment on local believer's side, who were no directly involved in the conflict. Following the argument of the man, who quarrelled most with the priest, the origin of the conflict has been the construction of a mechanized borehole for the orphanage (see chapter seven). Other minor incidents and arguments occurred, which fed the conflict. Later on, it was reinterpreted as a land conflict.

When the settling rights were given out to the Mission in the mid 1960s, parts of the land belonged to individual landowners, while other parts were bushy land, which was considered community property. One of those landowners was the *yidaana* of the quarrelling family. As landowners, they expect their tenants (the Mission) to consult and inform them about construction projects on the land but the Mission stopped following this expectation when the legal contract was signed in the 1990s which declared the Mission as land owner. One point of the family's argument claims that the transfer of land ownership was not lawful because those villagers, who concluded the contract with the Dioceses, did not own the land. Hence, the family argues that they continue being the lawful land owners and the Mission is only a tenant enjoying settling rights whilst the Mission is convinced that the mission is the legally approved landowner. The Catholic community had split into two fractions, those who supported the local family and others who supported the priest. This implies that the supporters of the local family would not follow the priest's call for work. And of course, the residents on and near the Mission land are at the same time landowners, which implies that if they support the claim of the one family (even if it is only by not sending the men of the house to work), they protect also their interest as land owners.

⁷⁸ Mr. W. Ayambire, interview transcription, 16.05.2004

⁷⁹ Mr. J. Asakibeem, interview transcription, 16.05.2004

One Sunday, the priest desperately mobilized the Catholics after Sunday mass to go spontaneously to the dam to carry stones in the heat of noon and wearing their Sunday clothes. The Catholics followed him. Passionate appeals for support of the dam rehabilitation by the SWOPA leader and Abeleteo resident, followed during the Sunday mass some weeks later. She reminded the Catholics of their duty to support the project and of the urgent need for the reservoir. She argued that any resentment between the fractions should not lead to the failure of the rehabilitation.

For people of Sirigu were not willing to contribute labour for the Mission Dam rehabilitation, the priest invited young men from the next village Mayoro to help. He organized transport and lunch for them to award their labour. Members of the Mission Dam committee explained their point of view:

“When they thought of constructing the dam [...] they [the Missionaries] first consulted the elders. That, what the tindaana is saying is not true. It is that the dam is not well made. Not that it needs any sacrifice. [...] Not that Sirigu people have refused to come out to do the work in the dam but Father just went to Mayoro for people to work. Father was feeding them. Father will not feed also Sirigu people. So, they said, they cannot be working with hunger. Father is not happy with Sirigu people because [...] of the land conflict he is having with one family]. That made him to transfer anger to the dam’s work.”⁸⁰

Another reason for the failed mobilization was given by the Dazongo *tindaana*, who referred to the reduced influence of the traditional leaders on the younger generation. Other views stressed that the people were not willing to contribute labour in addition to the payment of the large amount of 20.000 Cedis for the rehabilitation.

5.6. Conclusion

There is no official consistent coverage data on potable water supply; the government attempt to governmentalize local water resources failes partly due to the large number of providers, the neglect of locally created water sources, as well as the limited mandate of CWSA, which may monitor so some extent but has no efficient handle in sanctioning donors, which do not follow the guidelines of the NCWSP. In the district, there are a number of examples, where small water projects implemented did not follow CWSA standards and led to subsequent problems in water supply and maintenance.

Local people are not part of their natural environment; they create links between the living, non-living and supernatural sphere, which make up their liveworld, and their perception of nature as rather organic in the sense of Escobar (1999). At the same time they also conceptualize their environment, adapt to it but also shape it significantly. Ancesters, land shrines and rain serve as central element of belief system. Local environmental observation reflects results from natural sciences – although the particular explanations may vary. Local people try for long and by different means to increase local water availability. A part of these local means are institutionalized in the ritual calendar and the position of the *saadaana*. Others practically manifest in water facilities, which were manually created.

⁸⁰ Mission Dam committee (Mr. F. Amiziah, Mr. A. Akunsire, Mr. V. Adongo, Mr. J. Abagna), translated interview transcription, 04.01.2005

The present and past local attempts to increase water availability mainly failed due to the lack of technical knowledge and technical equipment. A large number of hydrological factors have to be considered for the construction of an efficient and sustainable dam (see Smilde 1999 and Boiten undated), which exceeded clearly the knowledge of local people (as well as non-hydrologists). This creates an on-going local dependency on external expertise and also means (construction machinery, transport of materials, finance). Moreover, the management of such facilities faces challenges due to the little technical understanding. External advice was not translated into practice but minimal management continued (see chapter seven for the management of the Busongo Dam).

Household water availability, as conceptualized in this study, is decreasing (Ghana's freshwater resources per capita), being rather stable (Atankwidi catchment geo-hydrology), increasing as well as decreasing (local perception stressing on dynamics in withdrawal facilities), or even as increasing (higher number of water points in dry season). It can be perceived from different scales and perspectives, which are not necessarily congruent the way they estimate on-going trends. It is important to note that from the water user's perspective household water availability is nowadays less prone to seasonal variation due to its dependency on groundwater.

6. Household water and local livelihood

Sagirega yeti in̄a kiiri la zom kumpi'on.

One can never let go one's source of livelihood even at the point of death.⁸¹

6.1. Livelihood diversification and productive uses of household water

The starting point for the investigation of local water management system is the elaboration of local water needs. These are then put in the context of local water availability to understand, the challenges confronting the management. This chapter addresses the local livelihood system understood in a wide sense as a system of socio-economic activities, routines and customs, which contribute to the living standard of a population, especially to nutrition and health. Furthermore, it presents typical water uses and the resulting water needs, including people's responses to changing a environment. Villagers experience these conditions as a livelihood constraint and employ two main strategies to cope with it. While the first strategy aims at adapting and coping with environmental risk in farming, the second strategy is to shift to non-farm activities.

With the diversification of economic activities, water uses and water needs between individuals and households also diversify. For instance, gendered labour distribution leads partly to gendered water needs, which gain importance when shifting to a more diversified agro-pastoral strategy. Household water is one of the key resources for many farm as well as non-farm activities. It is needed not only for productive uses but also for nutrition, personal hygiene, performance of rituals and medical treatment. Water demand in the research village is rising due to the expansion of the Sirigu market.

The most shaping characteristic of any rural livelihood systems is seasonality. Its influence on rural livelihood is threefold, in terms of natural conditions, labour requirement, and ensuring economic returns. *"The production cycles of crop and livestock enterprises are determined by the onset of rains, their duration, the length of the growing season, temperature variations across the calendar year and so on."* (Ellis 2000: 58). In case of the research village, Tripp states that *"The seasonal constraints in the area are extreme, as agriculture is virtually impossible during almost half the year, and seasonal differences in work pattern are evident"* (Tripp 1982: 396). Returns generated from different labour underlie strong seasonal variation. Thus an important motive for income diversification is the reduction of income instability

⁸¹ A Gurme proverb recorded in Nsoh (undated: 104).

(Ellis 1998). According to Scoones, households have three options to decide under this condition: (1) agricultural intensification, (2) diversification and involvement in non-farm activities, and (3) migration (Scoones quoted in Whitehead 2002: 577). Apart from the income stabilization effect, local incomes also need to be increased to fight poverty in the village.

Due to environmental change, lack of irrigation, and limited availability of arable land, the opportunities for agricultural intensification are surely limited in the village. Farming is mostly subsistence oriented, and the production of cash crops, such as cotton or dry season tomatoes, is only of marginal importance. Livestock production carries some potential for income generation, but a pure agro-pastoral strategy cannot ensure sustainable livelihood, all year food security and cash income. This fact draws attention to livelihood diversification, especially on productive water uses for non-farm activities at the household level.

This chapter traces answers to the following questions: (1) What role does household water play in the diversified agro-pastoral livelihood strategy? What water needs accrue from it? (2) Can divergent water needs, conflicting interest and different priorities between the sexes be concluded from gendered patterns of household water use?

The most popular livelihood concept introduced by Ellis targets all *“the process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living”* (Ellis 1998). It considers not only economic strategies, which households pursue to generate income but also looks at assets, institutions and social relations (Ellis 2000: 10). Moreover, the accessibility and utilization of social and public services provided by the state, NGOs or the local community are part of livelihood studies. This multi-faceted approach reminds strongly of approaches in economic anthropology, which stress on the importance of social relationships, intra-community exchange patterns, and property regimes. Livelihood as a concept approaches the economic sphere of societies in a holistic and people centred way, which takes account of situational dynamics and shocks. Three sets of livelihood strategies were differentiated in the literature, namely farming strategies, off-farm strategies and non-farm strategies (Ibid. 2000: 11-12). Households are usually understood as extended households, including household members in migration.

Livelihood in Northern Ghana was summarized by Whitehead as “*diverse ways in which people make a living and build their world*” (2002: 577). Moriarty and Butterworth claim, “*A key strength of livelihood approaches is that they encourage broad thinking.*” (2003b: 32). Thinking broadly of what contributes to people’s standard of living leads to a wider understanding of the livelihood concept. In this study, it not only includes income-generating activities but also non-income-generating activities. Some of them are very crucial in relation to water use and water need, such as food preparation, personal hygiene practices, water handling practices, medical practices, and rituals. They can rather be summarized as customs, habits or routine and are as such institutionalized. Although excluded in Ellis’s livelihood concept, these activities have an impact on the standard of living and well-being, and therefore need to be addressed in the analysis. For the matter of simplification, we will not apply the categorization of livelihood strategies suggested by Ellis but distinguish farm from non-farm activities, as well as productive from re-productive activities and customs.

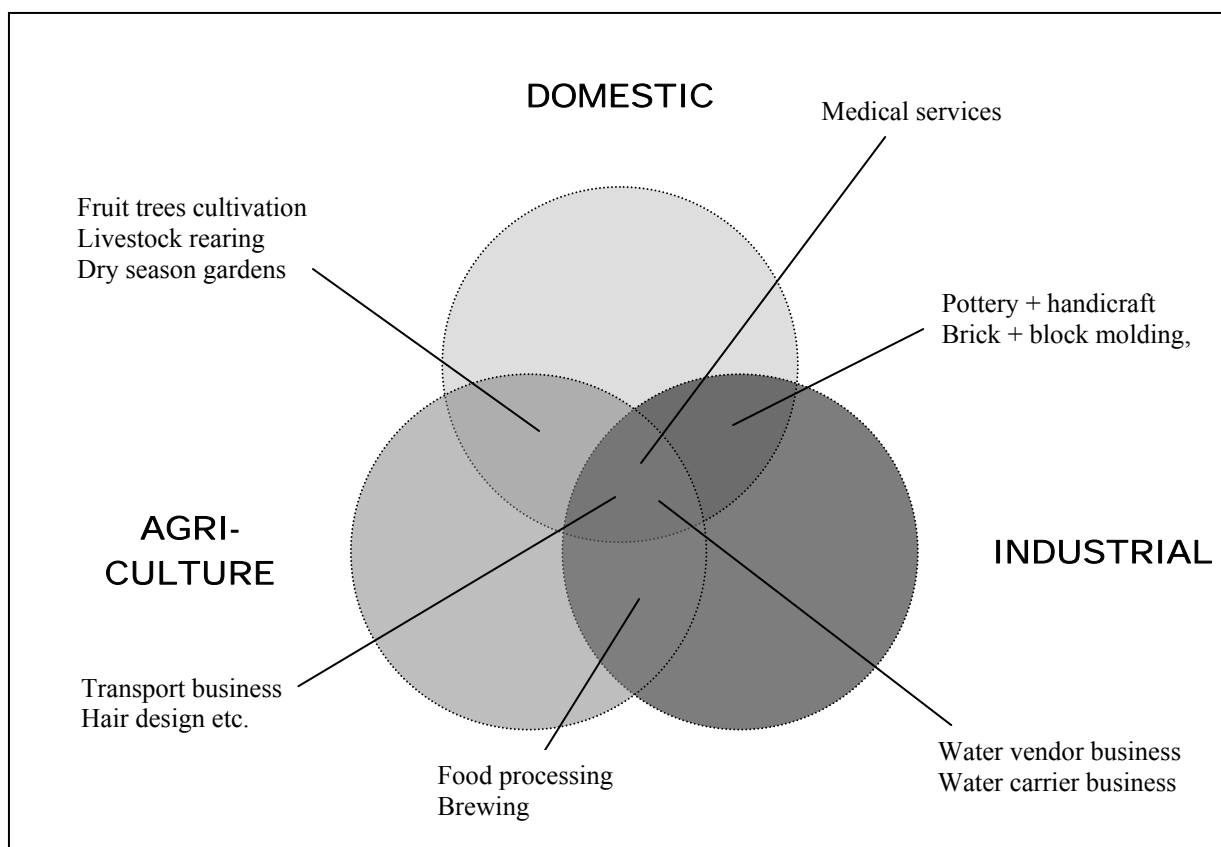
Poverty not only refers to a particular economic status of a household, which can be observed and measured, but also looks at the degree of embedment of a household in a social set-up, its property rights as well as its capacity to deal with the environmental conditions and different kind of risk. “*Perhaps the greatest value of a livelihood approach to water supply is that the inherent analytical framework will provide an understanding of the complex ways in which supply improvements have the potential to affect lives.*” (Moriarty and Butterworth 2003b: 29).

The main arguments for poverty alleviation in relation to drinking water focus on health benefits through the consumption of clean water and time saved when access to water is improved. These factors are assumed to lead to more productivity of the poor and to enable them to escape or alleviate poverty. In the African context, an insufficient number of empirical studies was stated, which validate and quantify this assumption of increased productivity (Rosen and Vincent 1999). Generally, little academic and political attention is paid to the productive use of household water. The study on household water security by Osei-Asare (2004) provides such an example within the GLOWA-Volta project.⁸² But as was pointed out “*the starting point for development and change must come from an understanding of people [...] and what they do (or would like to do) with water.*” (Moriarty and Butterworth

⁸² He discusses the economic benefits of timesaving and the relationship between income level as well as the decision to use and pay for improved water sources. But the fact that water as such is an important input for income generating activities on household level was not included in his argument.

2003a: 2). Research reveals a large bunch of water-based activities, which clearly exceed the narrow understanding of domestic use of water (e.g. studies in Moriarty et al. 2004, Cleaver 1998, Toulmin 1992).

Box 10 Productive uses of household water – at the sector interface



Sources: Moriarty and Butterworth (2003b: viii) and field data

The productive activities require small amounts of water in addition to the amount used for domestic purposes and aim at improving the nutrition of the household or small-scale income generation. “... *in most cases small scale productive uses of water are the highest economically valuable use to which water resources can be put*” believe Moriarty and Butterworth further. “*in particular for the poorest, a domestic water supply is frequently the only potential source of water for any activity.*” (2003a: 9, 3). If water is a social good and regulated under a common pool regime, people can make use of it, irrespective to their economic status. Water quantities they withdraw are not determined by their ability to afford water tariffs but rather by their water requirements. Water consumption rates seem to point in this direction. In Ghana, the lowest and highest income groups consume more water than the middle-income groups in dry and wet season (Osei-Asare 2005: 51). This perhaps implies that the poor consume more household water for productive purposes due to a lack of other

economic inputs, which might be available for middle-income levels, such as land, livestock or savings. On decision-making level, high and low-income households more often participate in decision-making on the local water supply, such as by attending meetings or being involved into the election of water committees. Middle-income households are clearly underrepresented in such decision-making (Engel et al. 2005). This may also have to do with the more urgent water requirement and higher interest of poor households in household water compared to those, who possess different and more assets to generate income.

Poverty alleviation can take place when more economic and social value is added to water volume used (Moriarty and Butterworth 2002: 3) This value can be increased by an adequate water management scheme which takes into consideration all potential uses of water.⁸³ Several studies show that women often own micro-enterprises, which depend on water as a resource input. Women directly invest benefits from these businesses into nutrition, education fees, and health care for themselves and their children. Such water-based enterprises therefore may have an immediate positive impact on the living standard of the household.

Even small quantities of water, such as one, two or four basins per week⁸⁴, enable people to start micro enterprises. Short water supply leads to the reduction of such activities in favour of indispensable domestic water uses. The focus in policy should shift from domestic water use to household water use to include small-scale productive uses of water. Such productive uses of water run at risk to fall between the water sub-sectors even though they should be included in planning and policy (Butterworth and Moriarty 2002). This also plays to the IWRM approach and would allow shaping water provision more according to the needs of the users. But “[t]he water sector remains highly stereotyped in its views of water users and water uses.” (Cleaver 2003: 7).

This chapter builds on data obtained from the water committee survey and the compound survey, from observations of community meetings, focus group discussions, as well as on interviews with villagers and officials at the district level. A particular set of interviews was conducted in the Sirigu market with owners of micro enterprises.

The following two paragraphs (6.2. – 6.3.) describe the local livelihood system. Moreover, nutrition and health status are discussed in their relation to local habits and water handling

⁸³ Whilst the economic value of water is stressed in the authors’ argument, the meaning of social value is neglected and stays somehow unclear.

⁸⁴ A standard basin used by most women to fetch water contains 45 litres.

practices. The next part of the chapter (6.4.) looks at diversified economic activities and stresses the crucial role which household water plays for productive purposes. The findings are summarized and commented in the conclusion (6.5.).

6.2. Local livelihood

6.2.1. Socio-economic stratification

This study chose compounds as the crucial economic unit. In the majority of compounds, several households farm together. Households farm separately in a minority of compounds but studies in Northern Ghana indicate a shift towards separate farming from the past decades (Kost and Callenius 1994: 54, Whitehead 2002: 595). Hence, farming units have to be considered when analysing a particular compound house (Tripp 1978: 57).

At the first sight, it is hard to distinguish socio-economic strata in the village, especially outside the market area. The building materials of the compound houses, the number of livestock, and the availability of vehicles (bicycles, donkey carts, motor bikes) suggest some idea of the economic status of the inhabitants. But they can be misleading because NGOs have supported destitute houses with building materials such as zinc roof and cement blocks.⁸⁵ A few outstanding non-poor households and (predominantly male) individuals earn income from government jobs, big businesses, such as a construction company in town, big livestock trade, or receive international remittances. Already in the 1970s, *“the absolute differences between farmers [was] not great, and farm resources and inputs [were] not concentrated in a few hands”* in the village (Tripp 1981: 19).

During several wealth ranking exercises in Sirigu, villagers found it too difficult to rank the houses in their neighbourhood. They told, *“You know, one year the groundnut harvest is good. You are better than your neighbours. Next year you farm the same crop mix and due to the rain, all groundnuts get lost. But your neighbour’s millet is doing fine. It is always like this [indicating waves in the air]”*. Thus, the local perception tends to neglect or intentionally ignores economic differences, when they are not too obvious. The general local perception is dominated by being a poor community with a few non-poor compound houses. According to my data, it was more appropriate and useful to rank village sections and neighbourhoods with each other than to stress economic stratification within village sections and neighbourhoods. But even then the differences were not so great. Some village sections and sub-sections

⁸⁵ As e.g. the Dutch based NGO “Ghana-Holland-Platform” in Sirigu.

displayed higher number of formally educated people and more involvement in market activities. A marginal sub-section involved into irrigated gardening. The location and distance of the sub-section to the market centre, to the schools, to Zokko River or to the Catholic Church was then crucial.

Whitehead faced a similar problem during her study on livelihoods in Bawku district of Upper East Region and suggests to differentiate between three grades of poverty: (1) poor but secure households, meaning the people are poor but possess enough savings to cope with the occurrence of unforeseen events (e.g. poor rainfall, illness) and are also able to build up assets after the liquidation of their savings; (2) poor and vulnerable households, referring to people, who can cope like (1) but have difficulties to regain their assets; and (3) destitute households, categorizing people with few assets and little capacity to earn income (Whitehead 2000: 17), for they do not possess livestock, agricultural surplus, or handicraft products which they could sell. The category includes those who can be labelled as too-poor-to-farm, who *“were often elderly, sick or disabled families and marginal households. They had poor labour supplies and nothing to liquidate to meet food or other needs.”* (Whitehead 2002: 595). Whitehead’s differentiation is locally meaningful but should be extended to a very little fourth category of local people, who have escaped poverty, the (4) non-poor households. A satisfactory quantification of the three categories suggested by Whitehead, was not within the feasible scope of this study. Instead, the differentiation between destitute, poor and non-poor was considered. Specific individuals and households are more endangered to fall into the category of the destitute households than others, such old widows, which has to do with customary law as one contributing factor (see chapter four). In Whitehead’s study, the size of the household was the crucial indicator for the socio-economic well-being. *“Large households were richest and small households were poorest.”* (Ibid. 2002: 582). The empirical data from the village also suggest that larger households and compound houses are less endangered than households with single individuals. But it is not only the number of people in the household but also the combination of age and gender structure, which determines whether a household is endangered to face a destitute situation. Larger households are rather able to balance their available work force in relation to the work load, which has to be performed to sustain the household; a single individual or a small number of household members may not be able to do that. For the research, obvious indicators for the economic status of a compound house and household were used, such as the ownership of livestock, vehicles, shops at the market and businesses in Bolgatanga, connection to the electricity grid, solar equipment and children

schooling outside Sirigu. This way, the non-poor households could be separated from the poor households. For the identification of the destitute households and compounds, I relied on the local perception within a village section or water user community, for neighbours and small communities are able to identify their economically weakest houses and I went then for cross-checking the information. In fact, this information was easier to acquire than the information on the better-off households.

6.2.2. Farming activities and livestock rearing

The responsibilities for different components of household subsistence are strongly differentiated by gender, e.g. the provision of food items and household cash expenditure. The agro-pastoral livelihood system is characterized by a gendered labour distribution. When looking at the livelihood strategy of single compound houses, a collective livelihood activity can be identified, which is based on the cultivation of staple food crops. The collective activity of the compound is then combined with a number of individual livelihood activities. Hence interdependence as well as simultaneous independence of the compound and household members can be stated (Whitehead 2002: 583). *Yidaama* (compound heads) play a crucial role in managing livelihood strategies of the compound. They influence the household size, the allocation of compound farms among the men of the compound, the adoption of new technologies, the building up of savings and the use of cattle and livestock for intra-community exchange, such as dowry, funerals and offerings (Ibid. 2002: 589).

The livelihood system in Sirigu is best described as agro pastoralist and diversified agro-pastoralist (agro-pastoralist with additional non-farm activities). The main occupation is rain-fed agriculture. The compound farming system as predominant in parts of Northern Ghana is an unusual farming system in tropical Africa (Tripp 1978: 67). The fields surround the compound house and borders to the fields of the neighbour. A network of footpaths within and around the compound farms connects the compound houses with each other. Additional fields, so-called bush farms are located in some distance to the compound farm, sometimes in another village section. Farm sizes in Kassena-Nankana district are small; 72, 1% of the households farm 1-5 acres, ca. 18 % of the households farm up to 10 acres. The size of the total cropped land within the district has not changed much between 1984 and 2000 and it seems that farm sized decreased (Codjoe 2004: 84). The small sample of 27 compounds, documented in 1976 displayed farm sizes ranging from 0, 07 ha to 1, 79 ha (average 0, 83 ha) (Tripp 1978: 92).

Farming period for millet, starts from May/ June to August with early millet (*naara*, lat. *Pennisetum typhoideum*), followed by red millet (*ki moliga*, guinea corn, lat. *Sorghum vulgare*) and late millet (*zε*, lat. *Pennisetum spicatum*). Other food crops grown in Sirigu include, frafra potatoe (*peese*), sweet potatoe and different kind of soup vegetables such as cowpeas, round beans, onion, tomatoes, pumpkin, and sorrel (*biito*) (for a complete list of local crops see Tripp 1992: 250). Mango trees are widespread and popular for they provide both shade and fruit. Other fruit trees are Cashew, Shea nut and Dawadawa. Presently, there is no dry season irrigation in Sirigu and therefore no dry season farming. An exception to this is the river fed tomatoes garden in the remote sub-section Bikumdoone, where people from Sirigu and surrounding villages farm plots. Some Siriba living at the southern edges of the village close to Kandiga have started engaging in irrigation.⁸⁶

People use mixed crop farming, sowing early millet and red millet at the same time and mixing the red millet seeds with seed of beans, pumpkin and okra. Some weeks later, groundnuts are sown on different fields. While potatoes, onion, sweet potatoes and tomatoes are grown in gardens; sorrel seeds are sown around fields. When the red millet is harvested, one sows the late millet on the same fields. Bullock ploughs are used by an increasing number of farming units instead of pure hoe tillage. The farming period lasts from April to November. The labour distribution during this period is both gender specific and gender sequential. Even though men and women farm staple food crops and groundnuts, they perform different tasks. The cultivation of cereals is mainly a domain of men although women increasingly involve themselves in weeding and other formally male activities (compare Tripp 1992: 255, Kost and Callenius 1994: 55).⁸⁷ On contrast, groundnut farming is mainly based on female labour, especially, when men offer women their own groundnut field. Vegetables and soup ingredients are again a domain of women, who cultivate them partly as crop mix on millet fields as well as in separate gardens. Women further undertake post harvest work, such as drying kenaf and sorrel leaves, drying and peeling groundnuts, threshing grain, cutting and drying okra. Men manage grain stores and allocate cereals to women for cooking. The cash income generated by women from their crops is their own.

⁸⁶ Personal conversation, Wolfram Laube, December 2005.

⁸⁷ According to Kost and Callenius (1994: 55), Nankane men take over the preparation of the fields, weeding, harvesting of millet and grain storage while women work on manure, sowing and the transportation of the harvest from the field to the compound. Post-harvest activities (threshing, winnowing, grinding of grain) and the storage of non-cereal food items are female domains.

The activities outside the farming calendar were usually described by the villagers as “*We sit and fold our hands because what else can we do?*” Despite that statement, many non-farm activities take place, which are of great economic impact for the households.

Table 17 Farming calendar

Month	Farming activities	Risk related to weather and rain
April	Preparation of fields	-
May	Compound farm: sowing of early millet, red millet and vegetables Elimination of smaller millet seedlings	Correct determination of onset of rainy season, erratic rainfall (no germination of seeds, dying of seedlings)
June	Bush farms: Sowing of groundnuts and late millet Near the houses: sowing vegetables Compound farms: thinning of millet, transplantation of individual red millet seedlings, weeding	-
July	Compound farms: preparation of beds for potatoes First harvest of sorrel and cowpea leaves Weeding Harvest of single early millet heads	-
August	Harvest of early millet	Heavy rain and wind storms (breaking of millet stalks)
September	Harvest of premature groundnuts Weeding, post harvest activities	-
October	Harvest of potatoes, other vegetables and groundnuts Harvest of red and late millet, post harvest activities	Erratic or missing rainfall (harvest of groundnuts almost impossible due to hard soils)
November	Harvest of red and late millet, harvesting of millet stalks, post harvest activities	-

Source: Tripp (1978: 72-75, field observations)

There is a significant co-relation between agricultural performance and total annual amount of rainfall. Low annual rainfall results in low crop output. Many farmers claimed that owing to environmental change the yield has declined within the past years. “*With sufficient manure and favourable rains, enough grain could be produced to feed everyone; if the rain failed [...] no amount of land would have been sufficient.*” reports Tripp from his field stay already thirty years ago (Tripp 1978: 81). Similarly, during the present study people referred to the size of land holding but stressed more on climatic and geological factors as the problem behind low crop output. They emphasized that the harvest is endangered by weather events, such as too much or too little rain at a particular point in time and strong winds rather than plant diseases or crop destruction by animals, such as locust (Tripp 1992: 254). For instance, a serious worry confronting the harvest season in 2004, as in the previous years, was the lack of rain for harvesting groundnuts. Though there was rain in the village during that the harvest season its distribution was extremely patchy. Groundnut farmers complained “*It falls where the soils*

are already soft but fails us where we need it.” Some farmers had almost finished harvesting while others could not begin harvesting due to hard clay soil. During the survey, I met farmers who had actually already resigned and written off their harvest. They told me that owing to erratic and scanty rainfall some of them could not harvest a single groundnut during the past farming season. They were forced to watch their groundnuts decompose in the soil because the harvest required too much labour or was practically infeasible.

The livestock includes guinea fowl, chicken, cattle, sheep, goat, donkey and dog. It is multipurpose. Livestock is used for paying dowry. It is further needed for inter household exchange and rituals. Livestock plays a great role in the livelihood strategy because it acts as a reserve from which money can be quickly set free when needed (compare Rattray 1932, Van der Geest 2004, Tripp 1978). Men own cattle and therefore the dowry system can be interpreted as an exchange system among males for female labour because women do not possess any of the livestock items exchanged. Small livestock and poultry are owned by both sexes but females prefer guinea fowls over chicken, which reflects gendered food taboos. Practically, men are more involved in poultry breeding because they walk long distances to collect termites and feed them to the chicks.

Studies from other parts of Northern Ghana indicate a growing integration of livestock husbandry and farming strategies (e.g. Whitehead 2002: 581). Livestock husbandry is valuable due to its crucial role in the enhancement of soil fertility through manure. Dung is systematically collected by boys and men and subsequently applied to the compound field. It is a common pool resource when found outside the livestock kraal and in some distance to the compounds. Also human waste left after ‘free range’ contributes to livestock husbandry and manure. This relationship has led to the frequent failure of the programs encouraging the use of latrines.

For some stages of the farming system are labour intensive, as during the preparation of the fields, sowing and harvesting, different social institutions and individual strategies aim at the availability of additional labour. The rotation of farming groups is one of them, meaning that people form groups and work on one field after the other. Such rotation is organized in the form of labour parties, such that the field owner is obliged to provide millet beer (*daam*) and cooked food to the workers or to distribute grain among the workers. This strategy is applied by non-poor and poor households. Selling labour for food is a strategy generally applied by poor and destitute households. The household’s participation in labor parties versus the

household's invitation for labour parties to acquire additional labor may serve as a reliable indicator for the household's or compound's economic situation in comparison with other houses of the community (Whitehead 2002: 589). Young people from the destitute compound houses are regularly invited by neighbors to work for food, grain and small amounts of money, which was explained as a means to support the destitute compound houses.

Young men are supposed to work for several years on their father-in-law's field to establish the marriage relationship (compare Rattray 1932). To meet such an extensive labour request, young men form groups to work on rotational basis rotate on their in-law's fields. Such groups are led by the *kɔma naba*. The group guarantees more efficient labour input and company. Moreover, it acts as a protection against overdrawn requests for the labour of young men because it is the in-laws, who are obliged to feed all the workers. Several types of local labour arrangements are reported for the Northern part of Ghana, such as in-law farming, friendship farming, and contract farming (e.g. Van der Geest 2004, Tripp 1978).

The agricultural cycle depends heavily on water availability at different points of time. The adaptation of farming techniques can be summarized as the first strategy to deal with environmental and hydrological conditions. In his study in Nandom district of Upper West Region Van der Geest describes many livelihood characteristics, especially agricultural strategies, which were also observed and documented in Sirigu. Moreover, he analyses these strategies in regard to changes and adaptations to environmental change, a relationship being of great interest to the GLOWA-Volta Project. Because the field research sites show many common characteristics, some conclusions from his study can be applied to Sirigu to support the field data.⁸⁸ Farmers employ many strategies to ensure the best yield possible. Van der Geest divides them into: (1) insurance strategies as response to normal opportunities; (2) coping strategies as response to unusual events; and (3) adaptive strategies in response to changing conditions. All strategies used indicate a high level of local knowledge about natural conditions and risks connected to it (Van der Geest 2004)

On-farm insurance strategies were summarized as follows: “...farmers cultivate large varieties of crops; they cultivate fields on many locations with different soil types and drainage situations; they spread sowing moments; they use different types of seed beds; they cultivate different crops on one field (inter-cropping); they sow several seeds per hole to

⁸⁸ Other studies in Northern Ghana also offer an opportunity for comparison (e.g. Tripp 1978, Runge-Metzger 1993, Tonah 1993, Kost and Callenius 1994, Desai 2001, Mendonsa 2001, Aruna Padmanabhan 2002, Whitehead 2002).

enable transplanting of seedlings when germination is not good on part of the field; they resow an entire field when a dry spell has caused bad germination; they refill with seeds have not germinated well on part of the field and when no extra seedlings are left for transplanting; they use legumes as cover crops between cereals to reduce soil and water runoff; they mulch their yam mounts to avoid desiccation; they cultivate early maturing crop varieties; and they use their knowledge of the (micro) soil differences and drainage conditions on their field to sow the right crops on the right places. Virtually all hoe farmers in the area farm that way. ” (Van der Geest 2004: 297) The same insurance strategies are applied by farmers in Sirigu, as documented in unsystematic field notes and validated in discussions with farmers. Another agricultural insurance technique is the earthen up of soil around millet stalks to prevent them from breaking.

The dominating crops guinea corn and millet are relatively drought resistant. They do not need more than 400 mm of rainfall per growth cycle. Moreover, guinea corn (red millet) can stay dormant when rains fail. In 1976, the villagers perceived red millet as the most important crop for them. Albeit this popularity and the fact that it carries some cultural meaning, farmers tend to replace red millet with other crops, especially early millet after experiencing bad harvest from 1974 to 1976. Red millet is culturally interpreted as being male while early and late millet are female. Red millet is preferred to other grains because it is ‘real food’. It plays a larger role in rituals and is also the only grain, which is subject to ritual prohibitions (Tripp 1978: 76). Contradictory, Kost and Callenius write that late millet is preferred before red millet. Red millet is perceived as more healthy in local terms and needed for rituals (1994: 57). Poor rainfall and declining soil fertility were held responsible for change in cropping pattern (Tripp 1978: 76). Other shifts in cropping pattern concerned late millet adopted from neighbouring Kassena and Nankane villages in the early 1970s and the general shift from grains to groundnut. “*Over and over again, informants said that in old days groundnuts were not so important; in fact, many houses did not plant them*”. Groundnut cultivation offers some advantages in comparison to millets, as they demand less weeding, can be sown after millets, can tolerate sandy soils, and can be used as a cash crop. Finally “*they are often the only thing that will grow.*” on the soils, summarizes Tripp (1978: 79-80). The present day crop pattern in the district is dominated by guinea corn and millet (72, 1 % of cropped land), groundnuts (18, 7 %), cowpea (61 %), vegetables (29 %) and rice (54 %). The high number of rice and vegetables results partly from crops grown in irrigation schemes (Codjoe 2004: 85). Where no irrigation is practiced, the dominant crops are guinea corn, millets and groundnuts. The

change of diet, which now includes more groundnut than in former times, is suspected to be responsible for the widespread occurrence of goitre in the research area (Tripp 1992: 256).

Van der Geest (2004) argues that the farming system in Northern Ghana is resilient as it relies on low-input agriculture and because farmland cannot be sold but only given out under the tenure system. Both factors are also prevalent in Sirigu. They open up the possibility to continue farming after the occurrence of a drought or other unfortunate natural events. While land as such is not in short supply in most areas of the village, the shortage of fertile land began being perceived as a problem in the 1970s. Consequently, the farmers stopped keeping fallow period on their bush farms (Tripp 1978: 81) and some bush farm areas were turned in compound farm areas through intra-village migration. Farmland around the market was turned into a market commodity and during the past years land titles were sold for construction, which had been impossible before for land could only be given out as tenure. Land tenure means that land use rights (farming rights) can be shifted to another farmer, who then farms the land and share a part of his harvest with the land owner.

6.2.3. Food habits and nutrition

A study on nutrition status in the village in the 1970s observed, “...*the diet of the Nankane is relatively simple, based on a limited range of foodstuffs and prepared under considerable restrictions of time, water and fuel*” (Tripp 1992: 253). This observation was also made during the present study although changes in food habits were also recorded. The food eaten in Northern Ghana consists of a thick or light porridge made from grounded millet and water, which is generally referred to as TZ (from Hausa *tuwo zaafi* = hot porridge) or in Nankane as *saggebo*. Maize can also be used as substitute for millet. The porridge is eaten with a variety of soups, made of vegetables and thickened with groundnut paste. The food is cooked in the evening; left over food is consumed in the morning. Flour water or groundnuts serve as a meal in the afternoon. Whether a woman is able to prepare a second meal in the day depends on her ability to generate income for buying additional soup ingredients.

Most compounds use their harvest exclusively for self-consumption. A number of compounds have to be supported with food relief from the churches or external NGOs, because their harvest is too little for subsistence and they do not have additional income sources.⁸⁹ The lean

⁸⁹ The Catholic Relief Service runs a “Food for Education Project”, the “Ghana-Holland-Platform” buys maize and millet, which is allocated among the destitute households. Some compounds insisted on giving me a bowl of groundnuts, potatoes or eggs, when I visited them to show their gratitude for my visit and work. According to a

season from March to July has to be bridged by most of the people, when their own harvest is consumed. Non-farm income and savings are liquidated to buy additional food, especially grains. Sirigu has become a net-importer of food since the 1970s (Tripp 1982: 392). During dry season, some fresh food items, such as onions and tomatoes, are obtained from outside the village, where they are grown under large irrigation schemes; dried local vegetables also replace the fresh ones.

Leaves and fruits of the baobab tree and parts of other wild plant species also form part of the diet. Wild herbs and seeds are important food substitutes in the lean season. Children in Sirigu looked for roots, forgotten groundnuts on the fields and little wild fruits when strolling through the village. In another study, the knowledge about species was observed to be concentrated among women from poor households, which tend to cook them more than households able to afford additional soup ingredients. The consumption of wild species was marginalized and connoted with low prestige (Kost and Callenius 1994: 64). Along with the fuel wood, gathering wild food species is the task of the women and children. Owing to the scarcity of trees, which could provide wood, millet stalks are collected, dried and use for cooking. Millet stalks are the property of the compound, which has farmed the millet, while firewood and wild plant species are perceived as communal property with public use rights.

Generally, meat is considered important but it is less important in the daily diet, but grinded prawns are added to almost every soup. Livestock (apart from poultry) is perceived as being too precious to simply serve as a food item. Livestock is usually slaughtered for consumption when rituals and festivities take place. The consumption of meat outside these periods is mainly limited to food bought at the market, meat from deceased animals and regular meat consumption within better off families. Muslim families do not eat deceased livestock. Smoking meat is the local practice of conservation. During the nine months of field stay, no hunting activity was observed. This has to do with the almost complete absence of wild animals.⁹⁰ But people, especially children, included lizards in their diet, whenever they got hold of them or found them dead somewhere. This is an unthinkable practice in other parts of

cultural norm, people who eat are supposed to offer and share their food with others by saying "*Wa ti di.*" ("Come, we eat.") This gives people of destitute households the opportunity to receive additional food. It is possible to reject this offer to share food. A person from a household with very little food will offer it pro forma but can rely on the rejection. Tripp observed "*when food is scarce, [the offer to share food] is likely to be a much more circumspect, mam gure la loko (I am holding a bowl.)*" (1978: 197).

⁹⁰ There was a dry season bias in the research period. Therefore no observation of local hunting or wild animal population in the wet season was recorded.

Ghana. The practice of eating deceased animals carries some danger to health. Single but serious cases of food poisoning occurred during the time of research.

Women were prohibited to eat chicken meat in older times. This taboo is still followed by a part of the population although the origin of and the reason for the taboo were rather unknown. The most popular explanation states that men were scared that while they are at their fields their wives would catch and eat the chicken living around the compounds. This argument and an often quoted local interpretation are also found in the ethnographic literature. *“His informant said that the fowl, a sociable and civilised beast, was good form men, whilst the guinea -fowl, an untamed beast, was good for women, who are wild and flighty beings”* (Cardinall 1969: 40 refers here to Tauxier, also see Rattray 1932, Tripp 1992: 253).

A study on the nutrition status in the research village during the 1970s clearly suggests that male and female non-farm income generation results in better nutrition status of the children (Tripp 1981). This underlines the importance of livelihood diversification in the area. Recent studies on nutrition status among the Nabdam in Northern Ghana indicate that since 1960, it has generally improved, especially for women (Destombes 1999, Ibid. 2005).

It is not households but single individuals within households, which show signs of undernourishment. Elderly people, dependent people and severely deprived single men are at the highest risk to fall into this category. This category of people is not able or heavily constrained to earn their own livelihood and they depend on others to support them. *“Individual nutrition status is primarily a social outcome.”* (Destombes 2005: 6). Thus, due to this support undernourishment is not systematically connected to economic stratification but social relations. Observations during the field stay reveal that undernourishment is not a serious problem because of food donations and intra-community support for destitute households. Still many little children show obvious signs of malnourishment, such as short size, swollen belly. Whether Nankane society has undernourished individuals as well is beyond the scope of this study, especially because such people are often also too weak to participate in public life or communal events and are rather invisible for an outsider. It seems possible that dependent people, such as children, old, and sick, are neglected by their family members, which may result in undernourishment. However, such cases are assumed to be exceptional.

The consumption of potable water is seen as a crucial factor contributing to health. The majority of people in the village drink water from the borehole all year around. This indicates that local people are aware that the quality of water from protected groundwater is better than that of surface sources. Despite this, it was observed that even when the borehole water was contaminated with insects; it was not treated by the households before drinking. Water handling practices also lead to the contamination of potable water.⁹¹ The use of river water for drinking, which some old people and households prefer due to its better taste does not necessarily contradict the local awareness on the co-relation between of clean water and health. Formally educated villagers explained to me the seasonal periods and fetching places for drinking water from the river. Fetching drinking water is practiced when the streams acquire high water level and swift movement, as this minimizes the relative number of parasites per water volume. Given the choice between visible insect contamination in borehole water and clean river water, the decision of the villagers appears reasonable. Drinking of water from wells and river contaminated by frogs and insects was only practiced in two sub-sections, where no potable water source was available as an alternative. The people there perceived their water quality as bad and had already organized and applied to become a project community under the NCWSP. These sub-sections were not poorer than others. For example, no borehole had been allocated to the sub-section Bikumdoone yet, because it consists of only six compound houses and boreholes were allocated to sub-sections where a higher number of users could benefit from the improved water supply.

6.2.4. Water handling practices and health

People in the village usually shower two to three times a day. This depends on their daily activities, the season as well as the water availability. Showering is performed in roofless bathrooms in front of the compound house, which are surrounded by a mud wall and equipped with a soak away made out of stones or a simple drain, which leads the wastewater out of the room. One bucket is sufficient for three baths when one uses the minimal amount of water. People take a bucket of water with a cup in the bathroom, wet their skin and then apply soap with a sponge all over their body. In the end, the soap gets washed up in a systematic way, which does not require much water. Because of high poverty level, most people use Key Soap, a widespread brand in Ghana, or equivalents. It does not cost much and is used for all

⁹¹ The problem was not only reluctance for correct water handling. I experienced myself how difficult it is to keep drinking water clean in my own household and how correct water handling suffers from negative habit formation over time.

personal purposes. When more water is available as in the wet season, much more water is used for bathing but the number of baths does not increase. Routine of hand washing before cooking or eating or after defecating can be observed but often soap is not used. Especially children are reluctant in using soap or have no soap at hand at the particular situation. Soap is a valuable household item and is kept with care.

Dishwashing is also performed with Key Soap although the cooking pots are first soaked and then washed with sand, ash or grass before using water and soap. One characteristic of Key Soap together with the local water hardness is that it is very difficult to get wash up. Freeing the dish from soap requires a lot of water. That makes the use of soap less attractive to girls and women performing that task and may lead to the preference of sand and grass, which are available in abundance and for free. This practice may lead to severe contamination of cooking pots and dishes with human and animal faecal coliforms (Anonymous 1981). Washing with ash was identified as a local practice in Northern Ghana, which fights coliforms on hands and dishes and therefore should get encouraged (Ibid. 1981).

People tend to wash their personal laundry themselves. This task is performed once in a few days. It can be done at the reservoir site, in the houses or close to the pump site. Some women and men fetch additional water for laundry whereby some others keep and collect water little by little in their storage vessel during the previous days. Some people use chemicals to change water hardness before doing the laundry to reduce the amount of soap needed. Again, to rinse the clothes is the main challenge and consumes most water due in the process. When women were asked about daily water amounts required, they automatically included the water for laundry as well.⁹² Thus, they determined a water requirement of four buckets (ca. 180 l) per day per person in the household. This number was validated in my own household.

Water handling practices observed during the field stay included the storage of water in large clay pots. Each household has its own storage vessels. The water is stored to have it at hand in the house. In many households, an additional smaller clay pot is also used to store drinking water. Storage pots are covered with a dining plate or lid in most of the houses. Household members withdraw the amounts needed with a plastic or aluminium cup, which is kept next to the storage pots. After returning from the pump, the water from the basin is usually decanted to the storage pots, in which small amounts of water may remain from former trips to the

⁹² About two buckets are needed per person per day for personal hygiene and consumption. Women added additional two buckets per day for laundry. Thus, they determined a water requirement of four buckets per day per person in the household.

pump (see picture and footnote on page 94). Therefore, it is difficult to calculate the exact storage time of water. Water fetched in jerry cans is often stored in them.⁹³ Long storage time usually results in the contamination of water with insects and dust particles even though the vessels are covered. The large and heavy storage pots are not washed usually. Smaller storage pots undergo regular cleaning but not in all households. Fetching vessels are always cleaned with water or water and sand at the pump site before fetching water. It was found that the contamination of household water with *E.coli* bacteria was higher in dry season. During that time the difference in water quality in the house and at the water source was also significant; an improvement in the water quality in comparison with its source as well as the decrease in water quality was measured. Water treatment at the household level was assumed to be the cause of the improved water quality (Carbone 2004: 75-80) but people in Sirigu did not treat water before consumption.

The central role of industrially produced soap in the elimination of diarrhoeal diseases is widely recognized at the local level although other hygiene practices (or lack of it) seem to be more difficult to change through teaching programs. People use soap whenever they can afford it but the amounts used within a household with many children are large. Key Soap has become a valuable item, which is used for exchanging gifts, e.g. after the birth of a child⁹⁴, to recognize somebody's effort and to pay somebody's work. The amounts used as gift are smaller than in town, where whole soap bars are given. A very common expression to indicate the temporary lack of money or destitution in the village was "*I have no money to buy soap for my family.*" or "*I need small [money] so I can buy soap.*"

Sanitation facilities in form of latrines are exceptional in the village. Only a handful of compounds are equipped with a compound latrine. Public latrines are available at the public clinic, the market, in front of the SWOPA yard, near the mission and at some of the schools. Despite this (though) incomplete coverage, the facilities are rarely used. The main reason is the need to manure the fields. "*What should our fowls and pigs eat then? There is not enough grain in the house. We can do little for our fields, what if we stop even that?*" asked the farmers. Moreover, a general inconvenience exists with latrines, which are dark, tight, and smelly and sometimes also dirty. As a result, people prefer using fields, bushy areas near

⁹³ Clay pots are the most common storage vessels for water all over Ghana. Most households (44 %) had fetched water in their house not longer than six hours ago. On third of the households had fetched water between 12 to 24 hours ago. The contamination was lower when water was stored in clay vessels than when stored in other vessels. When water was withdrawn with a handled cup, the water quality was better (Carbone 2004).

⁹⁴ This practice is not only observed in Northern Ghana but also in other parts of the country. Key Soap is one of the most usual presents for a new born child and the mother.

streams, corners or hidden places between houses in the market, or the animal kraal. Many adults perceive public display in such situation as inconvenient although it is not uncommon.

⁹⁵ *“When there are no crops and no bushes, we cannot hide ourselves. So we have to wait until dusk or go very early dawn.”* villagers explained. To avoid public display seems to be the strongest motive for pursuing a compound latrine.

Instead of relying on health statistics, field observations, literature, and discussions with local nurses can be used to summarize the health status of the population. Of special interest here are water related, oral-faecal (water-washed) and water born diseases. Both, the local awareness and practice of drinking clean water as well as the incomplete use of industrially produced soap and avoidance of latrines is reflected in the health status.

Table 18 Water and diseases

Disease	Infection route	Relation to water	Prevalence in village	Trend in prevalence
Skin and eye infections	Body contact	Water washed	Single cases	Constant number of cases
Diarrhoeal diseases	Mainly faecal-oral	Mainly water washed	Very prevalent	Constant number of cases
Malaria	Mosquito bites	Insect vector	Very prevalent	Constant number of cases
Elephantiasis	Mosquito bites	Insect vector	Single cases	Growing number of cases
Guinea worm	Oral	Water based (water is habitat of cyclops)	No local infections for many years	Decreasing with introduction of boreholes
Schistosomiasis	Body contact	Insect vector	No data	No data

Sources: Hunter (1992, 1997a, 1997b) and field notes

The constant case of water-washed diseases can be explained with the insufficient use of soap and water-saving practices. A widespread perception is that diarrhoeal diseases are due to poor quality of drinking water; however it is often the amount of water and the frequency of hand washing, which determine the probability of an infection. The quality of the water used for such purposes is not important. Health statistics report that in 1960 Guinea worm disease rates were 5-9 per 1.000 inhabitants (for Sirigu, Mirigu and Kandiga). Today, cases of Guinea worm disease have factually stopped in the research area with the opening up of ground water resources through boreholes in the 1970s (Hunter 1997: 75). Even though a part of the population still consumes untreated surface water, the prevalence has decreased due to the interruption of the parasite life cycle. There are not enough hosts available for the parasitic

⁹⁵ The usual way to deal with such a situation is to pretend not to see the person and not to exchange greetings. (see Van der Geest 1998 for Akan sanitation culture).

worm. Moreover, the habitat of the cyclops is stagnant and muddy water bodies and slow flowing rivers; stagnant water bodies are not used as source of drinking water in the village. A small number of Guinea worm infection occurred when migrants had brought the larva from southern areas of the country. (The time between infection and the painful expulsion of larvae through the skin takes about one year.)

The reversal of seasonality of the infection due to borehole provision did not emerge in the research site. But in parts of the Upper West Region, it was found that instead of dry season, today the highest infection rates occur in rainy season. The explanation is that during dry season, farmers remain in the settlements, which are provided with borehole water, whilst in rainy season they farm bush farms, where no such facilities exist (Hunter 1997: 117). Farmers then tend to draw water from contaminated surface water sources (Kendie 1992). In the research village, the coverage of boreholes extended to almost all sub-sections and farmers could draw water from the pumps closest to their bush farms (see next chapter on use rights).

With the rise in the number of artificial surface water bodies, the number of vector diseases also increased. Despite this, malaria seemed to show rather constant numbers of infection. This may be due to the on-going mosquito “*bednet campaign*”, which may have balanced the effect of increased breeding places. Changes in the village can also be observed in case of elephantiasis. In 1992, the geographic area was identified as ‘no reported cases’ (Hunter 1992). But based on my observations of visible infections during our surveys, visits, and on festivals, I would rather assume the present number to match Hunter’s category ‘low level endemicity’ or ‘increased transmission’. One factor contributing to elephantiasis infections is the “*rapid, low quality, unsanitary urbanization*” (Ibid. 1992: 627), which could be observed at Sirigu market, where accommodation for a large number of people was constructed without any extra provision of water and sanitation facilities.⁹⁶ There was no local data available for Schistosomiasis. This is not surprising, as this disease occurs typically in irrigation schemes, which provide the two basic conditions for an infection (surface water and frequent body contact with the water). There were no such schemes in the village.

⁹⁶ New houses are constructed as quarters, where rooms are rented out to individuals and families. Densely populated quarters are often not adapted to the needs of the inhabitants as good as compound houses are. Modern quarters often don’t have bathrooms, a livestock kraal, a separate yard or kitchen and a waste dumping place. This leads to an unhygienic situation and mosquito-breeding place. Such situation was not observed with local compound houses, which were most of the time very neat homesteads and displayed all these characteristics (e.g. in a usual yard of a compound house, no livestock can enter and contaminate the cooking place due to the strict spatial separation).

A small public health clinic and maternity clinic are situated in the village. More difficult cases, such as irregular pregnancies and deliveries, fractures, serious malaria cases, are sent to Kandiga, Bolgatanga or Navrongo for treatment. For this, a car and a driver are available at any time to transfer cases to the hospitals. But the facility is rarely used because the patients are charged for transport. The patients come not only from Sirigu but also from other villages including those across the Burkinabe border. Alternative and popular health facilities are local herbal clinic, which are run by *bageba* and spread all over the village. *Bageba* know how to treat a large variety of locally prevalent sicknesses. Nurses and health workers of the clinic have recognized them and acknowledge that the local treatment of some diseases is indeed very effective.

Neither the herbal clinics nor the public clinic are provided with sufficient water despite the fact that they are connected to a pipeline, which should supply them with water from the orphanage borehole.⁹⁷ They receive all their water from the hand pump of the Mission pump community. The resulting need for transport and water carriers leads to short supply for the patients and personnel, although water for purely medical uses is always available. *“You have seen the people bringing their own water. One patient comes and the wife, friend or husband carries a bucket of water. If they wait long, we cannot offer them to drink. The floor should be washed more regular.”*⁹⁸ An old man, who is employed as caretaker of the public clinic, carries all water needed for the public clinic and maternity. He also cleans the place and washes the bed sheets.

Water needs in the herbal clinics are specific. For nearly all kind of local medicine, roots and herbs are cooked on a stove in the compound yard and rituals are performed around it. Medicines are mainly herbal teas or herbal pastes and ointment to rub on the body of the sick and therefore always contain water. Medical baths are also a part of the local therapy. But water for medical uses should be understood in a wider sense as can be seen from the following case studies.

⁹⁷ The pipeline leading to the health clinic connects the mechanized borehole with first the overhead tank of the orphanage, subsequently the overhead tanks of two quarters houses, then to the overhead tank of the maternal clinic and ends in the overhead tank of the health clinic. Being situated at the end of the pipeline implies, that water has to be send into these pipes for a long period of time before supplying the clinic but pumping times are kept short to save electricity or diesel. Therefore, piped water does not reach the clinics.

⁹⁸ Informal discussions with nurses and midwives, 2004, 2005.

Box 11 Case study: Medical water use in bageba's compounds

Weak patients stay with the household of the *baga* and are cared for in their sickbeds. Popular *bageba* run little clinics with up to 20 beds. The two *bageba* interviewed complained about water shortages and a lack of a compound latrine, both would lead to a cleaner environment for the sick, the avoidance of intra-clinic infections and to a protection of the dignity of the very sick and weak, which are not able to walk some distance to hide. Finding (voluntary) water carriers to support women of the *baga's* family was also identified as a problem. If water was easier and more available, they would build up a herbal garden next to the house. All the desired fresh plants, roots, leaves and fruits for the medicines used to be found in near bushes until some decades ago. Such bushy areas don't exist any longer due to change and decline in vegetation cover. Time and money intensive travels as far as Tamale or Kumasi are undertaken by the *bageba* and their assistants to get the plants from the bushes and forests over there. At times, the treatment is delayed by a few days.⁹⁹

In the Traditionalist belief, sickness and death may also be caused by wickedness of people who bewitch others. It is important to find out the causes and culprit for the surviving dependants and to be able to sanction such behaviour, to continue with life, and ensure the reconciliation with the spiritual world. Different kinds of oracles serve this purpose. One popular variation in the village is called *nyu ko'om* (drinking water).

Box 12 Case study: The water oracle - Nyu ko'om investigaton

The family of the dead can consult the *baga* and ask him to perform the *nyu ko'om* investigation for them. They invite the people they suspect to "come and drink water" (*wa la nyu ko'om*) in the *baga's* house. There is a big audience at such occasion. The case is described to the *baga* and discussed again. The suspects get the opportunity to confess. If somebody does, the case is handed over to the family of the dead, which decides on punishment. If nobody confesses, the *baga* prepares a special calabash with treated water, which all suspects are obliged to drink from. Persons not guilty of the death take a zip but cannot continue drinking. It was told that guilty persons take a zip and cannot stop drinking. They will ask for more and more of the water and their belly swallows until they die. The fear of *nyu ko'om* is very strong. People who caused the death intentionally (by poisoning or witchcraft) normally confess and don't drink.

Even though the *baga* practice Traditionalist worship, his work is feared and respected also by many Christians and Muslims in the village. Some of them would follow the *nyu ko'om* call to avoid being held suspicious by their neighbours and the community. Others would refuse taking part.

6.2.5. Non-farm income generation

Many household items are still produced by their users. Others are bought in the market. Services (medical, education, transport) need to be paid. Additional grain has to be pursued for household nutrition. Almost all money for such spending is derived from non-farm activities. The need for and use of money is gender – differentiated. While women spend on soup ingredients, industrial household items, services of grinding mills, fire wood and clothes

⁹⁹ Interviews with Mr. Adumoliga, 28.05.2004 and with Mrs. *baga* of Atieboka, 15.10.2004.

for themselves and their children¹⁰⁰, men participate in or pay for school fees and school uniforms, medical cost, means of transport, water fees, and additional grain in lean season.

Sirigu hosts the second biggest market in the district when considering market revenues.¹⁰¹ Its growing importance as loading point for livestock and passenger transport resulted in the extension of the market area, a construction boom and an increase in traders and costumers within the past years. The market takes place once in three days, typical in Northern Ghana, and offers opportunities for the diversification of the agro-pastoral livelihood. Making appointments and organizing work follows the pattern of market days.

Non-farm sources of income are rural businesses. People are self-employ in food processing and selling. This implies sale of snacks and cooked food as well as the production of Shea butter or groundnut oil. Women also produce distilled alcohol, millet beer (*daam*) and soft drinks made out of millet, ginger and baobab fruit. Many local women, especially those, who live not far from the market, engage in petty trade with grain, fresh and processed soup ingredients, non local food items (bread, fruits, dry season tomatoes and onions), cheap industrial items and charcoal. Nankane women have a monopoly on regional grain trade as well as on soup ingredients and malt, which were formally a domain of men. Water is also sold in the market for immediate consumption. Men rather trade with kola nuts and livestock. The majority of traders in Nankane markets are women (compare Tripp 1992: 254). They either produce their commodities or walk to regional markets in Navrongo or Bolgatanga to buy them (usually in groups sharing the same compound or sub-section). Hawkers move from market to market in the Kassena-Nankana area on both sides of the national border following the regional three days pattern. They offer clothes, herbs, material, bicycles, local mats, local cages for poultry and other items. A few local traders run comparatively large businesses for industrial items and medication and own a market store. According to the study in the village conducted in the 1970s, men and women activities in trading were evident in providing a better nutrition status to the children. Only long distance trade, regional livestock trade and the import of industrial items to the local market were significant, but not the male trade with handicraft (such as leatherworks). In contrast, any involvement in trade activities by women translated directly into better nutrition status of children (Tripp 1981: 19). Handicraft forms another part of rural micro enterprises. Tailoring, sale of pottery, artwork and tools, as well as carpenter works belong to this category. Moreover, there are services offered at the market

¹⁰⁰ Compare Kost and Callenuis (1994).

¹⁰¹ Mr. J. Ayamga, interview, 20.05.2005

through which income is generated, such as hair design, mechanical services, water carrier business, medical services or communication centre. Observations at Sirigu market thirty years ago show that non-farm activities don't constitute a part of local livelihood for recent times for about 600 traders were observed in a particular market day in March 1976 (Tripp 1978: 131).

There are a few government jobs in the village, such as teacher. People from different regions or communities occupy most of the qualified government jobs, such as nurse, policeman or trained teachers but some villagers are also employed. Formally educated villagers rather find employment in the regional capital Bolatanga or in the South of the country and send remittances to the village. The Catholic Dioceses and the NGO Afrikids also employ a small number of villagers in their projects (orphanage, nursery).

Local wage or day labor employment also occurs in the form of working in one of the cereal mills or *chops bars*¹⁰², in tailor's shops. Such work is dominated by girls and women whilst boys and men help in construction, to repair bicycles or clean taxis and bus, which pass through the market. Teenagers but also younger children perform almost any kind of work, which does not require skills or much financial input.

Out-migration has a long history in the area (see chapter three). Seasonal and permanent migration was widespread in the village during the 1970s. *"Almost every man [in Sirigu] has had some experience working in southern Ghana, usually as a labourer on the cocoa farms, in the mines, or in the timber industry"* (Tripp 1981: 16). It is still of crucial importance. Seasonal labour migrants come back to the village in April for land preparation and sowing. Many young men migrate to the South, some to extend their education and many for the need to earn their living and only return during sowing time to their families or for important family events. Even though permanent and seasonal out-migration has been a rather male domain, households where only women were absent due to seasonal migration were also observed. While men are more involved in wage labour outside the village, women seem to pursue businesses like trade with materials or tailoring using networks of migrated relatives in Southern parts of the country (e.g. for accommodation).¹⁰³ Remittances flow from urban areas to the village but this is not necessarily the case for migration is used as a strategy providing

¹⁰² Chop bars are small stands by the road side where cooked food is sold or small street restaurants (comparative to *bonnes femmes* in francophone Africa)

¹⁰³ Although men also rely on such networks, women rather seem to rather follow related migrants (siblings, husband) than pioneer migration. Women also migrate to help related families with their young children.

remittances as well as strategy to relieve the burden within the village compound without supporting it with remittances (also compare Tripp 1981: 16).

Property income, such as rent, is not common in the village. Land tenure and the service of ploughing someone's field usually take place within the context of social relationships established through descent, marriage, or neighbourhood. It is seen as part of local exchange relationships, which include the exchange of food items or small amounts of money at occasions like field preparation and harvest.

Sirigu is in direct contact with external foreign donors, especially NGOs and individuals from the Netherlands and the UK. This offers some opportunity for development brokerage, and the few people acting as contact persons or community mobilizers for NGOs also generate income in cash and kind (see chapter nine).

6.3. Household water uses and water needs

6.3.1. Around the compounds

A number of productive activities for the household subsistence are based on water. Table 20 shows that not only gender but also age is meaningful in the research context, e.g. boys do not own cattle but are responsible for their water needs. Many activities have female and male equivalents (livestock rearing, handicraft, construction). Despite this gendered water needs can be distinguished. Women need more water for domestic activities than their male counterparts, especially for food preparation. Men tend to need larger quantities of water for livestock rearing than women. Hence, there is no absolute contrast in water need but rather a bias towards domestic water needs of women and livestock rearing requirements of men. Cleaver and Elson have stated a "*major [gender] difference in the use of water resources for 'productive' and 'domestic' purposes*" (Cleaver and Elson 1995), which the field data supports only to some extent because the kind of activities are similar but rather differ in detail and scope.

Table 19 Water uses at compound site

Female activities		Male activities	
Girls	Women	Men	Boys
Domestic activities (cooking, food processing, washing, cleaning)		Domestic activities (washing)	
-	Livestock rearing (Fowls, goats, pigs)	Livestock rearing (Fowls, chicken, goats, cattle, dogs, pigs, donkeys)	Livestock herding
-	Handicraft (pottery, basket weaving)	Handicraft (leather and iron works)	-
Fruit trees cultivation			
Plastering and decoration of houses		Construction and repair of houses	

Source: Field data, 2004

6.3.2. At the market

The market place serves a growing number of people as their homestead, which implies, that most water needs as presented at the compound site also occur at the market. Additionally, specific activities are performed at the market site. Several studies show that women often own micro-enterprises, which require small amounts of water on a regular basis. The study rather suggests that it is both men and women, running and owning such micro-enterprises. It was true that some activities were markedly female activities. Others were markedly male activities. The reason for that is the extension of household activities to the market for cash generation. The gendered labour distribution within the household is reproduced in market activities.

What becomes obvious from the data is that micro enterprises and economic activities at the market solely or mainly relying on water as a resource and not too much on other financial inputs (e.g. for cooking ingredients, firewood) were a female domain. The activities were the sale of drinking water (in contrast to the sale of industrial drinking water sachets), the production of ice blocks and water carrier business. Only few women (but also only few men) running successful enterprises could afford a connection to the electricity grid and own fridges and freezers. The sale of cool water was an activity, which was pursued by many trade women, because it does not require any additional financial input.¹⁰⁴

¹⁰⁴ "Cool water" is fetched from the boreholes and cooled down in big clay pots.

Table 20 Water uses at market site

Female market activities		Male market activities	
Girls	Women	Men	Boys
Small-scale food trade (cooked dishes).		-	-
-		Slaughtering and meat preparation	-
Production and sale of snacks (<i>kulikuli, koko, etc.</i>)		Production and sale of snacks (<i>kebab</i>)	
-	Production and sale of millet beer and liquors	-	-
Production and sale of local non-alcoholic drinks			
Drinking and food bars, fetching, packaging and sale of ice water ¹⁰⁵ or sachet water ¹⁰⁶ (wage labour)	Drinking and food bars, sale of ice water and sachet water (ownership of business)		Drinking and food bars, sale of ice water and sachet water (wage labour)
Sale of ice water on commission base	Fetching, package and sale of ice water, ice blocks	-	-
Fetching and sale of cool water		-	-
-	Water carrier	-	Water carriers
Hair design			
-	Production and sale of handicraft (pottery, basketry)	Production and sale of handicraft (leather works, iron works, carpenter)	-
-		Construction work (brick moulding, construction plastering)	
-		-	Transport business (washing cars, mechanics)

Source: Field data

In comparison to compound based water needs and fetching pattern, many resemblances can be stated. Again, some gender specific complementary labour distribution was observed. The predominant role of women in drinking water production and sale as well as in water carriage business can be interpreted as an extension of domestic responsibilities for drinking water on compound level as well as an extension of the female water fetching pattern, which is characterized by the provision far beyond individual needs and on behalf of other people (see chapter eight).

¹⁰⁵ "Ice water" is fetched from the boreholes and cooled down with either fridges or freezers or with ice blocks.

¹⁰⁶ "Sachet water" is packaged in Bolgatanga, Navrongo or urban centres down South. The 0, 5 l or 0, 75 l packages are sold under different brands. Sachet water is understood as showing higher water quality, although cases of contamination have been discussed in Ghana (Dodoo et al. 2006, Obiri-Danso et al. 2003).

Picture 8 Food sellers at the market



The women prepare Kenkey, a staple food made of maize. Water is not only required to prepare the food (a mixture of fermented maize flour and water is boiled) but also to package the portions. Dry leaves of maize are washed and soaked in water (aluminium basin in front) before being wrapped around the Kenkey balls. Leafs are collected from the customers after the meal, dried and reused many times. Water for commercial purposes is either transported and stored in market drums (as the red one seen in front) or stored in locally produced, heavy clay pots, which have the advantage of automatically cooling the water. Water is fetched with tin or plastic mugs (see behind).

6.4. Livelihood diversification

6.4.1. Micro-enterprises and small water enterprises

Compound houses which solely rely on farming, livestock rearing and handicraft for subsistence are rare in today. The diversification of income-generating activities is a strategy to meet environmental challenges. Non-farm activities depend less on environmental conditions even though not being independent. Handicraft, such as weaving mats or basketry build on natural resources, which may be available only seasonally. Pottery is easier burnt when dry firewood is available and no rain or wind disturbs the fire. Brick making depends on dry weather, too. Latter activities rely on water and all year availability of water from boreholes led to the possibility to pursue theses activities also in the mid and end of dry season (which consequently means, for example, that more firewood is probably cut in dry season for pottery than before the boreholes were introduced.). Other activities are completely unrelated to weather events in their resource input and working time, such as tailoring. Productive activities do not contribute to cash income in all cases. They are also basic for providing shelter, food and household items. Some micro-enterprises constitute at the same time livelihood and provide basic infrastructure for a functional market, which are unthinkable without the sufficient supply of food and water to the traders and costumers.

Women would not be able to pursue market activities due to time constraints without being able to buy cooked food on the market.¹⁰⁷ But short supplies of cooked food and self produced drinks show up each market day.

Many villagers think that with the introduction of the piped water supply, the situation will improve and the market would also attract more traders and costumers. *“First the water comes. Then the District Assembly will feel the need to build the road from Burkina Faso to here. When the trucks come over Sirigu instead of Paga/ Navrongo, they have to expand the light [the electric grid] and provide more infrastructure”*¹⁰⁸ Moreover, the water system is expected to enhance Sirigu’s position in the competition over the capital status of the new district Kasena-Nankana East, which carries wide-reaching implications for local infrastructure and employment opportunities. Hence, in the local perception, more water available in the market area, will enhance the importance of the market, lead to crucial changes of public infrastructure and improve local livelihoods by providing more employments opportunities.

Micro and small enterprises contribute significantly to employment in Sub-Saharan Africa (Davis et al. 2001). A study conducted in two small towns of Uganda found that improved water services by the introduction of a piped water system were less important for such enterprises than expected by policy makers, who constantly state the positive impact of water development projects on micro-enterprises. Owners of micro-enterprises communicated the need for an improved water supply and shifted to the improved sources once they became available but in fact, they neither increased nor changed their water use; they neither pursued household connections nor showed the same willingness to pay for such services in comparison to pay for improved household water supply (Ibid. 2001). The average quantities of water used by micro enterprises were surprisingly low and inelastic; sales of foodstuffs, dry goods and services were recorded to require only ca. 20 – 40 liters per day and enterprise. Restaurants and lodges used 120 to 100 liters daily (Ibid. 2001: 1759). When water supply was bad, owners of micro enterprises thought it was a constraint to their enterprise. Higher prices for water but also the customer’s perception, such as cleanliness, longer and more reliable opening times, were of crucial importance to them. *“...in terms of water use, many [micro-enterprises] look more like households than large commercial or insdustrial firms, and they are probably best viewed as extentions of household production units.* [Micro-

¹⁰⁷ Many households do not cook on market days, especially when the woman runs a business there.

¹⁰⁸ Mrs. Bibiana (midwife), informal conversation, 2005.

enterprises] *need water for drinking and basic cleaning, just as household do*” (Ibid. 2001: 1765). The requirements of water as resource input for micro enterprises seem to have been neglected by the study. For no reason given, micro and small water enterprises were not included in the study, even though water vendors (private vendors and sale of water at stand pipes) were mentioned. This is a typical observation, as water vendors appear in the literature as resource providers (often with a negative connotation for they charge too high prices) but not as income-generating activity, which may support the livelihood of a household.

According to a study, which was conducted in Accra, small water enterprises are all secondary and tertiary suppliers of water in Ghana, excluding the GWCL. *“These include water tanker services, motorized cart operators, domestic water vendors (which includes neighbor sellers), water sachet sellers and those who deliver water from the source to the end user.”* (Sarpong and Abrampah 2006: 11). In the context of this study, it is only water sachet sellers/ drinking water sellers and water carriers, who are of importance.

The following paragraphs will elaborate on what specific role household water plays in the diversified agro-pastoral livelihood strategy. Furthermore, it will conclude what water needs derived from it. Another question is whether a divergent primary interest and different priorities in household water between the sexes can be concluded from gendered patterns of water use and water need.

6.4.2. Productive uses of water - subsistence

The provision of water for livestock is an important productive use of the water, which is drawn not only from the small reservoirs and streams but also from hand pumps. Smaller livestock, such as poultry, pigs and goats drink water, which is carried mainly by the men and children to the compound houses. Men dominate livestock trade and women have to send their husbands or sons to sell their animals (men send their wives to sell grain). While most households use livestock rearing and trade as a secondary economic strategy, some households have made it their major income source besides farming.

Box 13 Case study: Livestock rearing

Abinkema *yire* is situated at ca. 150 meters distance from the Market Square borehole. Mr. Abinkema rears 84 chicken, 20 guinea fowls, two ducks and six cattle. In former times, he used to have more livestock but water and fodder are not abundant, he says. When Mr. Abinkema needs money he sells some hens and eggs when he has plenty. The cattle are kept for bride wealth exchange and are not for sale. Mr. Abinkema is rich as measured by Sirigu standards but his house gives a rather poor impression. The water provision of the compound completely depends on the Market Square handpump during the dry season. They pay regular compound fees of 2.000 Cedis a year. In dry season, Mr. Abinkema requires two drums (each of seven basins) of water each day for his livestock and a woman from his house is solely engaged in fetching one drum of water as it is time consuming. The second drum is brought by the schoolchildren of the house who go after school or at night to the borehole. They need very long to fetch a drum of water because after fetching a basin, they have to wait long before they are allowed to fetch the next one. In wet season, the cattle are taken to the river and the poultry is given rainwater. Mr. Abinkema says that he would be better able to take care of the compound when more water was available. He needs more for construction and for a small vegetable garden. According to him, to rear more livestock, not only more water was needed but also more fodder, which is lacking due to the bad harvest.¹⁰⁹

The account shows that ca. additional 630 litres of water are daily needed by this particular household to pursue livestock rearing, which provides the main source of livelihood. Fetching water consumes much productive time during dry season; actually it requires the labour force of two adult women (one is replaced in the house by child labour). At the same time, it does not require additional financial input to receive water.¹¹⁰

The amount of water used for pottery, handicraft and local art (paintings, leather work etc.) are difficult to estimate because the activities are usually done step-by-step and the water needed is fetched from the clay pots, in which all the household water is stored. Pottery is also done on a sporadic basis. Some stages demand for only a calabash of water, some even less.¹¹¹ It is only for the production of bigger vessels for the market, that the potters fetch additional quantities of water. Women, who are member of SWOPA use water from the hand pump on the SWOPA yard, which makes the facility attractive to them.

The desire for irrigated land or at least a better water supply, which allows dry season gardening, was high: *“People are ready and happy to make gardens in dry season.”*¹¹² However, only two compound houses were observed in Sirigu, which had a very small dry season garden (ca. 5-6m²). One of these belongs to an old man, who is also responsible for the borehole site. He lives at a few meters distance to the borehole and fetches water from the gutter to water his few vegetables. The other one is relatively far from the borehole and the

¹⁰⁹ Mr. Abinkema, interview summary, November 2004.

¹¹⁰ This, of course, will change once the piped water supply is established.

¹¹¹ On Nankane pottery see Kost and Callenius (1994: 74-76). Women from Akabange *yire/ Abeleteo*, interview notes, January 2005.

¹¹² Mission dam committee, interview transcription, 04.01.2005. The people living close to the mission area have experience in dry-season gardening because a community garden was farmed there until the wells, which were used for its irrigation dried off in the late 1970s.

effort required to water the few plants is high. Each day, four to five extra basins (ca. 180 – 225 l) had to be fetched and carried over a distance of 300 to 400 meters by the children of the house. The compound head was working for the pump committee Atonadoone, whose borehole is used by 65 compound houses and where users face long waiting times during dry season. The Heritage Day Care School started a small donor-supported project of ecological gardening in 2005, which is irrigated from the school hand pump. The Mission maintains a garden, which is watered with rainwater from a cistern and piped water from the mechanized orphanage borehole.

Picture 9 Borehole irrigated dry season garden and dish pottery



The cultivation of single fruit trees next to the compound houses is more common in the village even though most of the compound houses do not cultivate any. One of the constraints is again water and the time and effort needed to water the seedlings during the first dry season (ca. 2 buckets a day). Most of the seedlings simply die because people overestimated their work capacity or time and plant many seedlings at the same time. This strategy often results in the death of all seedlings. The second constraint is related to a local belief that a compound head will die as soon as the tree, which he planted, will carry fruits. (Some *yidaama* try to avoid this danger by letting person who lives far from the compound plant the tree in front of their compound house.) Both these constraints complicated the tree nursery and planting project run by the NGO NABIO, which withdrew rather unsuccessfully from Sirigu in 2005 after some years of operation. The density of the tree cover has a direct impact on the livelihood and well being of the people as well as an indirect impact because it affects the local environment, (such as evaporation rates. At the Mission area, a large number of exotic trees (e.g. Mangoe, Neem) have been planted and small tree orchards (e.g. Teak) are maintained in some village sections to provide wood for construction.

The construction and repair of compounds depend very much “*on the access to common property resources, such as water, grasses and wild trees, resources, which [are] central to women’s gathering and domestic maintenance.*” (Whitehead 2002: 589). Whenever possible the construction of new buildings and repair will be organized and accomplished when water from surface sources is still available. The construction of a Nankane compound house follows three phases: the production of mud bricks, the construction of new and the repair of old buildings, and plastering of the structures. All three phases require a lot of water but cannot be done in wet season because the materials must dry out completely for providing stability and longevity. The first phase takes always place before the onset of the single source situation (see chapter five) as soon as the harvest and food processing is finished at the household level. The water used is fetched from the streams or the riverbeds by boys and young men who either mould the bricks besides the riverbed, if the soil there contains clay or they push it in market drums on donkey carts to places where the appropriate soils are located. One market drum of water (ca. 315 l) is needed to mould ca. 50 bricks and hundreds of bricks are required for a building.¹¹³ Rainwater from the last rains can also be used for brick moulding because the time period between the rains is long enough to allow the bricks dry sufficiently.¹¹⁴

Picture 10: Construction of compound houses



Young men and boys fetch water with market drums and young women with basins from boreholes or small reservoirs. It is then brought to the houses where water is stored for construction and repair, which is done by the men of the house together with their friends and neighbours, whereby it is almost exclusively women who fetch water for plastering which is again a female task. Construction and plastering are group activities in a neighbourhood or

¹¹³ M. J. Aduko (construction worker), interview notes, December 2004, Mr. A. Agere, interview notes, December 2004.

¹¹⁴ Storing rainwater for that purpose is theoretically possible but not practical due to the limited number of storage capacities available.

village section and participating or calling for such activities are important strategies to ensure the availability of labour force.¹¹⁵ Single source situations provide a timeframe for planning. When starting too early, the bricks might be dissolved by the rains, when starting too late, the water from surface sources might not be sufficient for brick moulding, when ending too late, the rains might destroy the bricks or structures. This calculation is not to be done at household or compound but at community level because everybody depends on additional workers for their own construction project. It requires a precise knowledge of seasonal water availability and coordination of labour force within a village sub-section. The introduction of cement has eased the timeframe a little because cement bricks, so-called blocks, stand rains after being dry.

6.4.3. Productive uses of water - micro enterprises

It is a false assumption that it is only women who need water for market activities, even though their share in the production of food and drinks for sale are surely higher than those of men. Men use water for livestock sale and meat production, for running food stores, drinking bars (where both sexes work and produce food items) as well as for offering their services in the construction and transportation sector.

Box 14 Case study: Production of food and drinks

The kebab seller uses water for cleaning the tables and equipment, the preparation of the meat and the hands of costumers. On market days, Mr. Abagna can use 5 to 6 goats and up to 7 or 8 basins of water (ca. 315 l or 360 l). On non-market days, it is only 2 to 3 goats and 5 basins (ca. 225 l). The water is partly used at his shop and at the slaughterhouse. For this, he sends a water carrier there. Mr. Abagne owns only a clay pot that can hold 1, 5 basins of water (ca. 70 l). He buys the water from the water carrier for 1.000 a basin, who brings it from the Market Square borehole. If they cannot bring the water in time he borrows water from other food sellers (*peŋe ko'om na*). Costumers may also drink from his water.¹¹⁶

Mrs. Atabo is brewing and selling millet beer in front of her house in the market. Her *daam* production is one of the largest there, and she wishes to increase the production. The main obstacle for this is the limited access to water and limited number of people who work as water carrier. The *daam* production and sale takes place in a three days pattern based on the three days market pattern. Two days before the new market day, two women start fetching water. Both of them fetch ten basins each (ca. 450 l) and are paid 7.000 Cedis each. The day before market day, Mrs. Atabo needs another four basins (180 l) in addition for washing and cleaning. The same amount of water is then used again on a market day for the same purpose. These eight basins, she is fetching herself. So, calculating all together, she needs 28 basins (= 4 big market drums, ca. 1.260 l) all three days for her business alone.

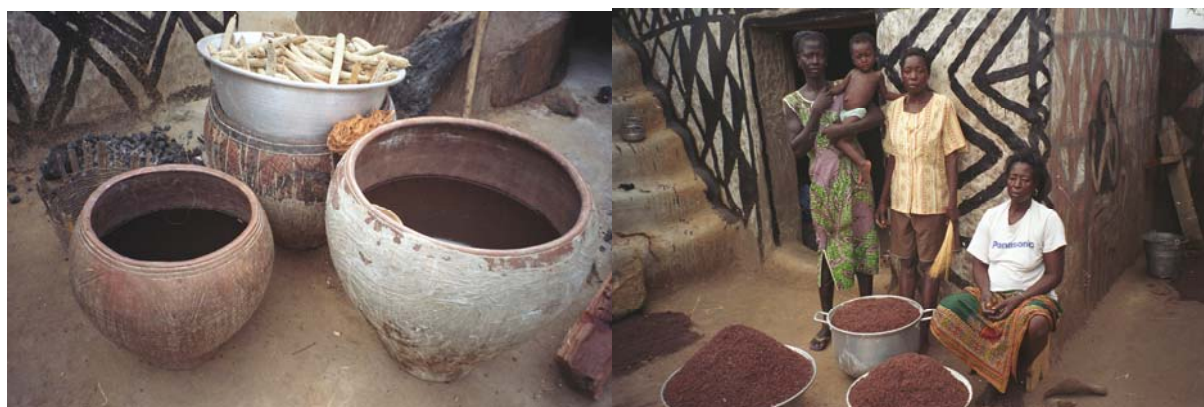
¹¹⁵ Now on, a group of local women artists can be hired from the SWOPA against the payment of a fee to the NGO as well as the provision of food and drinks to do the wall plastering and painting. This modern form of labour hiring aims at the conservation and maintenance of the wall paintings, for which Nankane is famous of and which were rarely been before SWOPA revitalised the tradition in the village. Nowadays, increasing number of painted compound attracts eco-tourists. Eco-tourism carries some potential to become a new livelihood activity in the village (sale of handicraft as souvenirs, guided compound tours, workshops).

¹¹⁶ Mr. Abagna, interview summary, November 2004.

Mrs. Atabo pays only the house user fees of 2.000 Cedis a year to Market Square pump community. Her water carriers do so, too. The money earned by *daam* brewing is her only source of income she says. (She was not able to name an amount.) It is mainly used to take care of the daily needs of her three children staying with her (two others are in Accra with their father) and herself. She calls her business a hard one but does not see another option for herself. Increasing the amount of *daam* brewed would improve her economic situation because the demand is bigger than the supply and the market is expanding and will attract more customers in future.¹¹⁷

Two butchers work in Sirigu market. For killing and roasting a goat two basins of water (ca. 90 l) are needed, for a pig five basins (ca. 225 l) and for cattle only two basins (ca. 90 l). On market days, Mr. Asampana can slaughter and prepare up to nine goats. He uses two market drums on a market day (also for cleaning and bathing himself). The water has to be provided by the owner of the animals who buy it from water carriers. In non-market days, Mr. Asampana fetches the water himself and sells it to the owner of the animal for 1.000 Cedis a basin. He only pays the regular fees of 2.000 Cedis a year to pump community Market Square. The prices (excluding the water cost) for his work are 2.000 for slaughtering and 7.000 for slaughtering and roasting.¹¹⁸

Picture 11 *Daam* brewery



While the example businesses are rather large scale when measured in village standards, most of the food and drink sellers in the market are running businesses much smaller than this. Some women require not more than two basins (ca. 90 l) on a market day to cook and sell food or to prepare drinks, such as local ice-cream made from baobab fruit, ginger drink or liquors. Other businesses under that category are *kuli kuli* production (a kind of hard biscuit made from groundnut paste), which is done professionally and occasionally by many women, the production of *coco* (a light porridge) and selling *kosi* (beans cake). Hair design also belongs to this category. Depending on the product and scope of production, one to six basins of water were required in a market day.¹¹⁹ Hence, the numbers given by Davis et al. (2001) seem to be too low. Some of the businesses seem profitable; many others are rather 'survival businesses', supplying the households with not more than the basic soup ingredients. Small-scale food vendors were willing to pay 20.000 Cedis (ca. 2 Euro) for the repair of the borehole they used but also made it very clear this that would cost them more than a week's profit (= 3

¹¹⁷ Mrs. Atabo, interview summary, 19.11.2004. On *daam* brewery also see Kost and Callenius (1994: 77-80).

¹¹⁸ Mr. Asampana, interview summary, December 2004.

¹¹⁹ Mrs. A. Akapoore, Mrs. Atapolma, Mrs. N. Abane and many other market women (usually three interviews for each occupation), interview notes, December 2004/ January 2005.

market days). Locally, people, who sell food only occasionally and during market days were considered to be small-scale businesses, while the ones working each day were perceived as larger businesses but less significant than daily food sellers with a fridge. This differentiation resulted in different payment schemes for borehole use but the actual consumption rate was not considered. This was also because women owning large businesses wanted to keep the amount for user fees low and argued, *“They who sell food have a lot of debts to settle. After they are mostly left with virtually nothing.”* *“Food selling has no profit nowadays. Even those, who practice it daily, are complaining.”*¹²⁰ Despite the hot debates, the borehole fees which different categories of micro-enterprises were expected to pay remained very small and did not show much variation.

6.4.4. Productive uses of water – small water enterprises

A number of women directly earn their cash income with water, meaning they are small scale water entrepreneurs. They can be distinguished into two categories: (1) water carriers and (2) the water vendors. Schoolchildren may also contribute to the income of their household by working as water carriers. At the Sirigu market, five women work individually as water carriers. They fetch water from one of the boreholes at the market site and carry it in basins to the shop owners who have placed their order for water. (As mentioned above, some additional women are working as water carrier for a specific food seller or *daam* brewer but their work also includes other activities such as cooking, cleaning or selling food.) The women are paid per basin and walk around the market before and during market day to offer their services to different people. However, water carriers are in short supply as most women in the village do not want to engage in this work, and it seems that those who do lack other choice. All women working as water carrier have one thing in common that they are the sole cash earners in their household due to different reasons, as having a sick husband, having a migrated husband, or being unmarried, and have to provide their children with food, school fees and other things exclusively on their own. The work is hard and most of the work is done at night in complete darkness because the hand pump is over-crowded during day time. The payment is made the following evening when the stores close and the costumers have consumed the water. When fetching larger amounts of water the regular price for carrying a basin (1.000 Cedis, ca. 0, 1 Euro per 45 l) is denied to the women and they are paid 20-30 % less per basin. Sometimes, payments are not made at all. Still the water carrying business enables the women to earn

¹²⁰ The categories of businesses were discussed at a borehole meeting held at the Market Square, translated transcription, 21.12.2004.

between 30.500 and 43.400 Cedis a week (ca. 3 to 4, 3 Euro).¹²¹ *“Those who fetch water for sale get more profit even than we, who prepare food and sell it on the market”* was claimed at a borehole meeting although the image lacked some realistic estimation *“she is able to fetch ten drums full.”* Water carrier consumes too much time and physical strength. It is not the profit but the mode of payment and the problems at the borehole that are unacceptable to most women, and this is the main reason for that most women avoid this business. Schoolchildren tend to fill this gap and carry water in market drums on donkey carts from the boreholes to the shops. However, for they have to work as a group, they have to share the money earned. The children earn about 3.000 Cedis per market drum (= 6 basins, 500 Cedis per basin), which is also underpaid taking into consideration the regular price of a basin filled with water. Employing children is thus cheaper than employing adults. The bargaining position of children and the category of women, who work as water carriers is weak compared to other members of society. The shortage of water carriers may not improve it much for customers may argue that they will find other children to work for them.

Box 15 Case study: Water carrier business

Mrs. Lamisi is from Kotoko and followed her husband four years ago from Accra to his village. He is weak and has some handicap on his legs. Mrs. Lamisi is the only cash earner in the household, which is also farming. Although Mrs. Lamisi seems to have integrated well in Sirigu by learning the local language decided to work as a water carrier because, she from Sirigu and therefore does not know how to do other work. Mrs. Lamisi fetches water often for a particular *daam* brewer and for another woman who owns a kiosk. The brewer pays her only 700 Cedis per basin. On a market day, Mrs. Lamisi fetches up to 15 or 16 basins for the market, carrying her baby on the back. On non-market days it is only six basins. Because she lives in Basingo Tendoono and pays the water fees of 5.000 Cedis yearly to the pump community there, she also fetches from the Tendoono borehole while at work. The waiting period is long and she has to queue with the others. Sometimes, some woman allows her to fetch water before her turn but often the women who fetch for the households are in hurry and do not tolerate this as they know that the water will be for the market. It happens each day and at times she goes home without water. To avoid this, Mrs. Lamisi has placed a big clay pot next to the borehole, in which she can store three basins of water which she fetches at less busy times, mainly at night.¹²²

Even though the women who work as water carriers have a profession, which is not considered desirable by the others, they are respected for being strong and very hardworking by other women who acknowledged that *“She is always running up and down the whole day. Her back is paining, she never sleeps because she takes care of her children.”* On the other side, they usually do not get supported when waiting in a line for fetching water. Especially during the dry season, when waiting times are prolonged up to five hours, the water carriers

¹²¹ For the calculation, a week was assumed to have two market and five non-market days. (The alternative would have been to calculate three market days and four non-market days. This difficulty stems from the incoherence of the seven days Christian week and the local three days market pattern.) The numbers are maximum rates based on the statements of several water carriers.

¹²² Mrs. Lamisi, interview summary, December 2004.

get desperate because they cannot do their work, leading to arguments and fights at the hand pump. Their option to escape the crowd by fetching from midnight until early dawn is also under threat because many others also shift to such times. The Tendoono hand pump is locked during daytime because of *“troublesome women who come and fetch for the market and are very aggressive. They insult our women and like fighting.”* The problem of relying on schoolchildren for fetching water is connected with waiting periods as well. They can only fetch after or before school when the boreholes are unlocked and waiting period is long, which leads to short supply of water at food shops, which then stop production and close for the day, irrespective to the high demand in food.

Water vendors in Sirigu market are specialized on drinking water; they split into cool water sellers, ice water sellers and ice block sellers. There is no market for water vendors, who sell large water quantities for domestic purpose as in urban centres of the country (see, for example, Sarpong and Abrampah 2006). This is because the hand pumps are accessible for everybody (see following chapters on water rights and water allocation). The sale of small amounts of water for drinking is an activity, which many women pursue as additional activity while trading vegetables or other petty trade items. The sale of ice water is limited to a handful of food sellers, bar owners and traders whose house is connected to the national electricity grid and who own fridges or deep freezers. Some girls work for them on a commission basis carrying water sachets for sale all over the market. Other girls fetch water themselves, buy ice blocks to cool it, package it and sell water independently.

Women who sell cool water from clay pots fetch water during the evening and night before the market day from the borehole of Market Square pump community and store it over night at the market, where nobody touches the water.¹²³ Most women fetch around three basins (ca. 135 l) for a market day in the dry season, which is then sold for 100 Cedis per cup. The water for sale always comes from the hand pump, which is also used by the vendor for their domestic use. Therefore, only women, who live in and around the market area, can actually sell cool water. Practically, some free-riding occurs at the Market Square hand pump because there is no way to limit the access. Selling water allows significant earnings additional to the money women generate through petty trade in food items, such as dried fish, salt, groundnut or millet. Water is usually sold or used completely, but any remaining water is kept till the

¹²³ The worst incident and only reported water theft, which happened, was that other market women used some small amount to drink or to wash their faces in the morning. When caught by others, they were told not to do so but no sanction was applied when it happened once. Mrs. M. Afoya, Mrs. A. Akalogire and other women from their compound, interview notes, December 2004.

next market day or used for cleaning. Market women are obliged to give out water for free to some people, such as relatives and friends. Thus, not the whole quantity can be sold.¹²⁴

Ice water sellers are less obliged to give water out for free as the sale of ice water demands for larger investment, such as for electricity supply, or the fridge, or the plastic bags, including the payments to the water carrier. It may also include the buying and transport of industrially produced sachet water. Some ice water sellers also sell ice blocks to girls who make ice water by carrying the self made water bags and the blocks in a cooling container over the market for sale. Factory produced sachet water is less popular than the local ice water due to its higher price (500 Cedis) and its bad taste.

Box 16 Case study: Water vendor business

Mrs. Alice trades at the centre of the market and owns the biggest ice water business in Sirigu. She sells ca. 1.200 portions a market day, which is an equivalent of four market drums (ca. 1.260 l). The money collected from it is 150 Cedis per portion and thus ca. 180.000 Cedis on a market day (ca. 18 Euro).¹²⁵ The sale on non-market days varies the income varies as well. However, due to the expansion of the market, the demand is increased. The vendor needs two freezers and many plastic bags to fill the water in. One such bag costs 26 Cedis and the labour to fill the bags with water is done by herself and her children. Mrs. Alice fetches and carries water herself with a donkey cart. Sometimes, her brother does this work for her. When asking schoolchildren to carry water, she says she would need to pay them 6.000 Cedis and adults refuse doing this job. Water carriers are short supply. Mrs. Alice's house is member of the pump community Tendoono, whose access is strictly restricted to members. She may fetch water there due to her compound membership. The compound pays 5.000 Cedis borehole fees per year. The vendor expects her business will grow once she has her own tap, because then she will be able to sell more water (refill the empty freezers immediately) and perhaps also sell water per bucket to other market women.¹²⁶ Although the business is comparatively profitable and expanding, she argued during the borehole meeting, *“Those who store water in the fridges for sale actually, get no profit at all. [...] This is because they pay very high electric current. Moreover, they don't even have people to sachet the water and sell it for them.”* The last statement contradicts my own observation of a woman who requested to work for Mrs. Alice but was refused.

Small water enterprises are not a recent phenomenon as can be seen in a description of economic activities at Sirigu market in March 1976, which refers to water vendors but not to water carriers. By then, water provision at the market site relied on the stream, a small dam and a newly established hand pump. During the day of observation, three women and seventeen girls sold water for consumption (Tripp 1978: 127). *“Young girls get their start in trading by drawing water from the river bed or the dam and selling it by the calabash to thirsty market visitors. They can earn a few pennies this way, although it is just common to get small kola nut or a handful of groundnuts or grain in exchange for the water. A few*

¹²⁴ Ibid.

¹²⁵ This information stems from the water vendor. According to my calculation, an amount of 189.000 Cedis is earned if a portion was 1 liter but in fact it is only 0,5 liters. The income thus doubles to 378.000 Cedis per market day (ca. 38 Euro).

¹²⁶ Interview summary Mrs. Alice, 11.11.2004.

women who are in particularly difficult straits may sell drinking water as well.” (Ibid. 1978: 130).

Additionally, people run businesses, which would not be possible without water, even though the resource input is very low. Still, they are at risk of being ignored. Among them are hairdressers, whose business demands mainly financial investments in equipment (cosmetic products etc.). Their requirement of one to two basins of water on a market day are either brought from the river by the hairdressers or bought from water carriers. Other examples are carpenters or owners of pharmacies. This water is fetched by either the spouses of the shop owners or by themselves and not distinguished from household water when living at the shop site. The growing transport business is also in need of an increasing amount of water for washing the vehicles and cooling the engines.

6.5. Conclusion

The research site is a poor village with little socio-economic stratification. Local agro-pastoral livelihood is prone to weather events, which lead to too little harvest and a regular period of food shortage from March to July. The two main strategies to meet the environmental conditions were the adaptation of farming techniques and the generation of cash income through activities, which complement the overall agro-pastoral livelihood strategy. Although subsistence is still one of the main characteristics, money has gained importance to provide industrial items for the households and to receive medical, educational and transport services. The need for and use of money is gender – differentiated. Because cash crops were of minor importance at the research site, livestock trade and the market activities of women and men provide the most important sources of additional income. As a tendency, more money has to be spent on food security and lacks for other purposes. “*More money, more poverty*” summarizes Whitehead (2002: 594) this paradox. Female cash-income was found to translate directly to better nutrition status and health of their households. Income generated by men is rather invested in means of transport and livestock, which can be liquidated in times of need. Saving has also been observed with women who have control their income and do their own budgeting (compare also Tripp 1978: 134). But it is a male duty to bring the compound over the lean season and respond to expensive social obligations. The diversified activities applied by men seem to generate more income than activities of women (Whitehead 2002: 586).

The analysis of other crucial factors, such as opportunities for credit, the dependency on market prices as well as the quantification of the water benefit is beyond the scope of this study. What can be clearly stated instead is 'no water, less rural micro enterprises'. When people have less water, they reduce productive activities in favour of indispensable domestic water uses. Not only the availability of water but also its transport to the market has been identified as a constraint. But it seems important to note that it is uncertain whether existing micro-enterprises will increase productivity, or extend once the Sirigu small town water system is operational – even though such statements were frequently heard when conducting the market interviews. The short supply of water carriers is determined by the marginalization and bad working conditions associated with the profession, it is clearly gendered profession.

In this particular case study, water only has a price when its provision is attached to cost additional to the borehole fees (such as working time for waiting, fetching, carrying, packaging, selling); it gets commodified through a process of production. Such price is locally accepted as it is perceived as the price for the service rather than the price for the resource. Even though the implementation of water tariffs was already discussed in community meetings and a price of bucket projected (100 Cedis), the water users have shown not much concern or objection yet. This is due to the fact, that some gave up hope that the small town water system will finally be implemented. Further, I observed a large knowledge gap which manifested in people not knowing the timeframe, design, and capacity of the planned piped system. Some villagers I met in the market did not even know there was any water project on-going. The local perception was dominated by the view, that more water will bring improvement, without considering the cost of it at all.

It is important to note, *“a focus on men’s and women’s priorities separately fails to recognize the need to balance water use priorities within a household”* (Cleaver 1998: 351). Men and women share interest and priorities in certain issues as much as they face contradicting interests and priorities between them. Interest and priorities are not constant but may change over time. *“It is therefore not very helpful to see women’s interest as entirely different from men’s nor to see the household as having uncontested unitary interest.”* (Ibid. 1998: 351). This divergence in interest was observable but of lesser importance than claimed in the drinking water literature. The labour and resource use contributing to the household living standard was characterized by gender complementary. Because gender acts as an organizing principle for labour, households with both male and female labour contribution are able to pursue a wider portfolio of economic activities. Hence, households, which lack one part of the

gendered labour contribution, are more endangered to experience destitution. The more diverse and big a household or compound is, the more are its inhabitants able to organize labour and benefit from different income-generating activities.

7. Local history of water supply and water rights

“Management of drinking water and sanitation by local communities is not a new phenomenon since they have been the main bodies responsible for the provision and upkeep of these systems for centuries.”
(Regallat quoted in Bacho 2001b: 7)

7.1. History of water and customary household water rights in Ghana

Many studies on rural water management focus on a particular improved water supply facility and are dually structured in a before-the-water-source-came situation and an after-the-water-source-came situation (e.g. Bacho 2001a). Previous or secondary water sources and the management of these are often not considered. This study is based on the assumption that only the totality of water sources with their particular management can give an informed insight on the local water right regime. Taking any water user community as starting point, one can reconstruct a local history of water supply. This history refers to the different water user groups, which have been organized around the household water supply over time. It aims at investigating water supply changes, the shifts in user group mosaic, introduction and failure of withdrawal technologies, and change in water rights.

Of course, the element water as such can be claimed to embody a history as was remarked by Bandaragoda (2000: 18) who referred to it as *“liquid history”*. He had a rather hydrological history in mind.¹²⁷ History of water in this work however will take the social aspects of water in the foreground because each water supply system is also assumed to be a social system. With regard to historical water user groups, some methodological problems emerge. Organizing the data according to historic phases and in consideration of only a particular village sub-section runs the risk of historic misinterpretation by introducing an evolutionist idea, such as the idea of a development from low-quality to high quality water sources with an increase of technical effort to acquire the resource. Oral history accounts are set into a relationship with present-day accounts and observations in other parts of the Sirigu to avoid such fallacies.

¹²⁷ Such history manifests practically e.g. in the pollution of water, which has gone through a factory or agricultural production before returning to natural watercourses. Liquid history refers to the way, taken by water in the hydro cycle. Usually, history of water is understood more generally as the historical analysis of research subjects (laws, companies, water sheds) related to water (see the homepage of the International Association of Water History: www.iawh.org).

The history of water in Sirigu is shaped by water development projects. The introduction of hand pump fitted boreholes to the research area does not yet display a strong impact on local water rights. But the paradigm shift from purely technical interventions to institutional interventions since the late 1980s under the WUP II program led to the occurrence of new water management institutions. This chapter will recapitulate the impact of institutional development on the local water rights regime; the questions addressed in this chapter are twofold: (1) How has household water been provided in the village and what are present supply facilities? (2) And how does the present local water rights regime look like? Which changes has it undergone within the past decades?

Academic literature often approaches rural household water management in a development-oriented way. Therefore, studies focus on formalized institutional arrangements and socio-economic conditions of water user communities, which either facilitate or constrain efficient management of the supply facilities (see for Ghana, e.g. Bacho 2001a). Some aspects of household water management are overlooked or not given appropriate attention; changes of water rights are often neglected. Water rights in drinking water or household water have been rather marginally worked on but an increasing number of scholars involve in this field for research. Studies, which included the management of different water sources into an overall analysis, were conducted in Tanzania and Zimbabwe (Cleaver 1998, 2001), Namibia (Niemann 2000), Tanzania and Botswana (Carlsson 2003) for example.

African customary water right regimes in household water suggest some specific characteristics, which were found in many African countries and societies. A review of ethnographic literature provides a good overview (Ramazotti 1996). The ownership of water resources in African countries is usually public and claimed by the nation state without having a direct or practical impact on local water regimes (Meinzen-Dick and Nkonya 2005: 4). This claim manifests itself in the national constitutions and national water laws. Originally and persistently, all people were and are entitled to water for primary uses. Another typical African feature of water right regimes is the inclusion of livestock in the general entitlement. Further, primary uses are understood in a wide sense, including productive uses of household water (Ibid: 2005: 4). This means that under the water right regime in the broader African context household water is usually connected to a public use right (see e.g. Niemann 2000, Meinzen-Dick and Nkonya 2005: 6). *“Typically [...] every person belonging to a community would have unrestricted access to water for basic domestic needs.”* also explains a study of customary water rights in Ghana, Mozambique, Tanzania, Uganda and Zambia (DFID 1999:

5). The notion of such a basic use right is very strong. This strong notion can also be interpreted as African human right to water. Use rights in household water are neither formalized, nor do they exactly define water quantities or right holders. Instead, they are an outcome of negotiation and therefore flexible in their definition and interpretation. Different property regimes, such as national and local regimes may overlap (Meinzen-Dick and Nkonya 2005: 4, 6). It is also typical that people aim at being right holders of several water facilities to minimise risk of non-provision when facilities fail to supply water. Decision-making rights for management of facilities are often in the hands of local authorities, individuals or groups, which have invested effort to build the facility. *“Although there are individual use rights in Africa, private water allocation rights are not widespread.”* (Ibid. 2005: 5). As a consequence of the basic right to water for primary uses, the right to exclude people from the access is also rather uncommon. Alienation rights are rather unknown in African customary water right regimes (Ibid. 2005: 4, 5). The transfer of water rights is not profitable to the former right holder.

A useful analytical difference was stated between water rights in groundwater, which is rather linked to communal or private property rights, whilst surface water is often linked to public property rights. An Africa- wide study argues *“Different rules apply to surface water and groundwater, with more scope for private ownership in the case of the later”* (DFID 1999: 5). According to the literature, the differentiation of water rights between groundwater and surface water can also be interpreted as the difference between natural water bodies versus created water facilities. It seems that human effort, such as labour or money results in ownership of the created facility. Well ownership is a typical example reported in a number of empirical studies in Africa (e.g. Niemann 2000, Toulmin 1992, Carlsson 2003). Individual or group ownership may result in private or communal use and decision-making rights.

Moreover, a differentiation between property rights in the resource and in the technical artefact is helpful. Although resource water is understood as a community property in most African water right regimes (Meinzen-Dick and Nkonya 2005: 5), use rights may be linked to the private ownership of the water supply facility. For example, groundwater may be considered community property but the well is linked to individual ownership. The well owner does not own the resource but only the artefact, which is needed to draw the resource. Hence, the use right does not concern the resource but the artefact. Another interpretation is that the owner of the artefact holds a right to allocate water and holds individual property rights in both the resource and the artefact (Carlsson 2003).

Writings about the customary household water right regime in Ghana fully reflect the general African findings. “*Water in its visible form – as sea, rivers or lakes – cannot be privately owned. It is unclear whether it is public property.*” wonders Mensah (1998a). His doubt is due to the fact that surface water is public property in some Ghanaian societies, whilst in others it belongs to the king or “*is said to be ownerless. Generally, a private person will never be allowed to purchase or own a surface source of water.*” (Ibid. 1998a: 9). At national level, the Ghanaian constitution clearly defines ultimate state ownership of all water resources of the country in chapter 21 “Lands and Natural Resources”.

Box 17 Article 257/ 6 of the Ghanaian Constitution

Every mineral in its natural state in, under or upon any land in Ghana, rivers, streams, water courses throughout Ghana, the exclusive economic zone and any area covered by the territorial sea or continental shelf is the property of the Republic of Ghana and shall be vested in the President on behalf of, and in trust for the people of Ghana. (GoG 1992)

Another article of the same chapter determines the establishment of commissions for the management and utilization of the particular resources and the co-ordination of concerned policies (GoG 1992, Art. 269/ 1). This article was the legal precondition for the establishment of the Water Resources Commission (WRC). Based on the recommendation of such a commission, the parliament may prescribe and authorise any government agency to approve the grant of rights, concessions or contract in respect to water or any other resource (Ibid. 1992, Article 269/ 2). This clause has been implemented in form of the CWSA in the context of drinking water. According to the WRC Act (GoG 1996, Act 522), no person or organization different to the WRC may divert, dam, store, abstract or use water without its consent. Furthermore, the construction of technical artefacts for the use of water resources requires permission by the WRC.

The codification of customary law and native law happened in the 1930s and 1940s; local informants reported current rules, which were recorded in editions on local law. These editions often reflected an ideal type of rule or local law and were subsequently utilized as precedence by the Native Authority courts. The written up customary law includes regulation for revenue collection, succession of chiefs, inheritance, wedding and divorce, as well as land rights and served as blue print for the (re-)establishment and implementation of ‘traditional rules’ (Lentz 1998: 286-287).

It was critically stated that no legal mechanism was created to deal with contradictions between customary water rights and statutory water rights and water law (Sarpong 2004: 11).

Although contradictions suggest the occurrence of problems, plurality of water rights is not necessarily problematic. At the local level, the government's claim of resource ownership is of little relevance. It may contradict local water right regimes, e.g. in case of centrally organized societies like the Akan, where the kings claim exactly what the government claims. But no conflicts occur from it. One reason is the lack of knowledge about the national water law at local level. *"The old customary rules on water rights, at least on paper, have thus gone down the drain. In their stead has emerged state control and monopoly over water rights via the WRC. On the other hand, it is arguable that customary rights and practices as regards the usage of water go on undebated on the ground, with the local water users not having the remotest idea that their ancestral rights have evaporated."* (Ibid. 2004: 11).

The exceptional regulation for domestic water uses (see chapter two) further avoids occurring conflict between the state and customary law and water rights. Because the water quantities used for household purposes are comparatively small, they do not require water use permits issued by the WRC as other water uses do in the country, such as large-scale irrigation or industrial uses. Consequently, the use rights to household water are automatically granted to local users without any state agency to allocate, bill or being able refuses water rights to people in the first place. There is no practical local interface or intersection between local and statutory water rights and water law for household water. Local water law remains rather unchallenged by national legislation.

Ghanaian customary water right regimes are localized and numerous, depending on their particular natural environment, livelihood and social organization of the local community. Also in Ghana, the basic right to water for primary uses is identified as an important component of customary water right regimes. *"A person can take as much water as she can carry as long as she leaves enough for others. This is an entitlement view of water."* summarizes Mensah what he calls the customary regime in rural Ghana (1999a: 19). Actually, he describes only the withdrawal rights. Another basic feature is the riparian doctrine. *"Most Ghanaians believe, that those who own land adjacent to water bodies, or have water bodies on their own premises, have the right to use this water to their liking [...but] their use rights are far from being exclusive."* (Laube and Van der Giesen 2003: 7-8).

In a comparative water right review, literature from a number of Ghanaian societies was reviewed.¹²⁸ The natural environment of these societies covers a spectrum ranging from forests with water abundance to savannah areas with limited water resources. Despite this, water rights to drinking and household water were uniformly described with “*controlled by the family*” and “*water free of charge*” in all cases. Private appropriation was reported only for Adangme society and among the Ga-speakers (Ramazotti 1996: 108-110).

Box 18 Customary household water right regimes in Ghana

“*Rights to water are unqualified [can be exercised by strangers without asking for permission or without offering prestation]. There are however certain exceptions. All individually built wells are excluded. In the Southern part of the area, where stock rearing is an important item of activity, watering rights are of importance. Such rights are qualified, but in some areas, where drinking water is scarce, water pools from which water for human consumption is drawn, are excluded.*” (Adangme)

“*There are undifferential rights vested in the members of a particular community by virtue of their membership of that community, and would include such rights as [...] to wash and draw water from a local water source (e.g. as a river). [...] Many of the natural resources of the country are subjected to common or community rights: thus bodies of water [are, too]*” (Asante)

“*Rivers and streams, though flowing over lands belonging to specific families, are subject to the common rights of the whole community. Any person may draw water from the river or stream without permission. [...] Lakes, creeks and lagoons are in a special category. [...] Where they exist, title to them is exclusively vested in the families on whose land they lie. [...] There is no prohibition against taking out water there from personal use by non-members of the family but ‘tsikiklu’, which is a way of drawing out all the water in a pool or pond in order to isolate fish from catching, is prohibited in another family’s land.*” (Ewe)

“*Rights to water and watering are unqualified, insofar as they are exercised by taking water from, or watering animals at lagoons and rivers, or other natural water courses. Water, which is to be taken from wells is not subject to those rights and it is treated as a commodity which has to be purchased.*” (Ga)

“*...water rights are common: Anybody can take water from water holes in the beds of dry rivers or streams, and from wells built by Local Authorities. Nevertheless, a certain degree of recognition of more individualised rights in water does exist in the usual form namely, that the result or somebody’s work belongs to him either individually, or to his group, dependent upon the social structure in a given area. Hence, it is everywhere recognised that a well dug by a person belongs to his person, with the proviso that upon his death it will merge into group property. However, usually permission is not refused to anybody to take water in a period of need.*” (Kassena-Nankana)

Source: Several authors quoted in Ramazotti (1996: 111-123)

Mensah argues based on his case study in a Southern district that digging a private well in rural Ghana implies considerable expenses and therefore the well owner is allowed to charge non-related users who want to fetch water from his well. He also mentions communal wells and concludes: “*It is [...] unclear, whether underground water is considered public or private property.*” (1999a: 9). Again, the confusion stems from the divergent ownership of the

¹²⁸ The reviewed literature concerns Adangme, Akan-speaking tribes, Asante, Ewe and Ga-speaking tribes of the southern part and also literature of undefined societies from the former Northern Territories.

resource, which on one hand is either not explicitly defined or communal, and the technical artefact on the other which is private.

Customary water rights for regulating navigation and fishing were assumed to be of little relevance in Ghana (Mensah 1998a) although the literature hints at their existence and distinct definition (e.g. Manoukian 1951: 66, Ramazotti 1996). Ghanaian water rights in irrigation have been dealt with elsewhere (e.g. Laube 2005). They are not relevant for this study and are therefore excluded from the following investigation of the local water rights regime. Not much is yet known about transboundary water rights at local level (for a review of the national and international level see Barry et al. 2006).

There is no doubt in the literature about the on-going trend towards the formalization of land and water rights in Africa. The discussion of water rights in Africa was closely linked to the debate on land rights. Moreover, water rights were examined in the context of chieftaincy hinting at its socio-political contextualization (Ramazotti 1996). Because land rights undergo a process of formalization, water rights in irrigation also experience the same. Moreover, the linkages between land and water rights are decreasing when being formalized; the most obvious manifestation being different ministries or state agencies being in charge of land rights and water rights. It is assumed that a similar co-relationship is also valid for the formalization of water rights in household water. The assumption is based on the idea of similarity between irrigation and household water right regimes but factually, no sufficient empirical evidence has been provided.

In Sirigu, the water supply differs in village sections and so do the ways, in which it is managed. The local water right regime displays both, the variety and uniformity at village level. It is plural in character; the same principles are applied but details vary. It is surely misleading to believe that the NCWSP has superseded the customary water right regime as was claimed “*Before the creation of GWSC and CWSA, customary law was the regime through which water was provided [...] Due to the fact, that water has not been provided to all rural communities under the CWSP, customary water law continues to be important [in such places]...*” (Mensah 1999a: 6). Instead, the establishment of new legal orders next to the existing orders, a continuous importance of the customary water right regime and hybridity of local water law is observable.

The chapter starts with a case study of a pump community, which will be continued in chapter six. It builds on qualitative and quantitative data gathered in Abeleteo during the water facility inventory, the committee survey, the compound survey and interviews in compound houses. The data was enriched with observations, data from other village sections and ethnographic literature. The historical and present-day data from Abeleteo was analyzed in comparison to present-day data of other water user communities in the village. To order the empirical material, a categorization of water rights taken up from Meinzen-Dick and Nkonya (2005) is applied to the data. The results are then listed in a table and further explained further (7.3.-7.3.). Before giving an overview over the local water right regime and exemplifying it, the local history of water supply is introduced (7.2.). The chapter ends with a conclusion (7.4.).

The field investigation was carried out in a village sub-section of Sirigu called Abeleteo. The name refers to a *tingane* in the sub-section. Abeleteo belongs to the village section Gunwoko. Its borders extend to Dazongo section to the North, to a Kassena village Mirigu to the West, and the feeder road in the East, which leads from the village Kandiga to Sirigu. On the other side of Kandiga Road, the mission area spreads. In the North, the Mission dam holds water in a small reservoir. The stream feeding it marks the border between Abeleteo and Dazongo (compare map 1).

7.2. The history of water supply in the sub-section Abeleteo

7.2.1. Dynamic water user group mosaic

The *yidaana* from the oldest compound house in the settlement summarized what water sources he and his family relied on for their household water in the past and present:

“First, when the people settled in Abeleteo, there was water. They used the water from the stream and dug holes in the ground. Only during a few weeks in a year, we walked to far Zokko River. Not far from our house were later some wells dug by Fathers [priests] which provided not only Abeleteo but also Mirigu and Aniergo. During that time, the well close to Amiziah yire was dug and it had plenty water. The area got drier and drier. When the wells near our house fell dry, everybody shifted to the Amiziah well. People came from Mirigu to that place. One well after the other dried up. From the dry Amiziah well people moved later to the well, which was dug by Father Meddens. It was situated where the dam is today. From there they had to move further to the Mission well when the Meddens well dried off. When all wells had dried off, the standpipe was brought and later when the piped system broke, the people used a borehole in Aniergo, which does not exist any longer. Then we walked to the pump in Atonadoone.”¹²⁹

¹²⁹ Mr. J. Nsoh, interview summary, 22.05.2005

The hydrological sub-text behind this narration is the opening-up of regolith aquifers for domestic water use and a decrease of the water table (compare chapter five). The two pump communities, which draw members from Abeleto were preceded by a minimum number of ten water user groups, meaning water user groups underwent frequent processes of re-grouping; additionally, people use surface water in wet season. The houses, depending on their location within their section, experienced different chronologies of water supply. Compounds of the Southern part did not go to the pump in Atonadoone but to one in Tangasiya. Water user groups are permanently in flux. Users assemble around a new supply facility and disperse when the facility fails or a more convenient water point becomes available. It is not whole user groups, which shift, but single households and compounds. The result is a dynamic mosaic of water user groups.

At no point in time, there has been the full variety of water supply available. Five phases can be distinguished in the sub section, such as (1) the phase of surface sources; (2) the phase of surface water and wells; (3) a phase of surface water and piped water supply; (4) the phase of surface water and water supply through hand pumps; and (5) the parallel use of surface water, hand pumps and the small reservoir. During the time of research, Abeleto was in the fifth phase. Abeleto people report that the phases showed some overlap in time. Before a phase was expected to end because the water sources became unreliable, the next one had already started.

7.2.2. Surface water sources (continuously)

Compound fission occurs in Kassena-Nankane villages whenever people feel that their compound houses had become too large and the inhabitants are too many to be fed by the harvest of the existing compound fields. The creation of bush farms and compound fission was the starting point for the settlement in Abeleto. In older times, bush was cleared for groundnut farming. When the land became scarce in the original section, some households later moved and settled on their groundnut fields, which were then turned into compound fields and farmed with millet, soup vegetables and groundnuts. Such intra – village migration is common and some of the village sections in Sirigu trace back their history to such household moves, compounds and lineages. Abeleto people came from other parts of Gunwoko, especially what is today's market area. The sections of origin and the new settlements keep up a close social relationship, especially in funeral rites. The first compound house of Abeleto still exists but has undergone numerous changes in architecture. The oldest

man of this house, who is in his late 60s, remembered that it was his father who came to settle in Abeleteo after his wedding.

Picture 12 Water hunting in the 1950s (Kassena-Nankana)



Source: Klages (1953) 'Water hunting' is a common metaphor to describe time intensive and exhausting water fetching. The heavy clay fetching vessels contained less capacity than aluminium basins used nowadays. The opening of the vessel was covered with a calabash, which was used at the well. It also prevented insects and dust from contaminate the water. Today, people use plastic foil to cover the basins; but the foil usually swims in the water without covering the basin completely. The calabash was probably more efficient in preventing contamination.

A network of small streams crosses the village sub-section in addition to the big stream towards the North. In dry season, when the surface water had evaporated, drained away and used, water can drawn from shallow wells (*buliga* or *loa*, pl. *loosi*), which are dug inside the riverbed. When the first people settled in Abeleteo, the alluvial aquifers held water almost all year long. It was only for a few weeks in a year that Abeleteo people had to walk to the opposite Eastern side of the village to obtain water from shallow wells in the bed of Zokko River (this name was more common than Atankwidi), where this practice still ensures all year water supply for household use.

*"We went to a place at Zokko Koliga, which name is Akaro. We left by four in the morning and brought two pots a day." "Akaro had many shallow wells. There was no problem." "You can dig a shallow well at any place at all. It will close automatically with time. You come and dig a new one. Men had a larger place in the riverbed for the animals." "We went early in the morning by four and then again in the evening. It always takes two hours to go and come. Men and boys also carried water. I did, when I was a small boy. The one who arrived first at a shallow well was the one to fetch first. Sometimes, when wells collapsed, people quarrelled. Later when I grew, we had to drive the animals there and came back late night. It was difficult because we herders did not get food before coming home." "People from Mirigu were there, people from Busongo, Basingo and also Kandiga."*¹³⁰

¹³⁰ Interview summaries from Abeleteo compound interviews, February 2006.

The settlers created additional dugouts and small ponds in Abeleto where the rainwater could be collected and fetched easily. The distances from the compound house to the water sources were short and the user groups many in number but of concise size. Depending on the location of the compound houses, one compound or a small cluster of neighbouring houses shared the surface water sources.

Box 19 Case study: Present day shallow wells at Zokko River

Shallow wells inside the bed of Zokko River provide household water to compound houses in the Eastern part of the village. The sub-section Gunwoko Bikumdoone, a remote and isolated cluster of six compound houses, draws all household water from the nearby river. Shallow wells resemble rather craters than wells. In January 2004, the observed shallow well had a depth of about two meters, which indicates the height of the water table at that particular place. The shallow wells are not secured in any way. When not being careful while stepping down or standing at the edge of the well, the construction may easily collapse. In Bikumdoone, strategies to keep livestock away from the wells are to drive cattle and goats to another part of Zokko River where a little bit of surface water always remains. It also includes fetching water for the bigger livestock in addition to water for poultry. All six compound houses fetch from the same shallow well, meaning that it provides sufficient water for 16 households (108 people as well as their small livestock). The community did not create additional shallow wells. Traces of former wells indicated several shifts and former digging activities within the same dry season, which frequent collapses had made necessary. Shallow wells are constructed collectively by the men. Bikumdoone people do not cover the open water. *“I always bring my own [drinking] water when seeing my relatives in Bikumdoone”* said an old man from Gunwoko. *“You see the frogs jumping into the water there.”*¹³¹ The water users are aware of the bad water quality. They had applied to become a NCWSP project community during the time of the research.

Picture 13 Shallow wells in 1953 and 2005



Source: left picture Klages (1953)

7.2.3. Wells (1965 - mid 1970s)

The first Catholics of Sirigu lived in or moved to Abeleto and the settlement's history since then is interwoven with the history of the Catholic community and Mission in the village. The “White Fathers” introduced Christianity to Northern Ghana in 1906. Their first Mission

¹³¹ A committee member of pc Gunwoko Tangasiya during our survey, field notes, 12.10.04

station was opened in Navrongo. In 1907, the missionaries introduced the first formal education to the region. Due to the restrictive policy of colonial administration towards missionaries and schooling, protestant missions followed not earlier than 1931 and 1940 (Der 2000).

Up to today, many links point from the Mission to the sub-section.¹³² Land scarcity was unknown in the early 1960s, when the first chapel was built. The Catholic Mission followed in 1965. Old people remember the area to have been covered with an impenetrable and dense bush with wild animals. The so-called “*wolfs*” (Nankane pl. *saase*)¹³³ were feared and the bush was widely known as ‘Bone Baobab’, referring to their victims. The area was a *tingane* - an area, which was crossed only by a few paths and avoided by Siriba whenever possible. The Sirigu elders¹³⁴ selected this bush land for the Catholic priests, who requested them to allocate land to their Mission. From there, the Mission tried to gain ground in the village and on this Mission land, Catholics could move freely without being disturbed by the Traditionalist Siriba, which offended and attacked members of the new and suspicious religion.¹³⁵

The land given out to the Christians was generously large because it was unused, dangerous land and also because land was abundant. This land allocation by the village elders can be interpreted as a strategic decision to limit the influence of the new settlers. First of all, it led to some isolation. Secondly, the ancestral spirits were expected to ‘take care’ of the strangers. This strategy of allocating wild and spiritual lands to Christian Missions was applied in many African set-ups. What was not foreseeable for the elders was the little fear of ancestral spirits, which the new religion brought along. Breaking of taboos by the Catholics did not result in the expected ancestral sanctions. Rather, the vegetation cover of the Mission land changed fast. Some local Catholics moved next to the church and Mission to support the priests in their work and to defend them against the wild animals. They cleared the land from its natural vegetation and created farms for their personal subsistence. This way, the mission land also lost its hostility because it ended from being the habitat of wild animals. The same area is today referred to as Moodoone – grassland (in particular Dazongo and Gunwoko’s sub-

¹³² Many people working for Catholic ‘enterprises’, such as the orphanage, the kindergarten, the clinic or the Mission building live in Abeleteo. The catechist’s house is situated in Abeleteo.

¹³³ Local translators explained that it was leopards or lions, whilst Rapp translates *sasse* as hyaenas (sing. *sasenga*, 1966: 212). Villagers told me in 2006 that after long time one such animal lives again along the river.

¹³⁴ Meant are not the *nabia* but the generally the section heads of the village because the chieftaincy system was not yet crucial for village politics.

¹³⁵ Mr. J. Akanson, taped oral tradition and subsequent interview, 27.05.2004

sections Tangasiya, Abeleto, Aniergo).¹³⁶ The land underwent a process of domestication when the natural vegetation cover was replaced by buildings, farms and mangoe plantation, which provided shade and fruits as well as orientation as they indicated paths.

One of the first activities, which the priests initiated after settling permanently in Sirigu was the construction of a well close to the Mission building to ensure all year water supplies for themselves and their community. It is doubtful whether they were conscious of the technical innovation they introduced to the village and the ensuing impact. Contemporary witnesses remember that:

*“When they [the Missionaries] came that wells were dug for we did not know water was down whereby when we dig it will be easy to get water. [...] Yes, I was there [...] many people were there. [...] The first man who’s name was John, a white man, after digging people copied him. All people were digging wells. [...] people came and joined Christianity because of the digging of the wells.” “...it was one Stephen who went digging the wells with John and as he heard the word of God he started sharing the news and as they go from section to section digging wells people started joining Christianity.”*¹³⁷

Here, as in many other Christian and Muslim missions, which took place in Africa, a close relationship can be stated between the delivery of water infrastructure, the willingness of local people to convert to the new religion and thus the success of the mission. One such relationship between water and religion is documented for the year 1932 in Jirapa/ Upper West Region where local elders after experiencing severe food shortage, approached the missionaries and promised to abandon Traditionalist belief and join the Catholics if the missionaries make the rain fall. The rain fell the same day and this was the beginning of success of Christian Mission in Jirapa. Nowadays, the town is a place of pilgrimage to pray for rain (Lentz 1998: 333).

Before, there was no local knowledge about the existence of groundwater. Siriba imagined the streams to have deepened their water level and thus dug shallow wells in the riverbeds. This thought or idea was not extended to land, which was usually not covered by water. Ponds were rain fed. Because people had no inducement to dig deep into the hard ground, it seems they never met deep ground water.¹³⁸ To my knowledge, no historic account about Nankane

¹³⁶ It is a reference term based on *moo* (= grassland, savannah) and the suffix *-doone* (bank, strand).

¹³⁷ Mrs. Magdalena (†), interview transcription and translation, 28.05.2004.

¹³⁸ Kassena-Nankane burial rooms are dug inside the ground but are less deep. *“The burial room is made to be laid out in, not to stand o to sit in, just as a room is made to be a sleeping place”* (Abasi 1995: 470). From the shape but not in diameter, they resemble the wells in Gonja region (compare picture 4). In other areas of Ghana, wells were dug already in pre-colonial times (Gyau-Boakye and Dapaah-Siakwan 1999).

settlements reports the use of wells. This strongly supports the research findings. It seems that the knowledge of constructing wells was much localized in Northern Ghana and not yet part of local knowledge in the village. The newly created wells in the village were about five to ten meters deep and are secured with stones and cement, or surrounded by a stone or cement wall. They looked like the Amiziah well on the picture.

Picture 14 The dry Amiziah well in Abeleteo



Abeleteo people remember that the wells were covered with wooden covers and some of them were also locked.

*“People were allowed to fetch but they have to seek for permission [from the yidaana]. But when you are digging your own well, people come in to help. So, when coming to fetch, they do not charge.” “Anybody who asks for water fetched from the wells. Also those who did not dig it.”*¹³⁹

*“Before you fetch from a well, you show your respect to the yidaana. Some locked their well. The Amiziah well was not locked. Small water comes out. When it is finished, we wait until new water is in. The Akawiri well was locked but it was also open for the people. Nobody was refused.” “We sit by the wells and wait for the water.” “We get up very early to look for water in the wells.”*¹⁴⁰

The sites of those wells can be easily identified because the artefact remained. Because the wells do not hold water in dry season, they are used for waste disposal such as for the disposal of old tools or mosquito sprays. They looked different and more secure than the wells, which are in use today.

¹³⁹ Mrs. Magdalena (†), interview transcription and translation, 28.05.2004.; field notes.

¹⁴⁰ Interview summaries from Abeleteo compound interviews, February 2006.

Box 20 Case study: Hand dug wells in 2006

There are two clusters of functional hand dug wells in the village. One of them is found in the Northern section of Nyangolino (ca. one hour by bicycle from Abeleto), where it borders to Busongo. The wells are lined with stones but covered. One has a wall around to protect the opening. A number of strong branches are laid over the opening of the others to allow people stand on it while fetching and reduce the risk of falling into the well (see picture 7). The wells host frogs and dust can easily enter them. One well had to be abandoned recently because a cow fell into it.

7.2.4. The old piped system (mid 1970s to 1989)

The centre of Sirigu as defined by main roads and the market area was once provided with a small town water system in the mid 1970s. Its dysfunctional artefacts, such as standpipes, pipes, high-level tank and engine house are still visible.

The groundwater was pumped with a diesel engine into a high level tank with a capacity of 30.000 gallons standing next to the Mission. There, the water was treated with chlorine and then led to the standpipes in the market and along the main roads and the Mission building. There was the technical option to pump water directly to the market without touching the high level tank, which was utilized during market days. The number of outlets exceeded 10 standpipes with min. 26 taps and was located in the relatively small market area and in front of the *Sirigu naba yire*. One standpipe was dedicated to the compound houses around the Mission and the last standpipe of the pipe line provided Abeleto. The only household connection led to the Mission buildings by this time.

The standpipe acted as an additional water point during the first years. It became later the only water source in the sub-section after the seasonal disappearance of surface water because the water table fell drastically and all wells dried up one after the other. Inhabitants in Abeleto and surrounding sections correlate those two incidents with each other: *“When the pipes came, the wells dried off.”* and the former GWSC system operator supports their view.¹⁴¹

Despite the supply offered by the piped system, hardly anybody mentioned it when summarizing the history of Abeleto water supply during the individual and compound interviews. When asking about it, villagers responded *“There was no water.”*, *“We did not go there to fetch - only sometimes because you never know when the water comes.”* *“It takes*

¹⁴¹ This argument appeared often in the field notes and also during an interview with the former GWSC operator Mr. P. Ayamga (18.02.2005). Whether the pumping rate of 5 gallons per second was too high and the groundwater recharge capacity was overstressed is empirically unclear. Another GWSC operator Mr. A. Akwunabase, also recalls a very high yield of the mechanized borehole (interview, 09.02.2005).

months, then they say that the pipe has opened, the pipes make noise, no water.”¹⁴² People remember the water supply to be very unpredictable due to short supply of diesel. Some recall the water quality to be good but others report that bloodworms came out of the pipes at times. Whenever the sound of the diesel pump was heard in Abeleteo, the people drew each other’s attention and literally the whole sub-section and surrounding areas left whatever they were doing and ran to the standpipe to line up. It happened that the overhead tank went empty before all households had received water, which was problematic due to the single source situation in dry season. When it failed people walked again to Zokko River or relied on water from surface water and shallow wells in riverbeds as long as it was available. Some also went to Aniergo sub-section.

7.2.5. Hand pumps (since 1970s)

The water situation improved when a borehole was drilled in Gunwoko Aniergo, the next sub-section southwards to Abeleteo. Different accounts were given about its time of delivery. Probably it belonged to the first well drilling program from 1976, which started again to spread from the Mission to the other sections of the village.¹⁴³ “*The first borehole was at the mission. It was one man from Doba who was a friend of the first catechist Stephen [...] and when he heard the news at Navrongo, they went and came with the whites to put it.*”¹⁴⁴

The CIDA project staff consulted the *Sirigu naba* and the elders of the various sections and asked them to choose for appropriate location for the boreholes. The decisions were taken within the village sections and then delivered to CIDA. The number of Catholics, which had increased and now lived in several parts of the village, was not crucial for the allocation of boreholes but the church acted as a forum and channel for information in both directions.¹⁴⁵ The Northern part of the compounds in Abeleteo started using a hand pump fitted borehole in Dazongo Atonadoone across the stream, when the water supply through the standpipe finally ended in 1989. (It is the same borehole, but a different hand pump, which is used by the Atonadoone pump community today.) The Southern part of the compound houses continued

¹⁴² Summaries from Abeleteo compound interviews, February 2006.

¹⁴³ The data is contradictory insofar as the Aniergo pump probably already existed when the standpipe was brought to Abeleteo. The compounds of the southern part of the section had probably already used it as an exit option, when the piped system failed them. That means the third phase was for those compound houses characterized by the use of two different water sources in dry season.

¹⁴⁴ Mrs. Magdalena (†), interview transcription and translation, 28.05.2004

going to the Aniergo hand pump until it broke down and then went to fetch water from either Tangasiya pump or Atonadoone pump.

Kendie and Abane, who reviewed the same program (Upper Region Water Supply Project Phase I) write: *“the project was implemented as a purely technical exercise with villagers providing little to no input in decision-making and implementation. [...] Available census figures were consulted and villages with populations above 500 were selected. A team of drillers and hydrologists then visited the village, met with the chief and his elders to explain their mission – to drill a borehole. Siting was influenced by geological conditions; no consideration was given to proximity to houses or traditional boundaries between villages and clans.”* (2001: 187).

Later, the priest in charge appointed a man from Abeleteo as local contact man between project and local pump user groups. *“Maintenance remained the responsibility of the project. [...] several review missions of CIDA recommended changes, culminating in the [...] emphasis on training Community Water Organizers (CWOs) whose aim is to advance participation of villagers in the project. [...] In 1987, the term Community Water Organizer was coined to describe the roles of the Community based workers, which was basically to undertake all educational efforts, organizing pump site maintenance, tariff collection, and fault reporting. An elaborate structure has been established to train and supervise CWOs...”* (Kendie and Abane 2001: 187) One man from Abeleteo was probably meant to be the CWO for the village; he was in charge for six hand pumps, inter alia, the Atonadoone hand pump.

“It wasn’t just like an employment as such but because Father [the priest] knows him [the interview partner] and Father knows he can do the work that’s why Father showed him to the people. That anytime they can come when there is a problem. They gave him a nickname ‘Assistant’. He is assisting Father. It doesn’t always take time [before the mechanic from Bolgatanga come]. Because when it spoils [the pump breaks] and you go to tell them [the Dioceses], they come because if they come here, they [the villagers] give them [the mechanics] eggs, guinea fowls and fowls. So they are always happy. When you go to tell them that you think this your borehole is spoiled, they contribute these things, fowls, guinea fowls and eggs. At this time, it will be the community, the people who fetch from that borehole. In those days, we don’t pay. They used to give [water] free for them. But now as they pay, if they [the mechanics] come they don’t do that thing [giving fowls] but nowadays they need money so you have to go and give something to them [the mechanics] When your money is still not up yet [the mechanics don’t come. Despite this,] now it is better because when a thing spoiled [a pump breaks] they had to go only to one person. So if that person is not there or that person is not in the house, it is a problem. In those times, they can give you their money and you spent it and when you come back and tell them that the money is not enough for the repair. But now, they can go there themselves and there is no problem whether the money is up or not. [...] They [at the Dioceses and area mechanics] explain to them. But because of the poverty, they

*always felt as you go, the people should just follow you and come. So if the people are not observing, they will come and tell you that you have spent the money if not that you should have brought it here. But [you do the job] because it is your own people and you know yourself.”*¹⁴⁶

When another well drilling program by the Dioceses was announced in 1993 during Catholic mass, an opportunity occurred to receive a borehole for Abeleteo. Five houses contributed the required community share of 150.000 Cedis and the borehole was drilled and equipped with a hand pump. In the beginning, only the initial five compounds were allowed to fetch water from it. Other compounds joined later, step by step, when they had collected enough money to join the pump community (see in detail chapter eight).

By that time, Zokko River was not considered an exit option any longer due to its far distance. This view indicates a change in local perception towards water supply. Water quality and convenience in fetching became criteria for the choice of water sources. Thus the temporary short supply in household water was caused not only by the limited capacity of the system and its dependency on diesel but also by behavioural changes of the water users. More water is used nowadays during dry season compared to the time when water had to be carried from Zokko River. *“We had less water and people did not bath by heart [as much as they want] like today.”*

7.2.6. Hand pumps and small reservoir (since 2005)

For reducing the pressure at the two hand pumps (Abeleteo and Atonadoone) and having an extra surface water source for some Mission related constructions, the idea to rehabilitate a small reservoir came up and was followed by priests and officers in the Dioceses Bolgatanga by contacting Dutch and German donors, writing proposals and supervising the construction process. The Mission dam has been fully functional and permanently holding water for the first time during dry season 2004/ 2005 although its construction time and first completion dates back to the 1970s. Further, a group of ten compounds at the Northern edge of the village sub-section contribute money to receive a second borehole for Abeleteo sub-section.

Digging shallow wells in the bed of the stream as well as creating small dugouts is not common in present-day Abeleteo. Such practices belong to the past whilst surface water from the stream is continuously included in present-day household use. Rainwater plays a minor role. The reason lies in the architecture of the compound houses. Most roofs are flat. Some are

¹⁴⁶ Mr. F. Amiziah (former Community Water Organizer), interview transcription, 29.05.2004

peaked but then roofed with grasses. Rainwater collected this way is contaminated with dirt and insects. Zinc roofs would allow systematic rain collection but the practice is very exceptional in Abeleto despite the fact that most compounds have one building with a zinc roof.

Picture 15 The Mission Dam reservoir in late dry season 2004 and 2005



The pictures show two perspectives, such as seen from the West and the East of the dam. Whilst in 2004, the reservoir was almost dry; it succeeded to store water during the following year after the walls of the dam were secured with stones. In dry season 2006, the pride of the local people was a single crocodile, which chose the reservoir as its new habitat.

7.3. Household water right regime

7.3.1. Overview

After analysing the empirical data on the water user groups and communities in Abeleto and in the village, the summary is displayed in a table 22.

Table 21 Local water right regime overview

	Streams/ rivers	Shallow wells in riverbed/ dug outs	Wells	Improved hand dug wells	Hand pump fitted borehole	Small reservoir	Old water system (pipes)
OWNERSHIP Who holds property rights in water supply facility?	Not defined communal	Not defined communal	<i>Buligadaana</i> (well owner)	Donor OR Well community	Donor/ pump community OR Pump community	Donor/ reservoir community	State
PROPERTY RIGHTS	Not defined	Not defined BUT Sense of ownership based on creation (digging)	Private Based on land ownership and/ or creation (digging)	Public Based on creation (Funding, technical support) OR Communal Based on creation (Community contribution)	Public Based on creation (Funding, technical support) OR Communal Based on creation (Community contribution)	Private Based on creation (Funding, technical support) OR Communal Based on creation (Community contribution)	Public Based on national law

ACCESS Who holds use rights?	All who wish	All who wish	All who wish	All who wish OR Members of well community	All who wish OR Members of pump community	Members of reservoir community	All who wish
USE RIGHTS							
WITHDRAWAL RIGHT	Public	Public OR Communal Based on sense of ownership	Public	Public OR Communal Based on membership + Secondary rights for non-members + Tolerated access of non-members	Public OR Communal Based on membership + Secondary rights for non-members + Tolerated access of non-members	Public (Livestock watering) AND Communal (household uses) Based on membership + Tolerated access of non-members	Public
ACCESS RIGHT	Public	-----	-----	-----	-----	None + Tolerated access	-----
USUFRUCT RIGHTS	Public	Public OR Communal Based on sense of ownership	Public BUT formal permission of <i>buligadaana</i> expected	Public OR Communal Based on membership	Public OR Communal Based on membership OR Private Based on payment of water tariffs	Public OR Communal Based on ownership	Public

POWER Who holds decision-making rights?	Elders (♂)	Elders (♂)	<i>Buligadaana</i> (♂)	Provider NGO/ Elders OR Well committee and members	Dioceses/ NGO + pump committee + user community OR Pump committee and members	Elders = Reservoir committee (♂) OR Reservoir committee and members	GWSC
DECISION-MAKING RIGHTS							
RIGHT TO EXCLUDE	None	None	None	None OR Well committee and members Based on membership	Pump committee and members Based on membership	Reservoir committee and members Based on membership	None
RIGHT TO ALLOCATE	None	None	None	None	None	None	????? GWSC operator ¹⁴⁷
ALIENATION RIGHTS ¹⁴⁸	None	None	None	None OR Communal Well committee	Communal Pump committee	Communal Reservoir committee	????? GWSC operator
MANAGEMENT RIGHTS	None	Communal Elders (maintenance) (♂)	Private <i>Buligadaama</i> (maintenance) (♂)	Communal Well committee	Communal Pump committee	Communal Reservoir committee	????? GWSC operator

¹⁴⁷ Open valves, determining pumping and fetching times (= water quantities)

¹⁴⁸ Collect water maintenance fees from members, negotiate over money for water with external construction companies (applicable only to small reservoirs)

♂ = exclusive male domain

7.3.2. Ownership – rights to own

Table 21 clearly shows that ownership in rural water facilities is fourfold. The ownership is (1) not claimed by anybody and not explicitly defined; (2) by a community; as well as (3) by a private person; or (4) claimed by a legal entity or organization, such as the state, the Dioceses or an NGO. Translating this into the terminology used for water rights, one can differentiate communal, private and public rights. Ownership is either public because water is perceived as common pool resource and common good. In such a case, there is no local property right is explicitly defined. Or it is public because it is owned by the whole village community or claimed by the national state. Streams and ponds are common pool facilities. Communal ownership was found with facilities, which enable groundwater extraction, as well as the storage of surface water. Because the number of these facilities is the largest, communal property rights are the most common form of ownership in Sirigu. Communal and private property rights are rights, which are strongly linked to the creation in the technical artefact. This may be a physical, financial or organizational effort. Because water facilities, which draw groundwater, require a specific withdrawal technique, they are necessarily an outcome of human action and effort.

The growing importance of property rights may lay in the technical structure of the water facilities. Shallow wells were not secured and collapse easily, with a single wrong step. A bigger threat to them is cattle and other livestock, which try to enter the wells to drink water. While people fetch water, livestock can be driven away by them, but when nobody is at the well, the animals usually come. (Even in Bikumdoone with only six compound houses, five to ten new shallow wells had to be constructed one after the other. This observation was made in January. Additional efforts are assumed to be necessary from January until the appearance of surface water. When a shallow well collapses, it demands for a fast assignment to replace the facility.) Arguments occurred when a shallow well collapsed and was not immediately replaced. The question of replacement became controversial. A higher number of users increased the probability of a collapse. The more inter-sectional or inter-village the water user communities became, the more difficult it was to settle arguments. Users came from villages around Sirigu. Individuals or groups dug the shallow wells. But people went to fetch from the wells he or she preferred. Women from Abeleteo tell that after quarrelling, they were not only chased away, but

when arguments escalated, their pots got were sometimes broken during fights. Then, the woman could not simply shift to another well and came at home without water.

The pressure at shallow wells in the Zokko River riverbed grew, due to the shortened period in which the alluvial aquifers hold water. Population growth was another factor. There must have been a local understanding of who created the shallow well, who caused the collapse and who was expected to replace it. Although the withdrawal right was not affected, a sense of ownership started evolving among those who had created such a water source and experienced collapses caused by members outside their community, which were not compensated. Such an emerging sense of ownership is the precondition for the establishment of communal or private property rights.

The property right in its first manifestation was linked to the physical creation of the water supply facility. In the course of development interventions and the implementation of technically more demanding constructions, which could not be accomplished by the villagers themselves without external help, such as drilling boreholes or lining wells with non-local materials, it extended to financial and organizational effort by donors and facilitators. NCWSP policy stresses the communal ownership of rural water supply facilities. From the mid 1990s onwards, property rights are transferred from the donor or state to the formal members of water user communities. The practical implementation of the policy depends on the provider of the water facility and their particular project law or implementation guidelines.

Box 21 Case study: Water provision by NGOs

Rural Aid delivered an improved hand dug well in Busongo after the collection of the community contribution. The NGO withdrew after making sure that a water user committee was put in place. This strategy follows exactly CWSA and Rural Aid implementation guidelines, which are coherent. The users own their well communally.

NABIO, which dug the improved hand dug well in Dazongo remained the owner of it. The community contribution was local labour contribution. The main purpose of the well was to water the tree nursery of the project. Household uses were rather a by-product.

Afrikids completely financed the drilling of a borehole and its mechanization for the orphanage, which they support. They also paid the pipelines leading to the public clinic. The property rights of the water facilities are not clearly defined and get contested from several sides (see below).

The membership of pump communities is exclusive. The payment of an entrance fee and registration of the members was a norm in 14 of 24 pump communities. Because of poverty in the

research area, not all potential water users are capable of paying their share of the community contribution when it is requested. Often a part of houses contribute higher shares and receive the property rights. Houses, which were not able to pay, are excluded from the communal ownership until they enter the pump community by the payment of an entrance fee.

Private ownership only occurs with wells. A new institution, known as *buligadaana* (well owner) or *buliga zuo daana* (owner of the well place), occurred in the 1960s. The *buligadaana* is the man who initiated the construction of the well among his male family members or section fellows and provided tools, food or money for the workers. The well is dug on his land and carries his name. Both, authority over work force and land ownership are in hand of elder men, which also act as *yidaama*. The institution of the *buligadaana* originates in both, the local emergence of property rights as well as in the introduction of the external technology. When wells were introduced, expert knowledge was needed. Later the knowledge became local knowledge. Resources, which have to be invested into well construction lead to private ownership (compare Carlsson 1996: 142-158 for well digging cost in Mali). It is obvious, that some people, such as women or young dependent men are automatically excluded from well ownership due to their lack of assets, land ownership and control over work force. At the same time, there is some overlap with local leadership, because some *yidaama* are at the same time also elders or carry traditional titles. In fact, it is often in their function as local leaders that they initiate water projects for the benefit of their communities.

Communal ownership in improved water sources was preceded by state ownership. The Ghanaian state owned the old small town water system as well as the CIDA boreholes provided in the 1970s. Practical manifestation of the claim of the ultimate property rights was the locally unquestioned authority of the state enterprise GWSC. It was technical staff, such as operators, who worked at the community interface.

Property rights can be unquestioned rights or under debate. Actors respond to the question after the ownership of the boreholes from the 1993 well drilling program in different ways, according to their particular perspective and legal reference. Representatives of the Dioceses argue for a shared communal/ public ownership model. Officially (in CWSA statistics), the hand pumps are communally owned but this ownership is not legalized in form of contracts or by-laws. The pump committees take up the notion of communal property rights by referring to management manuals.

The hand pumps locally known as “*Catholic boreholes*” or “*Church boreholes*” indicate not just a good collective memory recalling the provider but also carry a connotation of ownership. Usually, property rights lay unchallenged but at times, claims for ownership contest each other.

Box 22 Case study: Contested ownership of a borehole

The Dioceses and the NGO Afrikids intended to improve the water supply for the orphanage, which so far relied on a hand pump, which was also used by surrounding compound houses. Water from a borehole should be pumped to a high level tank and released via pipes to the orphanage, the two living quarters (for nurses and teachers), the two clinics and the Mission building.

The borehole, which was drilled for mechanization, did not show enough yields. The Dioceses negotiated with the Mission pump community to exchange their borehole against the newly drilled one. It was agreed that Afrikids should provide a tap, which could be used by the villagers in case they face problems with the hand pump. The villagers agreed; the old borehole was mechanized but the tap was never constructed. Instead of a VLOM hand pump, the new borehole was equipped with a hand pump type, which is very difficult to handle by the local caretakers.



The ownership of the boreholes was uncontested for many years until the Mission pump community faced serious problems with their hand pump. The yield is low, the hand pump has broken, raising money for spare parts is very difficult and the local caretaker cannot do anything himself because of the new pump type.

Members of the pump community claim ownership over the mechanized borehole. From their point of view, the property rights were granted to them through the NCWSP. The ownership was transferred to them after an amount had been paid to the Dioceses as community contribution. According to them, only use rights were exchanged between them and the orphanage. They think that Afrikids betrayed them. Another argument of the other water users is that the broken hand pump supplies more people with water than the mechanized one.¹⁴⁹

Afrikids claims that the orphanage owns the mechanized borehole. According to the NGO, the boreholes were exchanged after the agreement of the pump community. The NGO financed the hand pump for the new borehole.¹⁵⁰ Afrikids came to the funding of the orphanage later and stresses the community-based character of the project. Thus, the confusion about the ownership of the borehole is merged with the confusion about the ownership of the orphanage.¹⁵¹ In case, the borehole became an integral part of the mechanized system, the orphanage would be billed for water, which could turn out to be a financial bottleneck for the orphanage project.

¹⁴⁹ Mr. E. Akanson and Mrs. C. Akanson, taped interview, 15.12.2004; informal conversations; field notes.

¹⁵⁰ Ms. G. Fienberg (former Cohen), informal conversation, 2004.

¹⁵¹ Mr. E. Akanson and Mrs. C. Akanson, taped interview, 15.12.2005; field notes.

Representatives of the Dioceses obviously felt that the ownership of the mechanized borehole is with them based on their claim of ownership of the orphanage. Mission buildings draw water from the borehole and have a house connection without paying or compensating the orphanage or Afrikids. The dioceses can also claim partial ownership because the mechanized borehole was drilled under their leadership during the 1993 drilling program. From the Dioceses point of view, the ownership of the boreholes was exchanged.¹⁵²

The mechanized borehole is suitable and indispensable for the small town water project. The WSDB chairman argues that this borehole is a communal borehole. His claims are backed up with both NCWSP policy and socio-cultural norms, which demand for individual sacrifices for the advantage of the community. Afrikids or the Dioceses were not approached officially by any of the planning actors during the design phase.

7.3.3. Access – use rights

In the research context only withdrawal rights and provision of water for livestock are relevant. Access rights were theoretically only applicable to streams and reservoirs but were also not defined in the research context.¹⁵³

Also in Nankane society, the basic right to water exist for both primary uses and for livestock watering. The cultural norm of non-exclusion is very strong. People in the village cannot be prevented from fetching water for primary uses. Additional users or people from a different sub-section may face hostility at a particular water point and are not welcome in times of water scarcity and social tension. Tension occurs when users feels that the high number of additional users constrain their water provision and that the additional users would be able to create their own water point and did not so for whatever reasons. But the outsiders are neither hindered from fetching nor do they have to wait longer for their water. Tension usually finds its open expression in form of insults and offences. They may be linked to a strong call to create an additional water source and take away the pressure from the existing one. Such accounts are both historic and current and occur both at wells and boreholes:

“We went to fetch water from a well in another sub-section of Nyangolino. Some argument came up and the people insulted us, why we still come and fetch, meanwhile we are able to dig our own well and leave them alone. I was very angry. The next day, I called my people and we started digging this well.”¹⁵⁴

¹⁵² Informal conversations with staff members of the Catholic Dioceses Bolgatanga, 2004/ 2005

¹⁵³ Access rights define who may enter a water body, for e.g. fishing or for navigation. This right concerns non-consumptive water uses. Withdrawal rights are rights to withdraw the resource from the water body (e.g. fetch it) for consumption. Both categories are summarized as use rights.

¹⁵⁴ Three *buligadaama* of Nyangolino, interview summary, 12.02.04

Despite the private ownership of wells, its water is attached to a public use right. Everyone may fetch water from the wells without asking for permission. Users shifted from well to well to avoid waiting times. Only large water withdrawals, as for construction, should be announced to the *buligadaana*.

Whilst the use rights to surface water sources remained public, the public withdrawal right to shallow wells and dugouts was partly linked to a sense of ownership. It is not yet a right, which excludes people. Access can be negotiated and gained easily. Also here, nobody is denied access for primary uses and livestock watering. Some shallow wells or parts of the riverbed are allocated for big livestock watering.

Before the implementation of the NCWSP, the withdrawal right to hand pumps was not merged with ownership in the facility and a membership status. Instead, the withdrawal right seem – at least at some places of the region – to have been connected to the payments of borehole fees, which were introduced in 1985. *“reports of CWOs beating up villagers for not paying tariff or preventing villagers from collecting water because they could not pay the tariff have been documented”* (Kendie and Abane 2001: 191).

Present withdrawal rights are more differentiated. Because the pump communities are bounded, there are internal and external water rights. Withdrawal rights, which are directly linked to the member status of the water community, are internal and defined. Membership results in holding full withdrawal rights. The rights are allocated to the compounds as a whole in most of the cases, even though the borehole fees may be paid by individuals. Usually there are no individual use rights. Instead, use rights are group rights. Consequently, no qualitative difference exists between the use right of an adult woman, an old man, and a young boy or between households – as long as they inhabit and share the same compound house. The full withdrawal right is not precise in determining water uses, fetching times or water quantities. It simply states that people of a particular house may make use of the hand pump. Once a house has gained and has withdrawal rights, it does not lose them. Watering rights remain public, irrespective of membership status in a water community.

Non-members may receive limited withdrawal rights. Project law suggests implicitly an exclusiveness of use rights and it does not consider the practical situation on the ground. Not only

compound houses in the neighbourhood of a pump need water but also villagers, which farm bush farms, but live in other village sections. Other people may wish to drink or fetch water from the pump when coming to the market or to another village. Livestock roams freely. Other hand pumps may fail technically and their users seek exit options. Therefore, the cultural norm of non-exclusion and prescribed exclusive use rights oppose each other.

A diversification of use rights is observable, to bridge the gap between the existent local and suggested project law. A hierarchy of use rights is negotiated among members and non-members and formally adapted. As a result, withdrawal for household uses is differentiated from withdrawal for drinking on the bush farms, and withdrawal for small amounts for immediate drinking, use of the pump as an exit option during pump failure, and for providing water to livestock.

Table 22 Local use rights

Right holder	Use right status	Right transfer	Characteristic
Members of water community (Internal rights)	Full withdrawal right	After payment of community contribution or entrance fee	Communal right Group right Based on project law
	Use right for livestock	None	Public right Based on norm of non-exclusion
Non-members farming in the area (External rights)	Limited withdrawal right	Negotiated between committee and farmers	Private right Based on norm of non-exclusion Limited to drinking water use during farm work
Non-members passing by (External rights)	Tolerated access	None	Based on norm of non-exclusion Limited to immediate drinking and filling bottles.
Non-members from neighbouring water user communities (External rights)	Limited withdrawal right	Negotiated between committees OR between committee and individual non-members (After payment of fee)	Communal or private right Based on norm of non-exclusion Limited to small period of time (1-5 days) (Fetching after members)
	Use right for livestock	None	Public right Based on norm of non-exclusion
	Tolerated access	None	Based on norm of non-exclusion Perceived as illegitimate / sanctions

Limited withdrawal rights manifest in two forms. They are external rights. First they can be negotiated rights with farmers, which require of water for drinking during work. The committee acts as a representative of the community and right giver. Individuals receive the right from them. They are only entitled to carry water to their fields and store it for drinking on their fields but not to carry basins of water home.

A pump breakdown is a rare event and requires extraordinary arrangements and temporary withdrawal rights to another hand pump to ensure continuous household water provision. Even though, they are also external rights, they serve as manifestations of the relationship between the two pump communities. Normally, each compound is a member of one water user community. As long as the own pump is functional, people will not shift to any other hand pump for two reasons. First, the hand pump may not be attractive (e.g. due to longer distance) and more importantly, people are not entitled to use another pump. Fetching household water from a different pump under normal circumstances results in sanctions (driven away from the pump, being insulted and physically hindered from access); access is rarely tolerated.

External rights are one-directional. The right giver decides about the request and formulates rules and conditions. Requests can be rejected completely. If the needy community is large, a number of right givers (water user communities) face a number of right takers (single compounds), means the needy pump community splits and its members seek access to different hand pumps.

Non-consumptive water use, such as bathing, swimming, fishing or washing clothes is only applicable to rivers and small reservoirs. Access rights to rivers and streams are not defined and therefore public. For maintaining the quality of the reservoir water, bathing of people and animals as well as washing cloths are not permitted according to the committee rules. Practically, children and young people enjoy access because their behaviour is tolerated.

7.3.4. Power – decision making rights

It is important to remark that decision-making capabilities are not only a matter of rights but they also depend on individual abilities (e.g. mental, physical) and the particular situation and status of the individual. Individuals possess a different degree of social and economic capital. These factors vary from individual to individual. Moreover, they undergo changes during the life cycle

(compare chapter three). Cultural practices and beliefs are decisive factors, which usually elude the intentional exertion of influence and regulation.

For example, although women are ensured by project law to be crucial actors in decision-making over water resources by the NCWSP guidelines, a lack of self-esteem and courage to use this opportunity was often met in practice: *“The fact is that our leaders are not present [...] We are only women who are of ourselves. We are of our husbands, who take decision for us. So we are afraid that [when we decide] today, we may be blamed.”*¹⁵⁵ Here the socio-cultural norm of gendered behaviour in decision-making proved being more important on the ground than the introduced project guidelines. Once more, it is important to keep in mind that water rights are but legal entitlements, which are translated into legal practice. The practice may not necessarily reflect the right.

As discussed in chapter two, decision-making rights can be sub-divided into the right to manage a facility (the site, the funds), the right to allocate water to users and the right to exclude people from access. Not all decision-making rights are applicable to all kinds of water sources. For surface water bodies, such as streams and rivers, no right holder is defined. The management is rather a matter of self-regulation, which is shaped by socio-cultural norms. For example, it would not be an adequate behaviour for an individual to go and cut trees along the river banks without the agreement of the *tindaana*, who knows whether ancestral spirits could feel disturbed by such an act. It would not be considered to be adequate to allow livestock to enter the shallow wells instead of driving them to special watering places, because the repair would require additional labour. It would not be adequate to wash cloths directly in the shallow wells because water would be polluted and become unfit for household uses. Such inadequate behaviour is not explicitly formulated as rules but a matter of local common sense. It is very difficult to imagine that an average person would behave inadequately. Children and mentally disturbed people are monitored, taught and warned by all community members, when they come across such behaviour. If a decision has to be taken, e.g. a watering place shifted to another site of the stream, the decision-making body comprises the section elders. They also have the power to sanction inadequate behaviour but sanctions rarely occur in matters pertaining to surface water. Because surface water is a common pool resource, no right is defined to allocate the resource or to deny

¹⁵⁵ Translated transcription of borehole meeting Market Square pump community, 21.12.2004.

access. The decision-making role of the community elders concerning surface water as well as the role of the *buligadaama* are a manifestation of local forms of legitimisation and authority, which are based on patrilineal descent, seniority and male dominance and as such manifestations of Nankane socio-cultural norms.

The *buligadaana* neither holds the decision-making right to allocate water among the users nor does he exclude anybody from the use of a well. Being a *buligadaana* is rather about enjoying prestige and be called for duty when technical problems show up at the well site. *Buligadaama* do not benefit materially from their well ownership. It is rather that they are obliged to bear unavoidable costs for keeping the well functional if the users are not able to contribute a share. Users are not expected to give anything to the well owner for fetching water. Only when large amounts of water are needed, such as for construction work or the celebration of funerals, it is a matter of good manners to inform the *buligadaana* and bring him Kola nuts. Giving Kola is a common local practice to show respect to older people (e.g. elders, *yidaama*, the bride's parents) to approach them and to express one's gratitude. Hence the gift would be wrongly interpreted as payment for water, for it is actually a socio-cultural practice. User groups for wells are not bounded but flexible in their number of users. The *buligadaana* has no say in defining who belongs and who does not to the water user group. Hence, in the case of wells, decision-making rights are limited due to the norm of non-exclusion. For minimal management is performed, the number of management rights are limited and the rights not expressed explicitly.

Box 23 Case study: Joining a well community

When the improved hand dug well in Busongo collapsed in August 2004, the Busongo Sibiisi well community moved straight to the wells in Nyangolino without seeking anybody's permission. Their well committee secretary is one of the three *buligadaama* in Nyangolino but they fetch water not only from his well but also from two others. Despite this overlap in leadership, access was not negotiated with the well owners or former users but instead, the members of Busongo Sibiisi well community simply shifted and joined the existing well user groups.¹⁵⁶ For these user groups did not display formal boundaries, there was no procedure to recognize the additional users.

Culturally, it is a serious faux pas to refuse water to somebody. Water is the first thing offered after the exchange of greetings to visitors. Reluctance in offering, forgetting it or not having water in the house leads to endless apologies by the host and discomfort on the visitor's side. In contrast, the refusal of water by the visitor is so unusual among rural Kassena-Nankana that it

¹⁵⁶ Interview with Mr. N. Atugfo; 12.02.2004; field notes.

may be used to indicate extraordinary events, such as message about someone's death (Abasi 1995: 452). It is a matter of politeness to drink the offered water or at least drink some of it. During the field research, it was obvious, that in most of the houses, the offering water was still appreciated and practiced, whilst in some few compounds the cultural norm had eroded. (In such cases, other people accompanying me always commented this as lack of good behaviour.)

People have the right to demand for water at any time and from anybody by simply saying: "*Mam boti ko'om*" (I want water) or simply "*Ko'om*" (water). They expect the house person to get up and get water. Aliens like Southerners and me found this demanding attitude very impolite before getting used to it. It was annoying sometimes just coming from the hand pump and seeing strangers drinking half of the water one had just fetched. Thirsty people walk into any compound yard and take water from the big storage pots to drink when the house people are absent. Women in the neighbourhood complained that after leaving the compound for a short while, they found their fully filled pots half empty due to the thirsty schoolchildren, who passed the way. "*It is disturbing but what can we do?*" they asked. The right to refuse water or exclude people from water is of relative recent origin in Sirigu.

In every pump community, there is a group of people responsible for the hand pumps, which are usually referred to as pump committee, borehole committee or exceptionally *pumpi kiima* (pump elders). The decision-making rights of the committees are backed up by NCWSP policy and project laws.

Box 24 Water committee guidelines

"The community MAKES DECISIONS on how they want to manage the pump. The community gives POWER to a committee to make decisions and take action in their behalf. You have 10 TASKS as a pump management Committee:

- (1) ORGANISE THE WORK so that everyone has a job*
- (2) ORGANISE MEETINGS [...]*
- (3) INVOLVE THE COMMUNITY in caring for and paying for the pump and taking part in community water action*
- (4) GET OUTSIDE HELP – from COWAP staff, Area mechanics, the DWST, and other people*
- (5) MAKE SURE THE PUMP IS USED PROPERLY and water collection [= water allocation] is organised fairly so everyone gets water*
- (6) MAINTAIN YOUR PUMP organise inspections, maintenance and repair, hire Area mechanics when needed*
- (7) COLLECT AND MANAGE MONEY [...]*
- (8) KEEP [financial] RECORDS*
- (9) CLEAN AND MAINTAIN THE PUMP SITE [...]*
- (10) USE PUMP WATER TO IMPROVE HEALTH"¹⁵⁷*

¹⁵⁷ GWSC (undated).

All committees stated that the water user community elected them at a general meeting, though the answers differed slightly: “*The committee was elected at a general meeting.*” “*The community has chosen us.*” “*The committee members were voted for in a general meeting.*”¹⁵⁸ There are two words in Nankane meaning ‘to elect /to chose’: *biηε* and *looe*. The verb *biηε* carries a strong connotation of ‘to select/ to choose’ and ‘to appoint’, whereby *looe* is rather meant ‘to elect’. *Biηε* further implicates that a choice is a communal decision. “*The neighbours ask us to be their leaders.*” is what had happened in most of the cases. Observations at all kind of other community meetings and interviews suggest that the usual and most common way of delegating responsibility and decision-making rights in Sirigu is by appointment. Chief and elders often appointed committee members after an open debate, which identified capable persons within the community. Hence the decision-making right allocated to the committee heavily depends on the legitimisation of the committee through the community – no matter whether the committee members were elected or appointed. Elite capture of water committees by local authorities was not observed in the village.

A crucial selection criterion for the committee members was that they had done something good for the community before. They were known to be honest, truthful, reliable, good at handling people and good at mobilizing people. Other criteria were the permanent residence (as opposed to seasonal out-migration or schooling) and in a few cases, literacy. Some criteria were rather implicit than out-spoken and hint at the fact, that it is a complex bundle of supporting characteristics rather than one or two obvious criteria, which had an impact on the selection.

Box 25 Case study: Selection of committee member

The secretary from the Tendoono pump committee, Mr. Akia, holds four different community responsibilities. He acts as secretary of the village Association for the Disabled, as local Female Genital Mutilation campaign facilitator, as HIV/ AIDS community layman counsellor and also as community volunteer. He lives in one of the compounds next to the borehole. His house is the house of the Sirigu *tindaana* and Mr. Akia is a close relative of him. Mr. Akia is a Catholic. (The Dioceses provided the hand pump.) He is literate and speaks fluent English.

Source: field notes 2004

Gender was never mentioned as criteria for the selection of committee members; despite the local pattern to organize community work. The mobilization of women goes in line with the women

¹⁵⁸ Stressing the differences between the English words ‘vote’, ‘elect’ or ‘chose’ is not useful because the survey was conducted in Nankane and the translations given by my assistant were not all the time coherent.

associations, which unite women from village sub-sections. Hence, it was very obvious for most of the water user communities to create a link to this already existing and functional mobilization scheme by making the female (or sometimes also male) leaders of such associations a member of the pump committee.

The number of current members of the pump and well committees varies from three to seven members. *“Village political organization in Northern Ghana gives very little room for women to have input in decision making.”* (Kendie and Abane 2001: 197). This also reflects in decision-making around water sources. Although gender balance in committees is claimed in all NCWSP and NGO project laws, it is not realized in practice. Four of five possible options were realized in Sirigu (gender equality, more men than women, more women than men, only men; but never only women). There is a tendency to include women in the committee, but they are numerically underrepresented; no chairwoman was recorded. Women act mostly as treasurers, which seem to be a typical pattern of organization also in other parts of the country. Examples from Sirigu show, that women can be of great importance for the functioning of the committee without being member of it by, for example, by writing and doing the book keeping for the illiterate husband who works as the secretary of the committee. Many examples show that the members of water user communities are strongly involved in the formulation of norms, rules and sanctions for rule breaking. This happens usually during community meetings, e.g. so-called borehole meetings. In contrast to other village meetings most of the participants are women. On the agenda of such meetings are points, such as the exchange of information, the report on the financial status of the pump community, the determination of payments, the allocation of community labour for maintaining the pump site as well as the definition of sanctions against non-desired behaviour. Water committees rather lead or facilitate communal decision-making but don't hold exclusive decision-making rights. After decision-making during the meeting, they are on duty to implement the decisions, e.g. to collect fees, record the new rules, perform sanctions against members or monitor whether people fulfil their tasks.

Project guidelines for the management of improved water facilities implicate a right to exclude people from access to water. On the ground, the idea was translated to rules, without showing much impact in practice. The most mentioned consequence from the non-payment of borehole fees, for example, was to refuse access to those houses. The user community or the pump

committee decided on this sanction. However, the translation of this sanction into practice failed in most cases. First of all, not all water user communities were challenged yet to implement such sanctions. “*We would pour the water and give the empty vessels back to the women.*” was only speculated but never witnessed.¹⁵⁹ Secondly, refusing complete access to water was not always possible. A reason for the limited sanction capability is that culturally the right to exclude someone from water is a taboo. The occurrence of single source situation contributed to this factor for because the natural and institutional environment offers no exit option. Practically, the right to exclude was mostly reduced to a set of rules and prescribed procedures, which aim at the continuation of the entitlements and thereby averting the exclusion of the compound house. Although not intended, the formalization of water user groups into bounded water communities has enhanced the spread and legitimisation of the right to exclude. Whilst access is granted to all community members and exclusion avoided, the right to exclude is implemented towards non-members – even if only to a partial degree.

Nobody in a pump community holds the right to allocate water to users. All members may withdraw as much water as they like and as much as they can carry. There is no rule, which defines, how often somebody may use the pump for fetching water. Practical water allocation is determined by other factors (see chapter eight).

Communal decision-making in pump communities is limited to decisions of day-to-day management and the maintenance of the facility. It was stated about the situation before the implementation of NCWSP that “*participation was perceived only for the day-to-day management of the water pumps [...] At no time has a truly participatory approach been adopted in which villagers discuss the suitability of the water supply system and their ability and willingness to pay for those systems.*” (Kendie and Abane 2001: 197, compare Botchway 2001 for participation in NORRIP). The choice of the water supply systems is so limited by local hydrological conditions, local ability to raise community contribution and the lack of local knowledge of technical solutions, that the communal decision-making about supply system and pump site are nothing but a formal agreement to expert’s suggestions. Truly, local people may call for a facility in their sub-section and initiate waer projects. This could be called ‘demand-

¹⁵⁹ Busongo Dam pump committee, 24.05.2004

driven but apart from that, not many options for decision-making show up practically on project planning and implementation level.

The two small reservoirs in the study area are also under the management of water committees. The water committee for the Mission dam was recruited from the circle of elders. The project facilitator of the rehabilitation project employed by the Dioceses basically installed the Busongo dam reservoir committee and ignored local objection to one of the committee members.

“I am the leader of the dam. I have been asked to watch over the dam to ensure its proper upkeep. People have been chosen to work along with me. We called on the elders ... which Sirigu has five heads and to visit Father [the priest] and to write a letter to the Whites [the Dutch donors] to ask for help to construct a dam. The dam belongs to all citizens of Sirigu that is why we have made A. to be secretary for sometime past. [Some Busongo people think it was a kind of unnecessary meddling and also means to keep control to appoint somebody from Basingo. They argue that Busongo had enough literate persons to keep the records. The Basingo man also acts as present WSDB chairman.] Father [the priest] chose choose Asanga to lead us and to take our decisions forward and to bring us a feedback. [Q: Was there a committee before Father came in to assist?] There was no help. The help brought the leaders.”¹⁶⁰

The reservoir committees use community welfare as criteria for decision-making. Hence, withdrawal rights for the construction of schools or other communal buildings are granted under conditions, whereby private and commercial construction projects (e.g. stores for renting) are denied use rights. Practically, private construction of market stores falls under the household water regime as long as the shop owner is member of the reservoir community.

As already stated in the context of ownership, decision making, especially management rights differ according to the particular donor NGO or agency. The first of the following examples illustrates that the right to manage is only one side of the coin, whilst the obligation to manage is the other.

¹⁶⁰ Chairman of Busongo Dam pump committee, translated interview transcription, 24.05.2004, field notes.

Box 26 Case study: The right and obligation to manage

The pump communities, whose pumps were delivered during the Well Delivery Program by the Catholic Dioceses in 1993, follow particular management guidelines. Decision-making rights were centralized at Dioceses level. First local contact men reported problems and pump attendants employed by the Dioceses for repair. Some management rights were decentralized. Each pump community had its own committee equipped with management rights and local pump attendants. Other management rights remained entitlements of the Dioceses. The committees submit their annual borehole fees to the secretariat of the Dioceses in Bolgatanga, which decides on the amount of the maintenance fee and time of payment. The money is brought to a bank and invested in income-generating projects, which the pump community benefits from. The decision about investments is made at the secretariat. The pump community has neither easy access to nor full control over their funds but it holds a number of other decision-making rights, which regulate the day-to-day affairs at the pump site. The cost of eventual repair was paid by money of the pump community.

In case of the Rural Aid provided hand dug well, the transfer of decision-making rights to the user community turned out to be problematic. The Siidoone well community was incapable of repairing the well after the cement apron had collapsed in August 2004. The committee was conscious of the communal property and management rights but depended on external help to borrow a ladder to clean the well from dirt. The collected money to pay the technician to do the rehabilitation was not sufficient. When asked for help, the provider Rural Aid ignored the request because it felt not in charge of management. The well was still completely out of usage in February 2005.



The decision-making rights of the mechanized borehole at the orphanage are not clearly defined. When problems showed up, technical staff was hired and paid from NGO Afrikids and Dioceses funds. One man from the community voluntarily acts as operator.

NABIO made use of their project volunteers as a contact person. The Peace Corps reported problems to NABIO in Navrongo, which were solved by their technicians. Only when the last volunteer left, the management rights were handed over to the elders of Dazongo. For only a handful of compound houses show interest to use the improved hand dug well, the user group has not turned into a bounded community. Minimal management is performed and no maintenance fee is collected.

Sources: Field notes, pump committee survey

The transfer of decision-making rights to the user community from the Dioceses in 1993 was a partial anticipation of the NCWSP policy established five years later. At the same time, the policy was not implemented fully after 1998 because some management rights remained with the

secretariat in Bolgatanga. This hints at the fact that communal management can be understood and performed to different extents. The definition is donor-dependent. But this variation in project law is ignored in CWSA statistics.

It is only a few local people, which know the policy papers and management guidelines. Such monopoly of knowledge can be instrumentalised to get personal interest through. The existence of a water board in Sirigu since 1995 resulted in some interference of local decision-making rights. The WSDB chairman intended to take over the decision-making rights from two particular pump committees at the market site, when a third borehole was drilled between two existing ones because he had to find a way to get the hand pumps under the control of the WSDB in preparation of the coming water system implementation. He justified his claims with management guidelines for small town water systems and consultancy guidelines, which he traced back to a non-existent state law:

*“If this [the new piped system] is started, all money collected from any borehole will be handled by the water board and the committee responsible for the pipelines. That law is from the government. It is a must and it is everywhere in Ghana. [...] When the pipelines are extended to your community then such a borehole of yours will be taken over by the water board.”*¹⁶¹

Although his claim was actually not backed by any state law, he succeeded in setting up a unitary leadership for the three boreholes. The respective pump committees did not transfer their decision-making rights to the WSDB but they were rather expropriated from their rights (see chapter nine).

7.3.4. Usufruct rights

Charging commercial rates for water is still exceptional because it does not make sense in most of the pump communities for they are situated far from the market and do not possess infrastructure for commercial enterprises, such as grinding mills. Therefore, there is no need for such regulation. Household water requirements for productive uses are relatively uniform among all compounds. Water rights normally do not define water uses (except provision of water for livestock). But the conceptual connection between use rights and commercial water use already emerge in the village for management manuals propagate the introduction of usufruct rights under the concept of commercial water use.

¹⁶¹ Mr. P. Anoaah, translated transcription of borehole meeting at Market Square hand pump, 21.12.2004.

The guidelines were implemented in four pump communities, which are situated close to the market. The dual categorization between domestic and commercial uses found entrance to the local discourse. Because of the divergence of conceptual distinction and local reality, the regulation results in confusion among the villagers.

A number of economic activities are locally categorized as commercial. The categorization results from lively debates during borehole meetings and communal decision-making by the users and members of the particular pump communities when they had to decide on additional fees for commercial water use. Trade in cooked food is categorized as commercial, when food is sold each day (market and non-market days). But the amount of food and the size of the store also play a role for the distinction without being clearly defined. Water vendors are categorized as commercial enterprises when selling ice water but not cool water. Only water vendors, who own fridges, pay commercial rates but not girls who produce ice water with ice blocks. Grinding mills are commercial enterprises even though the water quantity used is very little. Taxi drivers, lorry owners and bus drivers are expected to pay for cooling and cleaning water as commercial enterprises. The Catholic kindergarten, as well as the women's initiative for Shea butter production also pays at the commercial rate. Other activities, like sale of cooked food on only market days, the production and sale of snacks or drinking bars don't belong to the commercial category. The borders of the categories are blurred.

Problematic are the registration, monitoring and sanctioning of so-called commercial enterprises at the market site. Therefore, the implementation of commercial rates is very sporadic and happens with focus on a few popular and local food sellers and fridge owners. It is obvious that the idea of commercial rates is not understood by many villagers but it was pushed forwards by members of the WSDB, who have undergone water management training. Commercial rates in the village are flat rates, which do not consider water quantity

7.4. Conclusion

The empirical example shows that there is not one system of household water management but several institutional set-ups in the village – even though they share some basic principles, such as minimal management, appointment of responsible persons and non-exclusion from access.

The local history of landscape change as the by-effect of the establishment of the Catholic Mission provides a good example of an interplay of local and external actors as well as natural, social and institutional factors. Moreover, the example of land allocation to the Mission illustrates how local knowledge and strategic decision-making may be prone to error. The consequences in the case study were both social and ecological. Even though the empirical account supports the 'savannahzation argument', it is a too small-scale observation to provide supporting evidence. Synergic effects between belief systems, human activity and natural environment may be coincidental and not necessarily reflect intended local practices of resource destruction, change, maintenance, or conservation. As a consequence, what are referred to as 'traditional practices' of e.g. water conservation may be rather reflections of an (outsider's) understanding of capitalist nature and rather than the reflection of local wisdom and intention, which perceives nature in a different and more complex way, which does not only aim at the management of resources but rather at the management of relationships between the living, non-living and supernatural parts of their environment to the well-being of the local community (compare chapter five).

Institutional arrangements do not follow a simple evolutionist way. Institutional development aims at the implementation of externally crafted institutions. Locally, the crafted institutions were partly implemented, partly refused and partly adapted to local requirements. This bricolage process is still on-going. Opponent institutions of local water rights and suggested project guidelines result in a hybrid form of water management which responds to existent and crafted institutions as well as to other socio-political institutions and seasonal water availability. Diversification processes in local water rights already occurred before development intervention entered the village but continued and speeded up when innovative water sources were introduced. The more (technical and institutional) development takes place, the more diverse the local water law becomes. Usually, the implementation of crafted institutions entail a number of detailed rules and regulations to define and ensure entitlements as well as to allocate the resource, which were not foreseen or intended by the water project.

The formally acknowledged and politically encouraged participation of water users in the management of their water supply was accompanied with the institutionalization of community participation as part of the organizational framework of NCWSP (compare chapter three). Crafted rules are introduced to the local arena and the initial implementation monitored and enhanced

(e.g. the election of a water committee), but whether the crafted rules become institutionalized is observable only at a later point in time. Existing institutions become out-dated and superseded by new institutions when new rules (either resulting from institutional crafting or emerging from ad hoc decision-making) prove to be convenient and advantageous for the water users. If the introduced rules do not respond well to the regulatory needs of a community or prove to be inconvenient but unavoidable (as is the case with some project guidelines), additional institutions tend to be established. Institutional bricolage consists of the implementation and refusal of acceptance of crafted institutions, the negotiation of existing institutions, the integration of plural normative orders and ad hoc decision-making. All these processes contribute to legal pluralism in water law at local level.

The case study shows that access to hand pumps became more exclusive considering the withdrawal rights, irrespective to the NCWSP's target to improve access (technically and institutionally). The allocation of communal property rights to water user communities did not lead to an improvement for the destitute compound houses because they already enjoyed access before and were automatically integrated to newly established pump communities. It was poor compound houses, which could not afford paying the community contribution and were therefore refused access to new hand pumps. This means that their inhabitants did not benefit immediately from a newly delivered water facility but only in a later point in time when they had saved enough money to participate financially.

8. Water allocation practice

8.1. Water allocation

Water use and water requirements differ in the village according to the location of the compound house, the composition of its inhabitants and the economic activities in which people engage. Moreover, water needs differ due to gendered and age related distribution of labour within the household. Obviously, it is neither the same amount of water, which people withdraw from the boreholes nor is it the same amount of effort, which people make and have to make to receive water. Moriarty and Butterworth (2003a) claim that *“household water supplies should be treated as domestic water already is, and should not be subject to the same allocation processes as for ‘commercial’ water [...] a proportion of water for productive use (as part of household allocation) should therefore be included in rights-based allocations [...] based primarily on principles of equity”*. This statement implies several things, such as the existence of a water right regulating the entitlement to domestic water, which is indeed the case in Sirigu. Second, it implies that such a water right can integrate a principle of equity among users. This popular notion is frequently met; claims for non-discriminating right to water or the improvement of women’s right to water have emerged predominantly in policy statements and development literature (e.g. UN/ Economic and Social Council 2002). Third, the claim leaves an open door for the allocation of commercial water according to other principles. The strongest of these alternative principles is the allocation of water according to its economic value (meaning that those who pay water tariffs will get water allocated). Thinking about right-based allocation of household water, one has to ask what equal allocation might mean. Surely, it would be of no use to allocate the same amount of water to each member of society because as explored above, individual water requirements differ according to gender and age. Other factors can be added here, such as health status, responsibility for infants, involvement in productive activities etc. Equal allocation could also mean that each individual receives as much water as he or she needs and desires or, in case of limited resources, an equal share of the resource according to individual and household water needs. With reference to the human right to water, the local allocation of

water should be free from discrimination on the basis of sex, age, religion, social origin and social status, property, physical and mental disability, and health status (see chapter three).¹⁶²

The local water right regime does not pay tribute to differences in water needs, because water rights are mainly group rights attached to compound houses and not to single households or individuals. Use rights do not define quantities of water that a house and its individual inhabitants are entitled to. Generally, water rights also do not consider different water uses. Moreover, they do not define water allocation practice in detail. Even though water rules exist to fill some gap in regulation, their analysis does not fully explain the differences in water allocation and withdrawal. Therefore, the sixth chapter intends to address following questions: What is the relationship between individual and household water needs and water allocation practice? Is gender-differentiated pattern of water use and water requirements reflected in water allocation practice? And to what extent is water allocation practice influenced by local norms and what are the other factors that come into play?

The academic literature suggests that practical water allocation of household water depends on both institutional and non-institutional factors. Institutional factors cited in the literature include use rights (often articulated as 'access' without reference to rights) and rules for water fetching but also general socio-cultural or religious norms, which are of importance for local communities; non-institutional factors include, for instance, ecological factors, local perceptions, open or hidden conflicts, but also individual characteristics of the water user.

Several examples for such socio-cultural and religious norms were provided by studies on African rural water supply and management. In Hausa communities of Northern Nigeria, the purdah system was observed to lead to a high involvement of men and comparatively low participation of women in water fetching activities (Nyong and Kanaroglu 1999). In some Southern parts of Ghana, local rules restrict menstruating women from fetching water as it is connoted with impurity (Mensah 1999). In the Luo society of Kenya, women are restricted from fetching water at particular period in their life cycle; men were prohibited to carry water. A set of cultural rules exist, which, for example, prohibit people from passing another's persons house on their way from the pump to their homestead (Nyaoro 2001). The non-institutional factors, which

¹⁶² The other criteria listed in the Comment no. 15 are not applicable in the research context.

regulate practical water allocation, apart from the most obvious one, water availability, can be distinguished into three categories: (1) local perceptions of water sources, (2) relationships between social groups, and (3) individual characteristics of water users. The first category mainly includes local perceptions about particular water sources, the distance to such water sources (Cleaver 1998b, Nyong and Kanaroglu 1999) and local preferences for a particular water quality (Cleaver 1998b). The second category includes tension between rival social groups (e.g., Nyong and Kanaroglu 1999) as well as tension between social groups due to competing water needs, e.g. between peasants and pastoralists (e.g. Tonah 2002). Arrangements between first and late settlers belong to this category as well as co-operational arrangements between peasants and pastoralists (manure – water contracts) (Toulmin 1992). Factors such as physical ability of the water user and the specific situation, which shapes his or her life, fall in the third category.

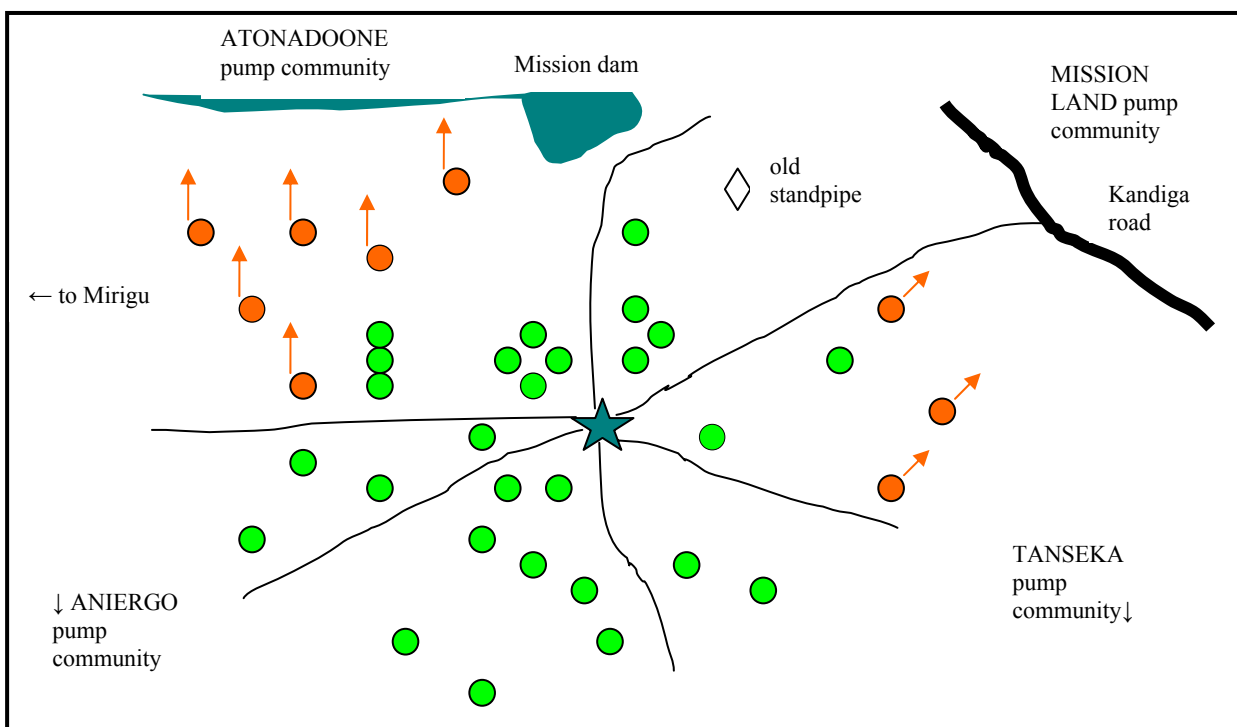
The empirical data to test the suggestions given in the literature were mainly collected through anthropological methods like systematic observations (during visits, at the pump site and participation in meetings and community events) and semi-structured interviews with men and women from the Abeleteo pump community. The compound interviews were preceded by a compound survey to be able to characterize the pump community as well as the single compound houses. The documents kept by the pump committee were also included in the analysis. The Abeleteo pump community was also a part of the pump committee survey. Additional data from neighbouring pump communities was integrated and analysed concerning their relationship to the Abeleteo pump community.

The next part of the chapter (8.2.) gives a detailed description of the situation in the Abeleteo pump community by introducing its location, socio-political and socio-economic characteristics. This description also contains explanations about the relationship of property rights and membership status as well as about the relationship between membership status and withdrawal rights. The relationships revealed through the pump committee survey (chapter five) are illustrated by a particular case study. To elaborate the questions in this chapter, the following sections (8.3.-8.6.) take a closer look at water fetching pattern and allocation within the pump community and at the market. The chapter ends with a conclusion (8.7.).

8.2. The situation in Abeleto pump community

The members of Abeleto pump community live in the village sub-section of Gunwoko Abeleto. A share of Abeleto residents living at the edge of the sub-section are members of other pump communities, e.g. ten compound houses on the Northern edge form a pump community with 55 other compound houses resident at the neighbouring village sub-section Dazongo Atonadoone (Atonadoone pump community).

Map 8 Pump community Abeleto



Source: community mapping exercise 2005

Star = pump; circles = compound houses (green = members, red = non-members), arrows = direction of used pump

As the community map indicates, the pump community membership is not defined by the location of a house in a sub-section or section. Pump communities cross administrative borders (local as well as national system of administration). Further, the pump is situated at the centre of the pump community. The all year accessibility is given because no bigger stream crosses the sub-section. Although the distances in the community map don't correspond with real distances, it is recognizable that distance to the borehole is not the crucial factor to define the pump community membership. At times, compounds belong to a neighbouring pump community even

though the Abeleteo hand pump is closer to their house.¹⁶³ Foot paths have developed from all directions towards the hand pump and strengthen the impression of having it at the very centre of the pump community. Some surface water stays in a natural pond close to the pump. Thus, the central pump site provides potable water and during the wet season also surface water additional to the Mission dam reservoir at the Northern part of the village sub-section. The pump community Abeleteo has 27 compound houses, with only one woman headed compound. In total, 372 inhabitants share this water supply facility.

Compared to other village sub-sections and sections of Sirigu, Abeleteo displays better economic conditions, which are partly due to its location, situated in 30 minutes walking distance to the market, having a feeder road close by and sharing the neighbourhood with the SWOPA. Non-farm economic activities and income sources show higher shares than in other areas of the village (compare chapter six). In one third of the compounds, at least one person, mostly a man, receives an income deriving from a government job. About one third of the compound generates a cash income through petty trade or the sale of pottery and artwork to SWOPA; these sources of income are women dominated. People run businesses of different scales in 18 % of the houses. Hence, a large number of houses can afford industrially produced items, which make life in the village more convenient, especially the means of transportation. In 85 % of the compounds, people own at least one bicycle, 14, 8% of the houses have a motorbike and inhabitants of 11, 1 % of the compounds use a car. Means to transport water (donkey carts and market drums) are the items most favoured after the bicycles. Five compounds (18, 5 %) include households, which have installed some basic solar equipment, which is very outstanding in the village.

¹⁶³ Distance measuring on the ground (walking with a step counter the distances from compound house to the borehole in exactly the way the women do) has validated this impression.

Table 23 Sources of income in pump community Abeleteo

Answers (multiple choice categorized by interviewer)	No. of responses	% of compounds
Farming	27	100 %
Livestock rearing	16	59,3 %
Handicraft (pottery + art)	9	33,3 %
Petty trade	9	33,3 %
Business	5	18,5 %
Government job	9	33,3 %
	Total no. of responses: 27	

Source: compound survey 2005

But these numbers should not belie poverty of nine compounds (33, 3 %), which do not have income sources other than farming and livestock rearing, and six of them (22, 2 %) experiencing yearly food shortages, which are eased with food donations by the NGO “Holland-Ghana Foundation”. Hence, the members of Abeleteo pump community tend to either rely solely on either agro-pastoral strategy or follow a strategy of diverse income generation.¹⁶⁴ Labour migration to the South was experienced by 37 % compounds and therefore it counts as another important livelihood strategy.

Interviewees stressed often that a classification of compound houses according to income or wealth would be misleading. This is because a house which experiences a good harvest in one year may experience livestock disease and mortality the next year, and therefore, the economic stratification is always changing from year to year. Moreover, people said, “*We are all fighting with poverty. The harvest gets worse each year.*” It seemed to me that the negation of existing economic stratification within the village was a typical strategy to deal with local poverty on a discursive level. Further, these statements indicate that in the local perception, agro-pastoral activities are interpreted as the central productive activities, although non-farm activities, which have gained importance over the past decades, make a crucial difference in the economic status of the households and compounds. Compounds relying solely on the agro-pastoral strategy faced more poverty in comparison to their neighbours in Abeleteo. The line between poor and destitute is defined by the yearly experience of food shortages. Hence, Abeleteo pump community is

¹⁶⁴ For sure, a co-relation between the number of adults in a compound and the diversity of livelihood activities can be stated. But also 25, 9 % of compounds with up to three adults followed a diverse strategy, whereby 14, 8 % of houses with a number between four to seven adults did not. Hence, for those who were only farming and rearing livestock the number of adults was not the crucial criteria.

economically quite diverse ranging from houses that are able to put money aside as savings (18, 5 %) to destitute compounds, which experience yearly food shortages of one or two months (22 %). These economic differences are visible but mostly not openly acknowledged by the inhabitants, who rather stress their common dependency on natural conditions and the related risk for the generation of agro-pastoral income, which is shared by all compound houses.

Inhabitants of Abeleteo generally attach great importance to education, which can be seen in the large number of houses which have youth schooling outside the village (44, 4 %), attending boarding schools, training colleges or university. This also hints at higher income levels than in other village sub-sections because it indicates the regular payment of school fees. A co-relation with the high number of Christians in this sub-section can be assumed because it is mainly members of the Christian communities who stressed on the importance of formal education for village and personal development.¹⁶⁵ The number of Christians, especially Catholics is high and the share of confessionary mixed compounds is smaller than in areas located further to the Mission land and the Catholic Church.

The socio-political organization of the sub-section resembles the situation in other parts of the village (see chapter three). The elders consist of a council of the eldest men of the sub-section. Abeleteo has a *kɔma naba* but is under the responsibility of a *naba* residing outside Abeleteo in another part of Gunwoko. Neither *saadaana* nor *tendaana* have their compound houses here. Abeleteo is under the *tendaana*-ship of Dazongo. The assembly man in charge also lives somewhere else. Here again, the crosscutting character of administrative units can be recognized. One could assume from the absence of individual authorities, that water allocation is less endangered by elite capture as reported in other studies (such as in Sessouma 2005, who conducted a similar study in the Burkinabe part of the Volta River basin).

To summarize, the pump community Abeleteo is somehow exceptional in the village because the economic situation is better and more differentiated, the level of education higher and the religious belonging less diverse than in other sub-sections. The pump community was chosen as the case study because I assumed to meet contradictory normative orders, more economic

¹⁶⁵ I assume this has to do with the high prestige of local people who are able to perform Sunday reading and the fact that respected people who do trained work (teachers, nurses) or are active as leaders/ community mobilizers in development projects are mostly Christians. Many development projects in the village were associated with Christian activities, NGOs etc.

stratification, more mobility and knowledge exchange in Abeleto than in other sub-sections. Further, no central authority can be identified in Abeleto. Still, poverty led to challenges, which had to be solved by the pump community.

8.2.2. Communal ownership of the pump

In Abeleto, as in other sections of the village, the poverty of a number of compounds encouraged the community to link property rights to additional rules, which went beyond the by-laws and guidelines given out by the Dioceses. The creation of additional rules was necessary to avert the dismissal of the project. Property rights could not be allocated at the same time to all compound houses but additional rules regulated the later entrance of non-member compound houses in the pump community. The guidelines of the dioceses planned first to collect an amount of 150.000 Cedis from the future user community as community contribution. As a second step, the property rights were transferred to the new pump community. How and according to which rules the money was collected in the communities was left for them to decide.

In Abeleto, each compound was expected to contribute an equal share irrespective of the economic situation or number of inhabitants. However, most houses were not able to raise the amount due to the short period of collection. The time of the money collection during the first five months in a year overlaps with a seasonal cash shortage caused by high expenses for funerals, the widespread inability to sell fowls, hens or eggs due to a seasonal disease, and expenses for additional food items bought in the market when the own harvest is going towards its end (from March onwards).

Finally, only five compound houses paid the whole requested community contribution (each 30.000 Cedis). As a consequence, the property rights were only transferred to these five houses, which called for a community meeting and set up rules to define the entrance procedure to the pump community for their neighbours. Subsequently, one of the five houses withdrew from the new pump community and was paid back its 30.000 Cedis. The pump committee was recruited from and chosen by the remaining four compound houses, indicating that its members belonged to the non-poor houses.

Once other houses fulfilled the request for an entrance payment, they received equal property rights in the water supply facility. However, no written record is available on this matter and oral reports differ. The entrance fee has constantly increased since then; some compounds entering the pump community later had to pay 98.000 Cedis to compensate the initial compounds according to the pump committee. Both, the amount and the idea of paying back remained diffuse because the money was not redistributed to the initial compound houses but was retained for borehole maintenance. From the minutes taken during an executive meeting, we know that: *“It was agreed that any house which wishes to join fetching from the borehole should pay 10.000 Cedis within this 1995 but in January ‘96, 15.000.”*¹⁶⁶ A new compound house was expected during the time of research to pay an amount of 140.000 Cedis to the committee to receive shared property rights. The committee justified the increase with inflations the Cedi has undergone since 1993. The financial requirements were randomly defined. Factually, no new compound has joined Abeleteo pump community since 1996.

The communal ownership of the water facility defines the membership in the pump community. Members are these houses, which have paid either the community contribution in 1993 or later an entrance fee. According to the committee, property rights were extended to two destitute compounds next to the pump, which were expected of never being able to afford the entrance fee. These two compounds were counted as full members.

Two compound houses hold a double membership in Abeleteo and Aniergo pump community, meaning that they pay borehole fees for these two hand pumps. The inhabitants tend to fetch water rather in Aniergo because it is closer to their house. The Aniergo borehole was constructed recently; the motivation to also pursue property rights there was the closer distance. To stay member of Abeleteo pump community was not costly because the entrance fee had been paid any way and it was not possible to get it back. They continue paying borehole fees in Abeleteo to ensure an exit option in case the Aniergo hand pump breaks or the hand pump there is too crowded.

¹⁶⁶ Pump Community Abeleteo Minutes Book, 17.12.1995 (executive meeting)

8.2.3. Use rights to the Abeleteo hand pump

Members of the pump community and users of the pump are overlapping but not coherent categories. In this respect, the case of Abeleteo pump community is representative of all other pump communities. The membership in the pump community entitles full withdrawal rights to all members of the compound house. Thus ownership and withdrawal rights are directly linked to each other. Further, withdrawal rights are connected to the regular payment of borehole fees. As the term implicitly indicates, it is locally more perceived as a contribution towards the maintenance of water supply facility than a water tariff. Another set of withdrawal rights is held by individuals of non-member compounds. These rights limit fetching times, water use and water quantity (see previous chapter). The non-member users pay neither borehole fees nor other fees for their water use.

The payments of borehole fees are recorded in a book, which is kept by the pump committee. During the pump committee survey, it was declared that two destitute compounds are freed from payments but further interviews suggested that is not the case. A widow living in one of the houses reported that the committee would pursue her to pay the borehole fees and threaten her to deny her access to the borehole, if she fails to pay. *“I am always the first to pay the borehole fees because if I don’t have water, I won’t have anything.”* Her neighbours reported that the committee tries to get money from her whenever they suspect her to have received some remittance from her sons, who migrated southwards for work. *“The way they disturb this lady... They say, how come that you have sons living South and they don’t send you money? But how much do they even have to send?”* If the pressure gets too much or the woman is scared that the borehole will be locked, she tries to sell something small like a bit of grain, or a fowl.

Project management guidelines and pump committee training worksops encourage the committee members to sanction non-payment of user fees by the refusal of water. Also in Abeleteo pump community, the non-payment of user fees leads theoretically to the temporary loss of withdrawal rights. Empirically, none of the 27 compound houses were denied access even though not all of them had paid their yearly borehole fee regularly. Asked about the widow and other compound houses, a committee member explained, *“We want to scare them. They won’t bring out the money if they know it will not harm them.”* The situation of a single source does not permit the complete exclusion of people from water, the local concept of water rights also play an important

role. Apart from the socio-cultural norm of non-exclusion, withdrawal rights are strongly linked to communal ownership and not to the payment of borehole fees. Excluding a house, which shares the same degree of property rights, is very unlikely even though this house does not pay borehole fees.

The amount of 3.600 Cedis borehole fee per compound house was collected from 1993 onwards; this amount has increased in 2003 to 5.000 Cedis per annum (ca. 0, 50 Euro). This amount is very little if it is considered to be the price of water. But actually, there is nothing like price of water, as water is not a commodity in this context. The borehole fee is a fee for the hand pump maintenance not for the resource.¹⁶⁷ The compounds are expected to pay in January to the pump committee, which goes around from house to house to collect the borehole fees. Four or five houses - always the same ones - paid the user fees by instalments. The main income sources with which the borehole fees are paid are the sale of livestock or eggs (74, 1 %) and agricultural harvest (40, 7 %). The responsibility for the payment is with the compound head in half of the compounds. In case of the other half of the compounds each adult will contribute his or her share to the amount the house as whole has to pay. When a repair is needed, the member houses are charged extra amounts to be able to pay for the spare parts and the area mechanic. Extra payments are not recorded but handled informally, which results in low transparency. In the beginning, the money collected was brought by the treasurer to the head office of the dioceses in Bolgatanga, where the money is administered centrally.¹⁶⁸ Since the loss of funds due to a theft by the bookkeeper of the Dioceses, the funds are paid into a bank account. Since the bookkeeper was imprisoned, no full staff member was appointed for the bookkeeping.¹⁶⁹ No further information or record was available from the Dioceses office even though the payments are still brought to the Dioceses and from there transferred to the bank.

In Abeleteo pump community, the borehole fees are usually paid and delays or non-payment are exceptional but occur from time to time.¹⁷⁰ In such a case, a set of informal rules directs the

¹⁶⁷ The borehole fee is used to pay spare parts and repair of the pump. Apart from this, the fee is so low, that it is impossible to calculate a price per m³ of water.

¹⁶⁸ During the training workshop, the committee learnt that 5.000 Cedis monthly (= 60.000 yearly) are spent as follows: 2.500 for mechanic, watchman, motorbike maintenance, fuel, administration and 2.500 for the pump community fund. Money was also invested into buying commodities and selling them off for a profit, from which the pump community benefited. No detailed data was accessible about these transactions.

¹⁶⁹ Father Ayaga, conversations, 2005

¹⁷⁰ Record book Abeleteo Pump Community

negotiations between the committee and the reluctant house. These informal rules include the option of paying by instalment, paying a lower fee, or paying at a later point in time. This explains why the widow is put under pressure but never practically prevented from fetching water. Locking the borehole or the announcement of it are only symbolic actions most of the time.

Inhabitants of non-member compounds do not hold withdrawal rights for household water; their requests for water are refused and they are hindered from fetching water for domestic purposes. This has happened several times with compounds from the northern part of Abeleto. *“They will drive us away when we come. In wet season, the stream crosses our way and we cannot go to the pump in Atonadoone. Still they will not allow us to fetch”* told a young woman from one of the non-member compounds. However, according to other people, even non-members are tolerated. Women from three northern compounds fetch occasionally from the Abeleto pump for household use. They are not welcome and arguments arise at the hand pump each time they show up. They were invited to consultations with the Abeleto pump committee and given the choice of either becoming a member by paying the entrance fee and borehole fees or to stay away. The three compounds are as much embedded in social networks (via kinship, neighbourhood) as the others. The female inhabitants of one compound house are known for their talent in pottery and art and are prominent members of SWOPA. It was suspected that the non-members sneak at night to the Abeleto pump. However, women of the suspected compounds denied this and wondered about the accusation. *“We only go there when there is a funeral here. Then we take our basins and leave it by the pump. On our way back, we fill them and carry the water home.”* This is an accepted practice, not only in this sub-section but also in other parts of the village. If secret night fetching takes place, it is not based on any right and is perceived as illegitimate; despite this access is tolerated.

The compound house, which was suspected of secret fetching, provided an example of divergent gender interest. It remained member of the older and distant Atonadoone pump community, for the *yidaana* did not agree to join the closer Abeleto community. He argued that his cattle were already used to the older pump, and his interest, which was not to make the cattle get used to the new place, gained priority over the interest of women from his house. The women prefer closer distance, especially because they have to cross a hip-high stream when fetching from the distant

pump in the wet season. Interestingly, according to local water rights, cattle may drink from any borehole, irrespective of the membership of the compound in the pump community for watering rights are public. The compound house could have joined another pump community without changing the watering place of the cattle. Even after the man died, his decision stayed valid. The women explained this partly due to the lack of money to pay the entrance fee to Abeleteo pump community. In fact, the women did not even know how much entrance fee would be required to join the nearer Abeleteo pump community. It seems that the lack of money was only a mock reason given and in fact, the incentive to pursue a new membership in the Abeleteo pump community was not strong enough to be translated into action.

8.3. Preferences for water sources

The choice for water sources depends on a complexity of water preferences (Clever 1998b: 350). From the GLOWA-Volta household survey it became evident that the majority of households in Ghana use different water sources for one activity. Moreover, one water source provides water for different activities. Most households rely on a major water source, which was complemented with additional sources. The particular combination of water sources varies across season (Engel et al. 2005). Not surprisingly, the in-depth research in Northern Ghana came to same findings. A particular characteristic of the village is the regular occurrence of single source situations. But the Abeleteo pump community overlaps with the Mission reservoir community drawing water from the Mission dam reservoir. Hence, in dry season, high quality groundwater is available as well as low quality surface water, and people make choices of which amount to fetch, from which source, and for which purpose. Two advantages of the reservoir over the hand pump are the absence of waiting times as well as the absent need for pumping. Choice is gender differentiated for most men and boys prefer an even and flat waterside of the reservoir, which can be reached easily with donkey carts whilst most women prefer an edge, from where the water can be easily drawn with a bucket without stepping into the water.

Most of the compound houses in Abeleteo pump community make use of the reservoir but some opted not to do so. The use of the reservoir is a decision taken at the household level, not at the compound level. The use right is acquired through a similar procedure as the use right in the case of hand pump (entrance fee paid for the compound house) and attached to the complete compound house irrespective of individual or household water needs. Whether the household use

the reservoir or not depends; inter alia, on the composition of the household. A second but overlapping factor is that the reservoir is used for providing water to livestock. Some domestic animals move there independently; households with very few livestock have to provide water for a part of their animals that do not move independently and people bring water to the house (from either the pump or the reservoir). The type of livestock along with the ownership pattern within the household plays a crucial role as well for the use of the reservoir option.

Box 27 Case study: Livestock ownership and preferences for water sources

One of the households in Abeleteo pump community consists of an old woman, who is still active and well able to run her own household. Her husband is dead and her daughters are out of the house. Her son lives with his wife in another household of the same compound. She owns some goats and for them she fetches water from the pump. She says that it would be very difficult for her to get her goats used to the reservoir because she would need to drive them there once a day about one or two weeks long for the goats to learn moving there independently. *“I am an old lady. Will I run behind my goats? There are no children in the house who could do that for me. Therefore, I give them from the water I fetch from the pump.”* Although having the goats going to the reservoir would be of advantage for her, she thinks that the situation is convenient for her because she goes to the pump anyway and does not need to provide water for anybody else but only for herself..

Source: Compound interviews, March 2006

Some people explained during the interviews that they feel that the reservoir is too far in comparison to the pump, which was a reasonable explanation when considering the location of their compound houses. Thus, distance was a third factor, which influenced the choice of water source. Fourth, water quality was also considered. Some households situated very close to the reservoir stopped fetching for bathing and washing in the middle of dry season, when the water became clayish. People of one household stated, *“After the rains, the water was very fine, very clean but now, it is only good for the animals.”* Other households and individuals did not mind and continued fetching water from the reservoir for bathing and washing, e.g. young men liked it because washing their cloths could be done at the dam in the company of their friends and in combination with swimming. The academic and development literature tackles the choice of water sources mainly according to three factors: distance to water source, perception of water quality, and time needed for water fetching. Cleaver provided a description of female criteria for the choice of water sources in rural Zimbabwe. Her case study illustrates how women balance cost and benefit of several water sources, but also that other factors are considered, such as the possibility to combine different work and ways, the reliability of sources, and it also shows that the preferences change with the seasons (Cleaver 1998b: 350-351).

What is interesting for the discussion of water allocation is that a review of available empirical studies in Africa put some of the arguments prevalent in water policy papers in relation (see e.g. review by Rosen and Vincent 1999). For example, evidently there is no major change in potable water quantity fetched per person, if the water source is situated at a distance between 30 meters and one kilometre from the household. Significant increase in quantity was only observed when a pipe was laid into the yard or house. The authors thought that the reason could be that the size of fetching vessels and number of trips to the water source is a matter of household routine and local custom. This is a well-recognized fact since the first “Drawers of Water” study from 1972, which has been validated by a number of more recent studies (Rosen and Vincent 1999: 50-51). Regarding water quality, a number of studies hint at the contamination of good quality water once it is transported to the houses and stored (for Northern Ghana see Anonymous 1981, for Ghana see Carbone 2004). Further, there is not sufficient evidence of the impact of good quality water on health benefits in Africa because sanitation and hygiene practice are two other almost inseparable components of health. Since the first “Drawers of Water” study, we know that the quantity of water available may have a bigger impact on health with respect to some (the widespread water-washed) illnesses than the quality of water (Rosen and Vincent 1999: 44-48). Looking at time savings, the review by Rosen and Vincent clearly indicates, that very little is scientifically known about the economic value of timesaving. Surely, people appreciate spending less time but studies suggest that this time is mainly used for household work, social activities, leisure and rest, instead of investing it in agricultural work. They propose that a much better understanding of value of time and time allocation within rural households is needed to value the economic benefits of timesaving and that timesaving instead shows a number of indirect benefits (Ibid. 1999: 55-64).

It is helpful to keep these insights in mind, when discussing and interpreting the preferences of people for water sources and water allocation. Proximity to the water source may contribute to convenience of the users but it does not always result in improved water availability at the household level. Timesaving may show some benefit in convenience but it does not necessarily translate into additional economic activity. Finally, the use of surface water when applied in larger quantities may be more reasonable than using smaller quantities of potable water in relation to health, e.g. for bathing, hand-washing and cleaning activities.

8.4. Compound water fetching pattern

Girls and young women fetch the largest amount of water consumed within a household. They provide water not only for their personal purposes (consumption, bathing) but also for younger children and men in the household, and kitchen work. Usually, men do not fetch water for children or female members of the household but they fetch regularly for bathing and washing clothes. In no case it is shameful or unusual for a man to fetch water for his personal hygiene, his livestock, or general household use. This is not a recent phenomenon for oral history by the eldest villagers report regular water fetching for household purposes by men during the time of their childhood.¹⁷¹ With regard to productive water uses, it is not in all cases the user, who provides water for the productive activity. On one hand women fetch water for their fowls whilst men fetch for their cattle or drive them to surface water sources. In addition, boys and men fetch water for construction (moulding bricks, building) but girls and women do so for plastering and wall decoration, to name two examples. On the other hand, if only very small amounts of water are needed, it is taken from the clay pots, which are used by households to store borehole water, usually brought by girls and women.

Table 24 Water fetching pattern for compound uses

	Female		Male	
	Girls	Women	Men	Boys
Cooking/ drinking/ cleaning	XXX	XX	-	-
Bathing	XXX	XX	X	X
Washing clothes	XXX	XX	X	X
Livestock	O	X	X	O
Pottery	XXX	X	-	-
Other handicraft	O	XX	X	X
Fruit tree cultivation	O	X	X	O
Construction/ repair of houses	O	-	X	XXX
Plastering/ decorating of houses	XX	X	-	O

Source: Field data

X= fetch only for individual purpose, XX= fetch for individual and other people's purpose, XXX= fetch for individual but mainly for other peoples purpose, O= only for other people's purpose

The data suggests a clear imbalance in water fetching. One tendency is that it is girls and women, who fetch water not only for their own purpose but also for others, as small children, men, and

¹⁷¹ For opposite situation in East Africa compare Thompson (2001: 63) and Nyaoro (2001). For detailed fetching patterns in the Central Region of Ghana see Hunter (2006).

boys. The second tendency is that the youth (from ca. 10 to 20 years) fetch water for adults and for purposes, which are not their own. This finding reflects the typical water-fetching pattern in sub-Saharan Africa (Rosen and Vincent 1999, Thompson 2001). Young people contribute water to the household, which is then used by adults or for their property, such as trees or livestock. This imbalance is not only due to gendered distribution of labour within a household but also due to the right in other people's labour. Elder people command over the labour of their children and grandchildren. But it is important to realize that women are neither a group with homogeneous water needs nor with the homogenous social status or same command over their own and other people's labour (Cleaver 1998b). Women rather have a command over the labour of their daughters, who join them in their domestic work. Women have command over the labour of their young daughter-in-law as long as they share a household. Sending daughters on errand to fetch water is a very common thing to observe. Women can also ask their sons to work for them. Usually this work is then male-specific. Sending boys and young men for water fetching usually underlies the command of men. Consequently, the water fetched by them goes into male activities, such as cattle watering or construction work (brick moulding, repair and construction of houses). The household composition has a direct impact on water-fetching pattern, e.g. age and sex of the children, the number and status differences between women of the household or the presence/ absence of adult household members.

Women are less flexible with regard to water fetching times than men due to the regularity and daily basis of their water uses. For instance, cooking duty requires women to fetch water both early morning and early evening. Women use water within the house for cooking, washing dishes, and bathing small children. They fetch water almost immediately before use when water stored in the clay pots runs out. Girls and young wives, who are not yet responsible for the household's food provision, are sent on errands to provide the water required, while the other women continue with their work in the house. Adult women may also delegate water-fetching duties to children. Young school children cannot yet carry large quantities of water for they do not have enough strength and skill to balance full basins on their head, but they start sharing responsibility of water for their personal purposes. Therefore, they fetch water when they need it for their bath, usually in the evening or in the morning, before going to school.

While women's and children's water requirements are related to particular times and are rather ad hoc in character, male water needs are not bound by such constraints. Because men fetch water only for themselves, it is easier for them to schedule their water use. The water they need can theoretically be fetched any time during the day when the pump is less crowded. Moreover, they enjoy free access to the storage pots of their household. Cooking, livestock watering and bathing are daily needs, whereas washing and construction are not. The water for these purposes can be fetched at night before or when the hand pumps are less crowded. Consequently, women face more constraints in comparison to men with respect to water fetching time. These constraints are structural and accrue from the gendered division of labour.

Another typical feature of water fetching is the gender specific mode of transporting the water (Thompson 2001: 59). Women and girls carry water on their heads in buckets or basins while men and boys carry buckets either on their head or in their hands and tend to use more often vehicles, like donkey carts or jerry cans tied to bicycles. The differences are not absolute anyway. It is obviously only some poor but all non-poor compounds, which possess means, such as market drums and donkey carts, and which can use such means to fetch water. Keeping social relationship to such compounds may enable a poor or destitute compound to borrow a donkey cart in times of need, for instance, during the period of construction work.

Picture 16 Transport of water



The seasonal workload for water fetching differs according to gender, and women again face more constraints than men. Because men do not necessarily need good quality water, they may shift to surface water. As a result, men have the tendency to abandon hand pumps during the dry season and more so in wet season. In contrast to some other village sections, the Mission dam

reservoir provides a choice between groundwater and surface water in Abeleto. This results in a reduction of water users as well as waiting time at the hand pumps, which has a positive effect on women, who also have the opportunity to choose between the dam and the pump.

Here, a high interdependence of surface and groundwater sources exists, which has not yet drawn much attention of present policy makers in Ghana, despite the well-known fact that there are multiple water sources serving multiple uses. The NCWSP is solely concerned with the provision and management of potable water sources. From the water users's perspective, it is an error to conclude like Martin and van de Giesen that unimproved or non-permanent water sources are "*of minor relevance for water resource planning*" (Martin and Van de Giesen 2005: 241). A local water provision based on several sources including potable and surface water is clearly preferable to a situation of only potable water provision and thus an issue to consider in present water resource planning.

In the development literature, interest on the allocation of the resource (quantity and quality) is often merged with the interest in convenience of allocation in the chain of diversified labour routine. (Instead of taking cattle to far away reservoirs, avoiding long waiting times at boreholes or ensuring special fetching times of the day for particular purposes accounts for such diversified interest in convenience of men and women.) Such interest should be seriously considered because it shapes the management of the water points and practical water allocation. But generally, women and men in the village are well aware of the water problems of the other sex. A general conflict between water allocations for domestic purposes versus water allocation for livestock rearing was not observed. Gendered conflict may be more relevant in societies with larger number of cattle or a pastoralist livelihood strategy. When interviewing members of compounds, the outcomes did not differ when talking to only women in comparison to conversations with only men or a gender-mixed group.

8.5. Compound water allocation practice

This section returns to the question of the relationship between individual water needs and water allocation practice. Does the gender-differentiated pattern of water use and water requirements reflect in water allocation practice? To which extent is water allocation influenced by local norms and which other factors come into play?

The water allocation at boreholes usually functions according to three main rules: (1) first come, first serve; (2) unlimited water withdrawal, which implies that one can withdraw as much water as one desires; and (3) the physical or personal presence of the person willing to withdraw water from the pump. If only fetching vessels are left to represent the person in the queue, the person is ignored and pretermitted, even when he/ she returns before his/ her turn. Queuing means being present but not necessarily queuing in a line. People may sit or stand close by. The order of the queue has to be remembered. Once, it is ones turn; one may fill as many vessels as one likes or a large vessel, such as a market drum. Somebody may come with two basins for example and fetch both when it is her turn. The second basin may be kept aside the hand pump, while carrying the first one home. Nobody will touch the water because it is considered to belong to her after pumping. Then she comes back to carry the second basin home. Most people bring only one vessel to carry water

Water is understood as a private property of the water carrier only at the time of pumping or fetching water and carrying it back home. As soon as the water arrives in the compound, its property rights change from the private property of the water carrier to communal rights of the household. In sharp contrast, men may claim water, which they have fetched on their own and make sure that it is them who exclusively use it. Practically, men also share or borrow water at the household level, when it is urgently required.

In practice, a number of additional rules regulate water allocation practice. They have an impact on the time an individual has to invest in water fetching. Men are usually given preference as soon as they show up with a bucket. They do not even wait “*when they meet reasonable women at the pump*”. The reasons given for that by men and women are the same.

“How much do they even fetch? It is only small amounts.”; “Men cannot stay with a group of women waiting.”; “Men are the landlords. They marry us [women]. They are the elders, our leaders. We do not compete with them.”; “Men marry women. They head the compounds. They are stronger. So the women would not argue with us [the men]. They cannot compete. [jokingly:] Men could beat them.”¹⁷²

In case the women react less ‘reasonable’, the men respect the queue. Young men rather wait than older men. Giving way to men to fetch water was not perceived as a problem or injustice by

¹⁷² Compound interviews Abeleteo pump community, Sirigu, February/ March 2006.

the women interviewed but rather as a matter of respect and good manners. Respect towards elder people and men are socio-cultural norms of Nankane society. Even though it was not understood as being problematic, this norm in fact results in a double advantage, which especially the elder men tend to enjoy. Since men require less water than women, they tend to acquire priority given in the queue at the pump. The result of this allocation practice is not measurable in different water quantities as women neither get less water nor do men get more. Water fetching by men does not extend the waiting time for women much as men do not visit the pump regularly. But it is more convenient for men than for women to go to the pump, especially because if women want to give a good impression, they will also pump the water for men. But boys and men have also been observed doing that for women if they want to give a good impression to younger girls and show respect to elder women. However, old women are not always paid respect and they either have to queue as everyone else or are given priority by younger women, which may also assist them in pumping water. *“It depends very much of who you meet at the pump. Sometimes, they let me go in front but mostly we older ladies wait.”* was summarized by an old woman.

Quarrels and arguments were said by the interviewees to be mainly caused by children and youth, who instead of fetching water for bathing in the evening do so before going to school. Girls fetching water for a woman waiting in the house might be in hurry to carry water home to avoid reproaches. They then quarrel to fetch water without queuing.

“You know, these small children do not have much sense yet. When you tell them that they have to queue, they start crying and insulting the adults.”; “The children, they play around the borehole doing nothing and when they see a woman coming to fetch they then realize that they were first, push their buckets and start arguing.”; “There is this young girl. Morning time you go she is there, noon she is there – she is always around, arguing with people. It is the children who bring all this confusion.”; “Children who are stronger or older than others will make their way to the pump. Then the other cries. There is a lot of quarrelling. Then the mothers start fighting with each other. How comes you beat my child? And so on. Because of these children.”¹⁷³

The norm of respect towards the elder should also be relevant towards adult women. But during the interviews, some adult women complained of being insulted by the children and youth from different houses. Wondering and asking about the norm of respect caused shaking of adult heads, laughter and answers like “The children in Ghana?” („*Ghana kɔma la?*“). Many other complaints

¹⁷³ Ibid.

and comments also hinted at the fact that knowledge on history and socio-cultural norms seem to be of diminishing interest and importance for the younger generation.¹⁷⁴

If possible, some women avoid the times, when the pump is too crowded to avoid any quarrel. They shift to noon or late evening, when it is either too hot or dark, instead of fetching water during cooler morning and evening hours. Especially women, who lack strength (*ka tari panga*¹⁷⁵) tend to avoid quarrelling situations because girls and women usually argue by shouting loudly, insulting each other and at times pushing and beating the other person. An older lady stated: *“I just sit and wait and keep quiet. Because what can I do? I don’t have strength.”* Another woman explained, *“It is always the way you address people that they address you. If you don’t raise your voice, nobody will insult you.”* Not being able or willing to raise the voice against those who break the queue results in longer waiting times for the ones who queue properly.

As can be seen from the local description of waiting situations, it is rather physical strength, which determines the quantity of water women are able to fetch – both due to their inability to defend their position in the queue and general weakness, which does not allow them to carry heavy basins or to go several times to the pump. Usually, other women from the household would help out but when the composition of the household is disadvantageous, all members face water shortage irrespective to their sex and age. Compound houses with several households are able to absorb disadvantageous combination of household members through social relationships within the compound, e.g. having a daughter in-law fetching for the old parents of her husband or delegating children to fetch for the weak.

¹⁷⁴ This feature is characteristic for many societies, including the German society. The ignorance of the young about their socio-cultural environment and local history emerged clearly when talking with them.

¹⁷⁵ *Panga* means physical strength and is also used in the meaning of health. It is met in form of a popular greeting. (Have you got strength? I have strength.) A person having strength is admired. The embodiment of strengths connotes looking fresh, having some weight and muscles and a strong voice, comparative to the concept of “able-bodied”. Rapp translates it with the German “*Stärke, Kraft*” and also mentions *pangadaana*, which he translates as “*Starker, Mächtiger*” (1966: 204) and thus brings in a second meaning “power”.

Box 28 Case study: Water shortage at household level

The compound only contains one household. The *yidaana* is old and weak and so is his wife. Their daughters are married and have moved to their husband's house; the sons have migrated South. They are left with a young adult daughter, who suffers from epilepsy and could not marry. The wife is able to fetch two jerry cans a day (ca. 60 l) for the three of them and the goats. Sometimes, the daughter also contributes a bucket of water. The water is not sufficient for domestic needs not to talk of the repair of the house, which would be necessary this season.

An old woman, who is almost blind, inhabits another compound. She relies completely on the help of some small children who help her light the fire, assist her in cooking and fetch water for her. In addition, they carry water for themselves too. However, the amount is too small to support the lady and provide for the children. The children help the old woman because the younger women of the house are often travelling to markets and there is no man in the house due to labour migration.

Source: Compound interviews 2006

The examples show that the water shortage is not caused by the local water right scheme, which permits members of a compound to fetch any amount of water because of their membership in the Abeleteo pump community. Neither is it poverty and the incapacity to afford water. It is only partly due to other community members that some members are deprived them from their position in the queue. The power, which such women and youth exercise over others, accrues from physical strength and not from higher social or economic status. The consequences of water quarrels for water availability are fourfold:

1. Lower quantities of water for individuals and households.
2. Longer waiting hours for water fetching.
3. Use of a distant pump instead of a closer one.
4. Shift of fetching times to mid-day and late evening and mid-night.

The last three consequences concern convenience in water fetching but imply that the needed amount of water can still be fetched although it requires more effort. Only the first consequence results in water shortage and it is always linked to lack of individual physical strength in the research context. Observations at village level, the committee survey and interviews in other pump communities validated the impression gathered in Abeleteo pump community.

8.6. Water fetching pattern and water allocation at market site

Generally, women fetch water for their micro enterprises themselves. Some of the market goods are produced in the compounds and brought to the market for sale, means that the water for their

production is drawn from the hand pump, which the compound relies on for its water. Men also fetch water for their enterprises but tend to rather pay water carriers, especially, when larger amounts are required. The predominant role of women in water carriage business can be interpreted as an extension of domestic responsibilities for water for consumption on compound level as well as an extension of the gendered water fetching pattern (see chapter six).

The situation at the market site was very similar to the situation at distant pump communities. But at the market, shifting to less crowded times was more difficult because the pumps, which were not locked (and opened exclusively for their members) were always crowded. Use rights for market uses and compound uses were not differentiated and related to membership of the compound house or individual household (in case of quarters) in the pump community. Water carriers used the pump, which their compound house went to. Water carriers had to queue like all other women. They try to deal with the situation by fetching a part of the water at night time. The shop owners leave their market drums outside their shops to be filled. Moreover, two water carriers bring big clay pots to the borehole at night, where they can fetch and store two extra basins when it is their turn, in addition to the one that they carry straight to the market. In dry season, water carriers, shop owners and people fetching market drums for their animals or construction meet at night at the borehole. Many quarrels occur at this time. Again, it is a matter of physical strength to defend one's position in the queue and to fetch all water needed at once. It is mainly women who fetch for their micro-enterprises, water carriers and youth, who fetch at night because owners of bigger businesses delegate or pay others to fetch for them. Hence, there are no large differences in social and economic status between the people struggling for water at night.

An exceptional case was the Tendoono pump community, which is situated close to the market. The *Sirigu naba yire* and *Sirigu tindaana yire* could not be excluded from the newly formed pump community even before they paid their entrance fee. For the pump is locked during the day time, some users reported that the women of the chief's compound can tell the committee chairman to open the pump for them in case they need water during the locking times. Women of other houses also take advantage of the unlocked pump, when they notice such a situation. Hence, they cannot request more additional fetching times, which is a privilege of the chief's compound but may profit from it when such a situation occurs. Even though the chief's house

enjoys such privilege, one cannot talk of elite capture of the borehole to the disadvantage of the other users of the pump.

One of the five hand pumps at the market site was provided by the District Administration. People argued therefore that the borehole was public property and the Market Square pump community could not claim exclusive use rights. Several attempts to register the users and collect user fees failed due to a high number of users and the number of users from other villages, which shows up only on market days. Here not all users hold withdrawal rights but their use of the pump was tolerated.

8.7. Conclusion

On the base of the empirical material, informed conclusions can be drawn to discuss the questions addressed in this chapter. The first question refers to the relationship between individual and household water requirements and the local water allocation practice. Local water rights, which partly accrue from the community management approach of the NCWSP but also existed beforehand, contribute to a right-based allocation of household water. They stress the equity of member compounds in ownership, access, and power – ignoring social, economic, gender or age status of individuals living within the households of the member compound. The bottleneck for the receipt of such water rights is the membership in a pump community. Even though the membership in a pump community shapes water allocation practice and water fetching patterns to some extent (e.g. regulating which compound fetches water from which hand pump), both are influenced strongly by decision-making of individuals, and informed by perceptions of water quality and quantities required as well as by individual interest to smooth labour routine. Individual decision-making has an impact on the source of water and on the point in time when water fetching is performed as well as on the behaviour at the hand pump. Second, structural factors contribute to the translation of water requirements into allocation practice. The combination of household members (and their particular property in livestock) resulted in specific water needs as well as in specific availability in labour force for water fetching. The local division of labour and socio-cultural norms further contributed to water allocation practice. These structural factors manifested e.g. in the main responsibility of young women for fetching water and negotiation processes at the hand pump. Finally, water allocation practice was determined by non-structural, non-legal, non-decision-making factors, such as individual weakness and

disadvantageous combination of household members. Not all individual and household water needs were responded in water allocation practice but most of the individuals and households received the quantity and quality of water they required and desired because water resources are not limited. Limitations occurred rather in the possibility to smooth labour routine, high number of users and rush hours at the hand pump. When water requirements are answered only insufficiently, a lack of physical strength was always one of the causes.

The second question approached the same relation between water needs and water allocation – but with a gender perspective. The study proved popular stereotypes about gendered interest, which are cited in the literature, to be wrong in the particular research context and indicate the importance of small-scale productive activities. The difficulty of analysis lies in finding the correct balance between gender interest and household interest. The chapter argues that despite gendered interest in a smooth labour process, the priority in interest of both sexes is the sufficient water supply for domestic and productive purposes of the household. This can probably not be generalized for the whole country but it holds true in the study area, where the complementary combination of activities at household level and a wide portfolio of economic activities may counterbalance the risk of farming under an erratic rainfall regime. Again, gender differences in water fetching have structural reasons, such as the gendered organization of labour on household level and socio-cultural norms. According to water rights, women did not face more or different constraints than men. The research findings contradict popular perceptions and policy statements within the water sector, where “... *there is a very common assumption [...] that the formalisation of women’s rights to water (often associated with their rights to land) will overcome the problems of inequitable access shaped by tradition and culture.*” (Cleaver 2003). This statement might be true for water rights in irrigation water but the assumption proved wrong for household water supply for withdrawal rights were not associated with land ownership. Women do not suffer from inequitable withdrawal rights (access) in comparison with their male counterparts. The crucial issue with household water is the gendered labour distribution in water fetching and the responsibility of women and girls to provide additional water needed by other household members, which requires additional time and additional physical effort.

Mensah admits that one could think of socio-cultural norms in southern Ghana (he calls it customary water law) as being anti-female because they prevent women from fetching water, e.g.

when being under their menses. He instead interprets such taboos as aiming towards water quality protection (Mensah 1999: 21). Nyaroro provided another list of such socio-cultural taboos in Kenya, which address mainly women (Nyaroro 2001: 53-54). One could also argue against Mensah by stating that such taboos may have a protective facet for women because they release them from hard work under some circumstances or contribute to their security. The crucial question then is who replaces women and whether the taboo leads to less water availability at household level. But to my knowledge, there is no empirical study yet done on this aspect. Mensah further states, “*while one can argue that customary law is not anti-female, it is definitely not pro-female*” (Mensah 1999: 21). Taking local withdrawal rights and water rules into consideration, he is correct. Whilst women do not face specific constraints concerning water use rights, they also do not enjoy any right-based advantages in comparison to men, which reflect and recognize their major role in household water provision. Also in water allocation practice, no preference is given to women.

Finally, which local norms play in water allocation practice and what is the importance of other non-institutional factors? Individual decision-making strongly shapes water fetching and water allocation. Moreover, practical water allocation is negotiated in respect to additional factors, which are non-legal and non-institutional, such as gender, age, physical strength and the combination of individuals within a household. These constraining structural factors elude institutional regulation under a water right regime. Water allocation practice in the research village does not show a clear pattern of excluding or depriving people from water, which could be directly related to social, economic, gender or age status. (The religion of a person does not play any role for water allocation practice.) It is some of these factors coming together with physical weakness, which result in water shortage at individual or household level which then hits all household members. Water shortage is not caused by discrimination against physical disability or health status but by practical infeasibility. Similar to Mensah’s statement one could claim that the water right regime is neither anti-weak nor pro-weak. Improving the situation of weak individuals and households lies outside of water rights and water rules but require practical social arrangements. During the committee survey almost all respondents stated that the destitute compounds are not only freed from their borehole fee but also receive support from the neighbours, such as food donations, help in water fetching, farm and construction work, or by inviting young members of the household for paid work. The case study has shown that economic

destitution, physical weakness and disadvantageous combination of household members overlap but they are not necessarily congruent. In Abeleteo, there was no practical social arrangement recognizable, which supports the people, who faced severe constraints in water fetching despite the stated concern for them during the committee survey. It is well possible that such social arrangements were functional in other water user communities where they were stated. One case in Abeleteo was surprising. An old lady complained that she did not bath for two days due to lack of water caused by her inability to fetch water while a number of related young men were present in the compound. My field assistant, who lives in the next compound house, commented, “*They [the young men] do not care [about the pump and the situation of the old lady]. They know. Who is fetching their water for bathing? It is them alone. They pretend like they don’t know.*” This anecdote further illustrates the on-going change in social arrangements and norms. Moreover, the research results on water shortage provide an analogy to chapter four, where it was shown that on-going social processes may produce individuals and households, which experience destitution and food shortages. Both phenomena do not necessarily overlap, e.g. the old lady from the example belongs to a non-poor compound house. She does neither experience food shortage nor other short supply in daily needs.

Hence, institutions, such as water rights and water rules, matter but they do so only to some extent. The idea that management institutions alone can regulate water allocation and lead to more equal access among users is but wishful thinking. From an academic point of view, the possibility of changing water allocation practice by eliminating the crucial constraints through institutional crafting seems infeasible. To relate again to the Human Right to Water, one recognizes how little impact such a globally stated right can have. First of all, a version of such a basic right already pre-existed. Second, discrimination was not identified as crucial factor in experienced water shortage. Therefore, this study is inappropriate to test, whether the concept is more than a political lip service; studies on other research settings in Ghana may give more insight (see e.g. Eguavoen and Spalthoff 2007).

The research findings are very environment and culture specific. Rural case studies in Botswana, for example, suggest more mechanisms of discrimination and exclusion from household water due to hierarchical social organization of societies (Peters 1984). As was argued in chapter three, the society under consideration does not show a strict hierarchical organization. Single accounts

and policy papers on rural water supply mention the monopolization of pumps by local authorities and the exclusion of people from an existing rural water supply. *“I sincerely believe that a community can manage their water system when they are allowed to choose freely the people who should be in charge of it. But crisscrossing is there in many cases.”*¹⁷⁶ Generally, the empirical documentation of such cases is very small or non-existent. Therefore, the origin of this ‘elite capture and exclusion argument’ for Ghana remains somewhat unclear. This is not surprising because there is an academic bias in water research for worst-case scenarios. During the months of field study, local NGO members reported a few cases of elite capture of pumps.¹⁷⁷ The examples seem to be exceptional in consideration of the great number of hand pumps where no such incidents seem to happen. Whether and to what extent they affect water allocation practice is neither sure nor documented. More cases of elite capture are reported in urban set ups, which show higher socio-economic stratification. From the research findings of this study, one can conclude that monopolization and exclusion in the research area are phenomenon of local social dynamics rather than of inappropriate management institutions. Hence the study of such exceptional cases should always be put in relation by the documentation of less spectacular (‘boring’) cases to avoid jumping to conclusions. Changing the water management institutions by institutional development intervention can probably not fight existing monopolization, elite capture and exclusion if it is not embedded in local institutional changes capturing the whole community. Despite that, the elite capture argument and cry for better institutions it is found in almost all development literature, which was written and published by the MWH, the CWSA and donor agencies. But it does not occur in the empirical studies, which have been produced in Ghana. Such studies rather suggest willingness of communities to negotiate water allocation when the resource gets scarce instead of applying strict mechanisms of exclusion. An exception seems to occur in settings, which are characterized by competing water uses, very heterogeneous socio-cultural background and different livelihood systems (e.g. Tonah 2002 on resource conflicts between Fulbe pastoralist and local farmers in Ghana). The situation differs in small town water which are provided by piped systems and where more individual interest and social

¹⁷⁶ Mr. K. Kwotua Alirah (former WSDB Paga, AWDSO executive), interview, 05.03.2005.

¹⁷⁷ Ibid. The members of some water committees in Kassena-Nankana district (especially in small towns and settlements with ethnically mixed population) were *“picked and not elected”* by the communities. *“Chief sons and daughters forced in their way.”* Sometimes, elders were picked as the committee chairman and whenever there was a sharp political division within the community, there was interest in gaining control by becoming member of the pump committee. In the beginning, people thought that there was money in the work of the WSDB or pump committees. Therefore influential cattle dealers entered the communities and were over-represented.

dynamics come into play (see chapter nine). But also in this context, the exclusion of potential users seems not to be the most urgent problem.

9. Small town water systems – same policy - different outcome

“Again, Siriu Water Project will soon start. Constructors have bid and have been selected. What we are waiting for now is for the World Bank to give no objection.”¹⁷⁸

9.1. Failing small town water systems

The small town sector policy of the NCWSP reflects exactly the same principles as the policy for rural water supply and management.¹⁷⁹ Community-based management is the politically preferred management option. According to CWSA statistics, a number of 472 piped systems were completed and handed over to small town communities. The management of already existing water systems were transferred from GWCL to community-based management from 1994 to 2004. *“These communities originally under the management of the GWCL system, have opted for the community ownership and management system (COM) under NCWSP and had therefore their systems converted or rehabilitated accordingly. [...] 285 Water and Sanitation Development Boards (WSDBs) have been formed and trained”* (CWSA 2004). Management by GWCL continues if no better management option was found or local communities decided for this management option. Public private partnerships (PPPs) constitute the third possible management option.¹⁸⁰ Official statistics already hint at differences in outcome of the NCWSP policy when applying it to small town water systems. Reports on the management of rural hand pumps generally show a positive picture in terms of technical sustainability, improved water supply and access (e.g. Bacho 2001). Eventual negative aspects include the monopolization of water points through local authorities in single cases and the inability of single pump communities to sustain their hand pump. In contrast, the examples of dysfunctional small town water systems are numerous. Many are broken down; many work below their technical capacities; and many are not managed in a cost-recovery way. This leads to a failure in water delivery even though the system may be technically functional. Therefore this chapter addresses

¹⁷⁸ Sirigu Water Board chairman, e-mail, 19.03.2007.

¹⁷⁹ Because the technical facilities of a piped scheme are various, the guidelines for the community contribution are broken down into more detail. *“Capital cost contribution for towns should be as follows, 5 % for basic water supply services, 50 % of the additional cost of levels of service higher than basic supply services, 100 % household connection”* (GoG/ MWH/ CWSA 2004).

¹⁸⁰ For a comparative analysis of the three management options see Eguavoen and Youkhana (2007).

the following questions. (1) Why does the NCWSP policy result in different outcomes for the rural hand pump and small town water system management? (2) Which institutional changes occur when a water system gets introduced to a settlement, which water supply was previously dominated by the use of hand pumps? And (3) should community-based management be considered as the most preferable option for small town water systems?

A review of international case studies results in a list of factors, responsible for small town water system failure under community-based management. The resume after twenty years of community-based management approaches in water management sounds sober “*There is increasing evidence that community management has been no more successful in delivering a sustainable water supply than any other approach.*” (Schouten and Moriarty 2004: 1). The explanation of different performance in rural and small town settings is a conglomerate of reasons, which consists of mainly three lines of argumentation. The first line stresses the lack of local management knowledge and the need for capacity building. It is also argued that small towns are simply too big for community-based management. The third line of argument stresses on the occurrence of conceptual and institutional changes, which are held responsible for the failure. The three arguments will be presented by building on empirical material collected in Sirigu.

Observations during community meetings in Sirigu and AWSDB meetings were combined with semi-structured interviews. They were conducted with actors and experts on local, district and regional level, who were involved in the planning, implementation and subsequent operation of the new small town water system. Documents on small town water system operation in the three northern regions were analysed. The data was complemented with empirical findings from six other community-based managed small town water systems in Upper East and Upper West Region (see map 4).

First, small town water systems in Northern Ghana and the particular water project in Sirigu will be introduced to provide the contextual background (9.2.). The next paragraphs outline the three lines of argumentation why small town water system under community-based management are prone to failure. The next paragraph (9.3.) discusses problems of local capacities in water system management. It is followed by (9.4.) where social dynamics are discussed. The third line of

argument, which focuses on conceptual and institutional changes, is presented in (9.5). Final conclusions are drawn in (9.6.).

9.2. Community-based management of small town water systems

9.2.1. Small town water systems in Northern Ghana

The first small town water systems in Northern Ghana were constructed in the course of the 1950s and 1960s and their operation and management was allocated first to the Native Authorities and from 1965 onwards to the GWSC. *“Right from the drawing board the issue relating to management posed a challenge. In terms of implementation, the shortage of professional staff such as hydrogeologist, engineer, technical staff, and the problem imported materials proved a real challenge [...] The low revenue generation capacity of the Native Authorities resulted in problems of meeting the cost of operation and maintenance.”* (Bacho 2001b: 37). The performance of operation and water delivery varied from town to town but was generally constrained by the lack of management, equipment and staff. Pipe networks, storage tanks and electric pumps suffered from breakdowns or simply from the ravages of time. Maintenance and repair of the pipe networks, their extension and the investment into new infrastructure became a problem – also because most of the water systems worked in a financially deficient way and required frequent state subsidies for the purchase of diesel or electricity.

The Canadians were not only active in rural water projects but also engaged in small town water supply. The first small town water systems were constructed under their leader– and sponsorship. The third decade of CIDA engagement was characterized by an increased activity aiming at institutional development to encourage the longevity of the delivered water facilities. The continuous engagement of CIDA into drinking water supply delivery in Northern Ghana provides a good example of a donor agency, which evaluates its work critically and tackles constructively the constraints of their projects. Akuoko-Asiebey rewards this attempt for improvement: *“A summary of CIDA’s activities in the water sector in the Upper East Region indicates a sustained programme over two [now three] decades, with continuous improvements and modifications...”* (1995: 249). The changing international approaches to drinking water and development paradigms in general can be traced in the history of CIDA water projects and CIDA acted as a forerunner for community-based water projects in Ghana. Some water policies, project guidelines

and crafted institutions, which are presently valid countrywide, have been tried first in the Northern Ghana CIDA pilots.

The two GWSC Assistance Projects (GAP, 1992-2000) rehabilitated the desolate technical infrastructure of 34 piped systems in the three Northern regions. Two other small town systems were part of the project but later got disqualified; one of them was Sirigu. Moreover, GAP aimed at a more sustainable management option for the systems through user participation. A complex institutional framework for such management was crafted and implemented in first anticipation and later accordance with NCWSP guidelines. Unique in Ghana is the GAP child „Association of Water and Sanitation Development Boards“ (AWSDB), an umbrella organization, which during the time of research assembled all 36 WSDBs in the three Northern Regions, including the two small towns, which were disqualified from GAP and some WSDBs of towns which remained under the GWSC management (see Eguavoen and Youkhana 2007). The work of the WSDBs are presently monitored and supervised in Bolgatanga by a water department of the Canadian funded DISCAP (District Capacity Building Project). Several assessments and a management optimization pilot were run by the organization, which is also involved in funding of capacity building and AWSDB activities. DISCAP drafted a number of by-laws, as for example a generic constitution for WSDBs in the Northern regions in 2004, which was expected to be extended to whole Ghana at a later point in time.

9.2.2. The Sirigu small town water system project – a chronology

In March 2006, the local WSDB called for a community meeting in Sirigu. The meeting was meant to inform the Sirigu *naba* and elders in the village of the progress in the small town water system project. The speech addressed the elders of Sirigu, who had requested a progress report, the DWST officers, who were not able to join the meeting, the responsible CWSA officer and myself. Moreover, some villagers joined the meeting. They had been invited or joined for their own interest. The speech was read out in English and then translated into Nankane.

Box 29 Speech of the WSDB chairman to the Sirigu community

“The Sirigu Water Project has been on course since the year 1994, under the [...] GAP phase 2. In 1998, the then GAP personnel [...] met the chief and people of Sirigu and informed us to mobilize 5 % capital contribution to qualify for a mechanized water project. After a long struggle, Sirigu could not qualify [...] due to very low contribution of the seed capital.”

Later, another project was initiated for Sirigu through CWSA in Washington, USA. It was known as Community Driven Project (CDD), an IDA project. [...] After a maiden meeting convened by the DA inviting the Sirigu chief and his Water Board members [...] the Water Board [...] intensified their campaign measures. [...] More than 11 million Cedis was realized from our citizens residing in Accra. [...] The community through the Water Board attended several meetings of the pre-selection processes at the DA and finally came out with Afrowood Consulting Ltg. [...] In the year 2002, Afrowood being the TA [...] was recruited to assist the community to meet its 5% contribution before scheduled and also plan the system. The TA was working while we were also seriously contributing to be qualified. [...] seeing that the time for us to complete paying the 5 % contribution was running out, the community had no choice than to go in for a loan of 50 million Cedis from the Association of Water and Sanitation Development Boards in Tamale. This loan endorsed by the DA actually stepped up our contribution to 53 million Cedis in its account at the GCB. [...] the DA under the NPP administration saw the need [...] and paid 200 Million Cedis into the account so that the TA contract work could be started. This step up from the DA brought the total balance of the community contribution to 253 million Cedis. It was therefore noted that both, the DA and the community have realized their 10 % quota as specified by the World Bank. The TA [...] had to scale down the number of the Board members [...] in 2003. The composition was carefully based on sectional and water users in the community. [...] This cordial relationship between the TA and the Board made their work easier and quicker than expected.”

Source: manuscript of speech, 03.03.2006

It is doubtful, whether all present people were able to follow the argumentation of the speech. It includes many technical terms and abbreviations as well as development rhetoric, which were included in the Nankane translation. Moreover, the speech presented the project from a particular perspective leaving out facts and adding others. It was driven by the open agenda to push the dormant small town water project further, to communicate continuous interest in the water project to the water officials, and to exchange information about its present state. It also served to calm down some upset and impatient villagers, who had lost faith in the water project. Further, it was scheduled to remind the villagers of the credit, which had to be paid back soon to AWSDB. The self-staging of the WSDB and its chairman was on the hidden agenda. The board sought legitimacy from the side of the elders and the Sirigu community for this legitimacy was endangered due to a severe delay of the water project.

The construction of the water system had not even begun – twelve years after starting the project. What had happened? The bottleneck of the CIDA small town system rehabilitation project was the 5 % community contribution, which Sirigu was not able to collect even though the WSBD (then still called water committee), which had been installed by CIDA beforehand, made great effort in raising the funds and performed mobilization exercises all over the village. The board collected the money during community meetings in the several sub-sections. They did not go from house to house to collect the 1.000 Cedis per man and 500 Cedis per woman but collected

money during community meetings.¹⁸¹ *“The 10 % contribution was equivalent to 18 million Cedis, however, we were not able to hit the target [...] We are able to collect an ample amount with which we opened an account at Navrongo Naara Rural Bank. It was later transferred to Paga and then to Tamale.”*¹⁸² The village missed the deadline for its capital contribution and was therefore disqualified from the GAP water project. CIDA would have undermined their self-made and newly established project legislation and set a bad example for other communities applying for rehabilitation of their water systems if it had not realized the disqualification. The ready-made system design for Sirigu, which CIDA had prepared, was put on ice.

It was not only the deadline set for the payment as such but also the absolute incapacity of the local community to afford the payments as well as unwillingness to contribute. *“We gave them [the project facilitators] money for T and T but [...] the money was not enough and we added some money to it. That money we added, I had to borrow it. So everybody knew that we were not having sufficient money.”*¹⁸³ When it became evident that the first Water Board was not able to make the people pay, a second WSDB replaced it in accordance or consultation with the consultancy, employed for TA (Technical assistance). The new strategy was to support local money collection with collections among migrant communities in the South of the country. This new strategy led to the acquisition of funds but the amount required was not even approximately met.

Despite this severe drawback, the local efforts went on and the village received organizational support by CWSA and DA to link up to another water system rehabilitation project. The second WSDB continued its work and was central for the acquisition of the World Bank project, which acknowledged the village as very committed community and as sufficiently organized to receive a piped system. During their field visit, the World Bank inspection team met the WSDB volunteers and was positively impressed by the WSDB office. Before their arrival, an empty market store was equipped with office furniture, books, folders and office utensils. It gave a picture of a functional and formally settled bureaucratic unit. All WSDB documents were ordered and presented to the World Bank delegation. The inspection of the WSDB office, the discussion

¹⁸¹ Due to the dispersed settlement pattern, going from house to house is both very time intensive and exhausting. During community meetings, people tend to pay more than when being in their houses because they face the local authorities and other community members when payments are made publicly.

¹⁸² Mr. A. Agere (chairman of first WSDB of Sirigu), translated interview transcription, 25.01.2005

¹⁸³ Mr. A. Agere (chairman of first WSDB of Sirigu), translated interview transcription, 25.01.2005

with a selection of community members and the WSDB turned out to be very satisfactory for the World Bank delegation. After leaving the village, the borrowed furniture was returned to their owners. Due to this strategy, Sirigu became a Community Driven Development (CDD) pilot community. But the project legislation of the World Bank also prescribed a community contribution of 5 % capital project cost in line with the then already established NCWSP policy.

*Table 25 Community Contribution for Sirigu water project*¹⁸⁴

Total Construction Cost	Donor (90%)	Community Contribution (5 %)	District Assembly Contribution (5 %)
\$ 245.210 (¢ 2.280.453.000)	\$ 220.690 (¢ 2.052.417.000)	\$ 12.260 (¢ 114.018.000)	\$12.260 (¢ 114.018.000)

Source: Afrowood (2005)

Again and not surprisingly, Sirigu had big difficulties in raising the community contribution. Neither the economic status had changed, nor the fund raising strategies. The WSDB chairman conducted more fund raising journeys to migrated villagers in the South. The major share of money collected as community contribution originated from Kumasi and Accra. At the beginning of the CIDA project, the local WSDB was encouraged to become a member of the newly established AWSDB. All collected funds were transferred to centrally managed AWSDB accounts. Due to its member status, the Sirigu WSDB was entitled to take up a loan of 50 million Cedis from the Association to top up the locally collected amount. Still, the funds fell short of meeting the World Bank project requirements. Finally, the biggest hurdle in getting the project started, the 5 % community contribution, was taken over by the DA in Navrongo, which used HIPC funds to step in. Thus, unlike in the speech given by the WSDB, the local community did not realize their 5 % quota but borrowed money against interest and received a kind of district donation. It was the DA, which saved the CDD water project from its second dismissal.

On 23rd November 2003, the community prepared its project proposal and submitted it to the DA via the DWST for approval. The consultancy from Accra took up the preparation work and

¹⁸⁴ The honorarium for consultancy work and cost for project administration are paid by the donor and are excluded from the total construction cost.

conducted a census in the village, which indicated a wrong population number because respondents of the survey included migrated family members, who live permanently in the South of the country. The survey had to be repeated. Other relevant information about the village was gathered in community meetings and with the help of the WSDB members, especially its chairman. It was the good technical equipment of the consultancy company was the reason why the WSDB selected this consultancy among the competing candidates. The seat of the consultancy was Accra with an office in Bolgatanga; local consultancies (from Northern regions) had also applied for the project but were refused by the WSDB. The working conditions of the Ashanti consultant interacting with the villagers, in fact constraint the work. He relied on translators and had to supervise and accompany the planning process in several small town water projects of the Upper East Region at the same time. Most of the time, only market trucks and taxis were available for his transport. The office in Bolgatanga lacked basic technical equipment.¹⁸⁵ The consultancy continued working on the existing design of CIDA but later introduced some extensions, which the WSDB members suggested and insisted on (see below). Technical problems challenged the design, especially the deep water table and the lacking availability of high yielding boreholes for mechanization.

When the design was finished by the consultancy, and the capital contribution of DA and community paid, the water project stopped in dry season of March 2005. The consultancy was freed from its duties by the CWSA in Bolgatanga, which followed an order from the CWSA head office in Accra. Background of this order was a general re-allocation of the water consultancies at national level. Instead of several water consultancies operating in the same region and district, the contracts were re-allocated to one consultancy per region to enhance transparency and to cut transaction cost. Old contracts were cancelled and a new application round begun to re-allocate contracts.¹⁸⁶ One year later (March 2006), no decision was yet taken in Accra on the re-allocation of the contract for Upper East Region. This resulted in the impossibility for choosing and contracting a construction company for the technical implementation of the Sirigu small town water project; the project (as well as other ongoing water projects in the region) had come to a preliminary end. This situation provided the context for the community meeting. Even though the

¹⁸⁵ Mr. K. Nkrumah (former water consultant), interview, 07.03.2005

¹⁸⁶ Mr. K. Dorcoo (water consultant), informal conversation, March 2005/ April 2006; Mr. G. Amoah (CWSA), informal conversation 2005/ 2006.

local actors, such as the WSDB, CWSA and DA were willing to continue with the project, their hands were bound; the system design was postponed again for uncertain time (for possible obstacles in water project planning and implementation, see Rottenburg 2002, whose fictive case study is also informed by data collected in Ghana). The final report by the consultancy can't belie the tentative failure of the project and the lack of clear contractual agreements between the actors involved. *"...generally the project has run very smoothly without any serious and restricting constraints. The cooperation and support of the DA/ DWST and CWSA have been excellent and enhanced the operations of the Consultant. [...] the Consultant has not been paid anything for works carried out. The Consultant had to look elsewhere to borrow money to execute the contract at exorbitant rates. There was no indication that, the Consultancy agreement was only for the 1st phase. The consultant has invested money thinking that the project was going to run till the end of the 2nd phase only to be told that, that contract agreement has been determined with no compensations paid to him"* (Afrowood 2005). In the Sirigu case, the water project faced technical and financial challenges, which led to a severe delay in the delivery. But the piped system would have been constructed by the time of the community meeting without the intervention from Accra. My impression gained from observations and interviews with DA, DWST, CWSA in Bolgatanga, the WDSB and the consultancy was that there were at times difficulties in communication. But all actors on district and local level were committed to the water project and pushed in the same direction to make the water system finally come to Sirigu.

9.3. Lack of capacity and oversized systems

The Sirigu water system could not be observed in its operational stage yet. But the capacity argument can be underpinned by an inventory and evaluation, which was conducted by DISCAP in other small towns. Generally, *"all WSDB had little capacity [...] as they were deficient in designing adequate systems and procedures for efficient operation and maintenance, planning, budgeting and rational tariff setting"*. *"Most of the operating staff has a fair knowledge of their routine duties [...but] They are unable to trouble shoot or analyse problems that are out of ordinary ..."* (Akari 2003b: 7-8). My own research, AWSDB investigations and DISCAP assessments indicate a common set of weak points of small town water management related to WSDB capacity, including rational tariff setting, analysis of reports and book keeping. Other problems, which occurred frequently was the insufficient number of operational staff, low and

irregular payments of operational staff, lack of all kind of equipment (for transportation, water treatment and water quality control, communication). WSDBs had no efficient means at hand to sanction the non-payment of bills from state institutions, such as the police station, the hospital, the school or public office buildings, which have partly accumulated bills of millions of Cedis each, which lack the WSDBs for their operation. WSDB members felt left alone and betrayed by the state authorities and local CWSA and DWST have neither mandate nor efficient sanction capability to support the WSDBs in this difficult situation.

As the earlier chapters have shown, rural water management under the NCWSP is successful because users maintained major institutional features of their former water management. Crafted management bodies and regulations were selectively integrated but not translated fully into local water rights and water allocation practice. Hence, there was much continuity in local management. User committees and pump communities followed up a strategy of minimal management. This strategy is equal to the management of other local (non-potable) water sources. Capacity building and the introduction of VLOM hand pumps enabled local users to carry out technical maintenance of the hand pump. Moreover, they had the possibility to engage trained area mechanics for technical support. This way, the dependency from a central management body could be reduced. Piped water systems are very different from hand pumps. They are technically more complex and require frequent resource input, such as fuel, electricity, chemicals. Therefore, they depend on cost-recovery to pursue such inputs. Moreover, piped systems are rather prone to technical failure and require more technical maintenance. Despite these differences, the same minimal principles of management were observable on the ground. *“None of the water systems practiced routine maintenance of equipment and infrastructure [...] Generally, the systems break down and then they are repaired...”* (Akari 2003b: 7). This was not only a question of knowledge gaps but also of attitude, usually going hand in hand. When looking at the constraints, the application of existent management and technical knowledge was as crucial as the existence of knowledge itself.

The application of minimal principles of management on one hand and the construction of ‘maximal’ piped systems on the other enhanced the risk of technical failure. *“They all [small towns, WSDBs] want big systems, which cover a large area. Many standpipes, many pipes. But they cannot manage it. When we suggest a simple solution, say a mechanized borehole, high level*

tank and outlets in front for a market centre, they refuse. It would be less costly, easier to cope with. [...] Many of the systems, we have built are already broken down. I could say, it is good for our business but I care for the communities.”¹⁸⁷ In Sirigu, the tendency towards a maximum system could already be recognized in the planning phase. The CIDA design for rehabilitation was exactly based on the pre-existing piped system, which had become dysfunctional. Only the location of standpipes was planned to be shifted slightly. Apart from this, the rehabilitated system was intended to look like the previous system (compare chapter five and seven).

In fact, such a system would not have done much for the improvement of water supply. The final consultancy report states *“The community currently depends mainly on 1 borehole (BH No. 455A-4) and 3 seasonal streams for its water needs. One other borehole (BH No. 455A-5) with a yield of 120 l/ min has been mechanized by the Orphanage Home for its use only”* (Afrowood 2004). But in fact, currently, the number of hand pumps in the catchment of the on the old piped system is larger. It is unclear why the number of hand pumps was reported incorrect in the design. Since the construction of the previous water system, seven additional boreholes were drilled and equipped with hand pumps, e.g. in the sub-section Abeleto.¹⁸⁸ The planned standpipes were located rather close to these hand pumps. Moreover, standpipes are expected in the planning process to deliver water all day long. But observation from operating water systems suggest that the time of delivery is limited to some hours a day, to special days or generally little reliable. A crucial advantage of the hand pumps is their 24 hours accessibility.

The negotiations of the consultancy, the WSDB and other villagers recognized the little potential for improvement in supply if the water system would be rehabilitated according to the old CIDA design. Negotiations were driven by the local interest to extend the pipe network to sub-sections, which had no hand pump or where a large number of users had to share the existing facility. *“What the people said was that they want everybody to be near to a source of drinking water. Their dreams were that even far away people like those from Amuntanga community would have water nearer to them. This will bring relief to the people.”*¹⁸⁹ Local interest groups in areas of Dazongo and Basingo already collected money for many months or years to qualify as project

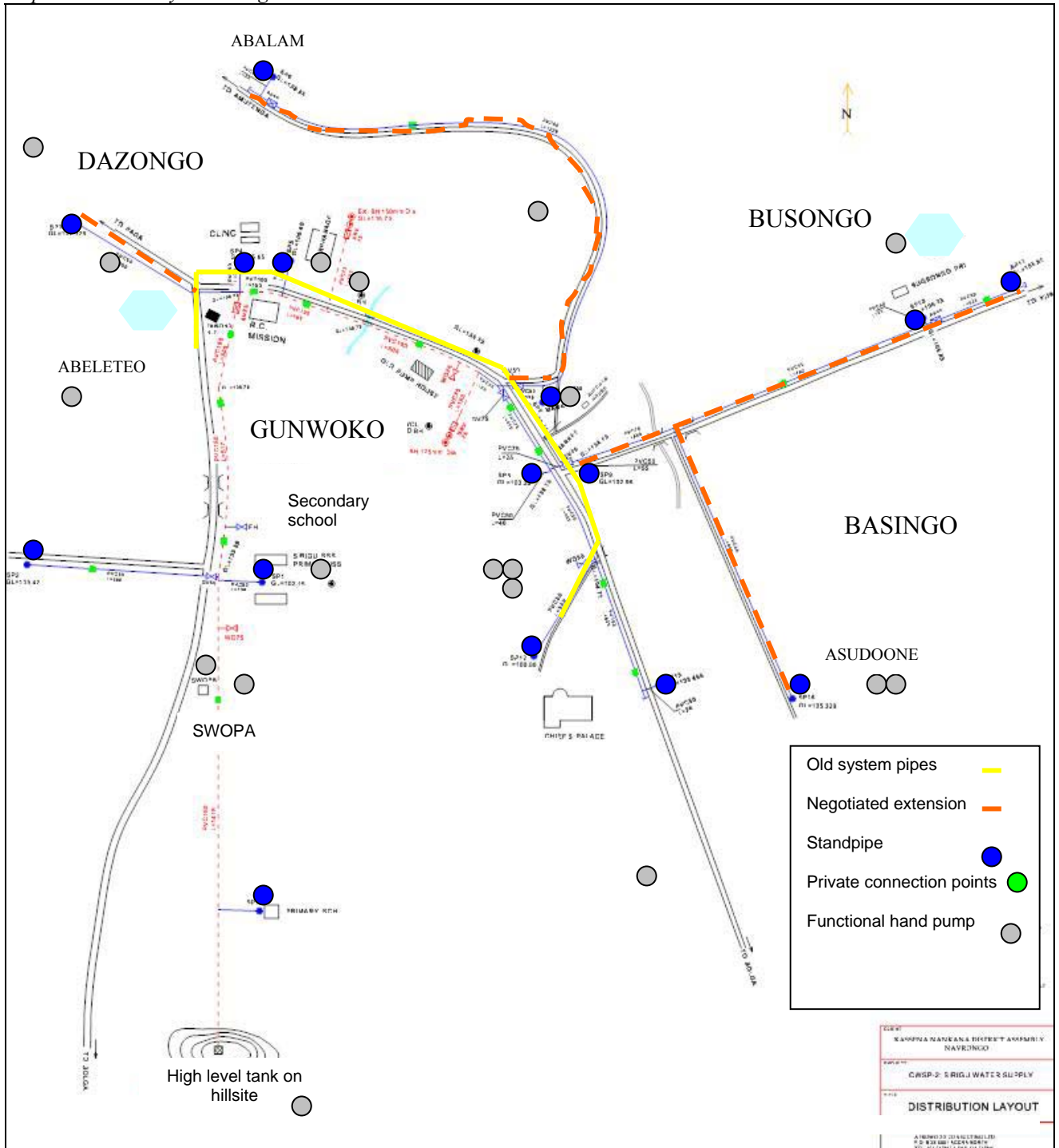
¹⁸⁷ Mr. K. Dorcoo (water consultant), March 2006.

¹⁸⁸ I recommended the consultancy to include the existing hand pumps into the system design, to make local water needs better visible. Not all hand pumps in the catchment were known to the consultant working on the design. The suggestion was then integrated into the design.

¹⁸⁹ Mr. A. Agere, translated interview transcription, 25.01.2005

community under NCWSP and to receive a hand pump. There was general consensus within the community that those areas are underserved with water facilities and that they should get a stand pipe connection. Therefore, the consultancy took up the local suggestions and integrated them into the system design because NCWSP guidelines stress on the participation of local water users in the planning process. A planning knowledge was created, which did not include the water planning expert's view only but also some local suggestions, which the experts had not suggested for good reasons. The planned system contains six components, such as (1) two mechanized boreholes with submersible pump; (2) one 100 m³ reinforced concrete storage reservoir sited on a forest covered hill in Tangasiya; (3) a pipe network of approximately 10, 7 km; (4) fifteen new standpipes, each with two taps, and an animal drinking trough; (5) the rehabilitated GWSC pump house serving as the new WSDB office; and (6) seventy-five private connection points (Afrowood 2005).

Map 9 New water system design



Source: Afrowood Consulting (design), add-ins by author

The consultancy and the WSDB decided together for the floating network option, in which the transmission pipelines serve also as distribution pipelines. In this layout option, the storage tank serves as water reservoir in times of higher demand or in case of power failure. To put the tank on the hill, which is a well-known *tingane*, was informed by the idea to use the natural elevation for the gravity system. Main incentive to decide for the floating network option was the financial savings from shorter pipelines. But the reduction of pipe line length was rather insignificant in comparison to the increase of pipeline length in the context of network extension. The additional pipes length led to a high increase in construction cost. The extension also leads automatically to more technical complexity and longer pipe network, which has to be maintained in future by the user community. Even though the WSDB members had received some training long time ago, they stated in interview not to feel capable yet to manage the up-coming water system. The WSDB chairman was the person most aware of possible obstacles and solutions owing to his membership in the AWSDB executive board, where experience in community-based system management was shared among the members. He had also visited a number of operating water systems and kept close contact to other WSDBs and the DISCAP staff. Moreover he had sometimes assisted the former GWCL operator during the time of the old piped system.

As mentioned above, DISCAP conducted a pilot management optimisation for small town water systems. For this, its water sub-project selected nine small towns, which were observed and studied in their performance of operation and management. For each, a diagnosis was conducted about the specific problems (technical, operational, financial, and administrative or personnel problems). Solutions were designed and implemented with the help of a DISCAP expert team and one selected mentor for each cluster. The three mentors were chosen from exiting WSDBs and operation teams, from small towns where the water systems performed well. Mentors and system operators received training at Polytechnics. After the initial phase, regular visits of the mentors and DISCAP experts to the nine small towns took place to supervise the processes on the ground. Present and former GWCL staff was also planned to take over an advising role. A second umbrella organization, the “Association of Staff of Small Town Water Systems” was called into life to serve as forum for the exchange of experience and skills. The main conclusion from the DISCAP management optimisation pilot is that WSDBs are able to manage their systems efficiently, if they are continuously supervised and professionally supported. The DWSTs do not

necessarily have the capacity to do this because the staff members often have a different professional background and were prepared for the task of the DWST in CWSA training courses only. In fact, the particular DWST staff members in Upper East Region argued that they were in charge of all areas in the district, where no WSDB operates, meaning that they did not feel in charge of small town water system management. CWSA is planned to take over this role in future (MWH/ CWSA 2004a). The close supervision through DISCAP is unique in the country and indicates the leading role of CIDA in finding new solutions for more local sustainable water management (Akuoko-Asibey 1996). It is doubtful, whether the DISCAP engagement will be copied by other donors. It requires permanent project staff, long-term commitment and frequent funding.

9.4. Size of the community and local social dynamics

9.4.1. Limits for community-based management

Doe and Kahn (2004) identified three clusters of local factors from their socio-economic research in small towns of Ghana, which contribute to the success of community-based water management. The first cluster stresses the small size of the community. The second cluster is concerned with the participation of the community in planning, decision-making and service establishment. Finally, the third cluster hints at strong community cohesion and strong social pressures. Moreover, they argue that community characteristic also plays an important role in the success but that little is yet known about it. From their own study, they derived that communities with a population up to 3.000 people, small household sizes, older household heads and farming as preoccupation displayed a better community management. They explained with the local participation, which gets enhanced under these circumstances. Doe and Kahn conclude that *“Community management is useful for communities’ development but one size [one approach] does not fit all.”* (Ibid. 2004: 369) The size of the community matters. According to them, community management tends to be an appropriate approach for communities not larger than 3.000 inhabitants. Taking up their argument, it would mean that communal small town system management fails in many cases because the community, which manages the facility is simply too large. The bigger a community is, the more divergent interest may occur, the more difficult is it to organize collective action and to control each other. Likewise, the bigger the community is

the more attention has to be paid to the question of appropriate community representation, transparency in management and the involvement of all local stakeholders.

All WSDBs visited and examined in this study had a kind of constitution or a set of rules, which determined the election and composition of the WSDB, as well as regulations for regular replacement. These institutions were directly informed by CIDA intervention during the time of WSDB implementation. WSDBs were expected to draft such rules individually. Some WSDBs had revised their constitution since then to make it more feasible or to include rules, which were not foreseen before. In practice, such constitutions didn't always translated into practice or lost practical relevance for the setting up of the WSDB (see Youkhana and Eguavoen 2007). Moreover, they provided some loopholes, which were abused by individuals, who followed personal agendas. The capability of local communities to set up their own constitutions was recognized to be insufficient. DISCAP tried to meet the situation by a professional and generic by-law. This blue print constitution for WSDBs is a legal document of seven tightly written pages, which are hard to understand by non-jurists. The paragraph for replacement states for example

“Members of the water board shall face re-election at the end of their first term and in any subsequent term, one-half of their number [of] if their number is not an even, the number nearest to one-half face re-election. The members of the water board to face re-election shall be those who have been longest in office since the last election, but between persons who become members on the same period to face re-election shall unless they otherwise agree among themselves be determined by lot, the re-election process shall be general meetings of their groups called specifically for that purpose and for which notice of not less than two weeks has been given to the group.” (DISCAP 2004).

Having in mind that pump committees tend to stay in office once they are appointed by the users, the election process for a WSDB seems to be very complicated. Illiterates are encouraged to participate in WDSB work but are completely dependent on their literate colleagues to explain and interpret the rules for them. It can be assumed that the growth of institutional complexity encourages by-passing of rules and regulation in practice. This is so because complicated rules, such as the DISCAP document quoted above become unfeasible for the people who are supposed to translate them into action. Probably, additional institutional arrangement will be created to simplify the suggested procedure or such new regulation will not be applied at all.

9.4.2. The Sirigu Water Boards and other interest groups

In the course of the water project, new interest groups were created. CIDA crafted and implemented a local management body, called first Water Committee and later Water and Sanitation Development Board. Project guidelines suggested it to be a local decision-making body, which acts as contact group for donor and implementation agencies, organizes the local money collection and health education campaign, administers the funds and delivers information to villagers and development actors. After the implementation of the water system, the WSDB is supposed to manage the facility, setting tariffs, employing and monitoring technical staff, be in charge of funds for operation and repair. It was intended to be a gender-balanced body, which incorporates several local interest groups. The election and implementation was monitored and supervised by CIDA staff. An elder and illiterate livestock trader, who was popular in the village, became the *kokadaana* (chairman) of the board. A young teacher, who recorded the meetings and did the book keeping, supported him.

“It was during the meetings at the chief’s palace that we were chosen as executives. I was chosen as the chairman. Selected individuals came from Bolga [Bolgantanga] and Navrongo and gave us orientation. [Q: How did the idea of water board come up?] The idea came from ourselves, the people of Sirigu. They who are members of the board represent the various communities. These communities include Gunwoko, Busongo, Nyangolino, Basingo and Dazongo and Wugingo. They are six. They themselves [the project facilitators] said it was not necessary for an educated person to be the chairman. [...]. I was filled with fear upon being chosen as the chairman. The greatest fear was that the work was to be done for free. [...] But because I know that it was for the good and development of Sirigu, I wasn’t bothered. [...] With every task carried out, it will be my responsibility to report everything to the chief.”¹⁹⁰

The Water Board started performing by moving from village section to village section to conduct an inventory of water sources and to mobilize the villagers. The project was explained to the people and funds collected. There was an agreement that CIDA would repair all broken hand pumps and this agreement materialized. Moreover, CIDA provided two more boreholes for free as they had offered to the water committee before the money collection started for the piped system. When it became obvious that not sufficient funds would be collected by the conventional way, the water board got hijacked and taken over by a group of villagers, which drew their legitimacy from their contacts to outside donors, their position in the District Assembly, material resources and higher level of education.

¹⁹⁰ Mr. A. Agere, translated interview transcription, 25.01.2005

“A certain group of individuals came and I handed over all their things to them. Some villagers said that we were not active in our work. That is why the system has not been commenced. Shortly before that incident, I had sent a man to Tamale. This man was accompanied by another member. When they came back, they reported that nothing at all went well. They attributed all to the fact that I can’t read and write. I was therefore no chairman any longer. [...] One day, at the chief’s palace I was asked whether or not I am a literate. My answer was that this question was baseless because I am not paid for the work I do. I was selected with the chief of Paga, the Chief of Chiana and several others.”¹⁹¹

In fact, the appointment or election of the first water board was a public affair, which was witnessed by DA officials, including the district chief executive. The complete dismissal of the first water board and the appointment of the second WSDB were rather opaque. Some educated people, including one assembly man, put heads together and suggested a new board to the chief. Its operation started without formal inauguration.

“The fact was that we were not really having nice bicycles. [...] But indeed, I have no car. They have cars. I am not a teacher. They are teachers. How can I challenge them? [...] The people saw that I had no car yet they said I could do the work. More to the point, we didn’t embezzle money. So what did we do? [...] Someone should have told them [the new board members] that what they were doing was not good. One should have told them that these leaders have not done anything wrong. Why then are they denied leadership? [...] So, I still pray that the new board will recognize their mistake and call me to still support them using the experience I got. After all, I am in Sirigu. I haven’t gone anywhere.”¹⁹²

The first water board chairman, enjoyed popularity and authority among the villagers. His legitimacy as a chairman was backed up with the local system of leadership and the village chief’s authority. His fund raising strategy made use of local forms of organization by asking the section elders to call for meetings, to collect money, which was then publicly handed over to the water board. It was the section elders (*nabduma*) who kept an overview, of who had contributed; existing institutions were used to serve a new purpose. The GAP facilitator guided the community to form a gender-based water and sanitation development board based on sections and divisions of the community. Minority interests were also considered in forming the WSDB.

The members of the second WSDB were listed by some educated people according to their priorities before getting in contact with them and presenting them to the Sirigu *naba*. They also

¹⁹¹ Ibid.

¹⁹² Ibid.

choose the members according to principles of gender balance and sectional origin. The legitimacy of the second WSDB and his chairman was not backed up by the local system of leadership but more by the social status and network of the members and the material equipment (private belongings, such as motorbikes, mobile phones, a computer), which the board could benefit from in its work. Some members were trained teachers, almost all were literate and Christian as well as known to be committed for the community. For example, one woman also acted as spokeswoman for the *daam* brewers in the village and was executive of the Christian Mothers Association. The chairman could bring in his personal contacts to donor agencies, water experts, DA members, and had experience in proposal writing, action plan drawing and money acquisition because he was also involved in other development projects, such as a school project and a farming project. Being also a pastor of a Pentecostal church, driving a motorbike and having a second residence in Bolgatanga, he displayed all typical local characteristics of a development broker.¹⁹³ *“If you go in front you see [him]. If you go behind you see [him]. If you go to the right you see [him]. If you go to the left you see him. Even above and underneath you see [him].”* was pointed out by one illiterate farmer, who represented the Sirigu chief in the WSDB, and originates from the Sirigu *tendaana*'s compound. Despite the central role of the local WSDB chairman, the chief's representative also stressed on the importance of the Sirigu *naba* *“The chief is the overall boss in Sirigu even though there is a committee. The chief is still the boss. I am his representative. He is the District Assembly of the area here.” “If the chief is not aware that something is going on, it cannot exist.”*¹⁹⁴ Even though the chief's representative and the WSDB chairman occupy central and somehow monopolist positions (*“The board in Sirigu is a one man show by its chairman.”*¹⁹⁵), both experience limitations of their power and influence.

¹⁹³ Becoming the WSDB chairman further enhanced his career as development broker, because it provided him with additional authority, contact, material resources, prestige and influence in the local political arena as well as in the AWSDB, where he acted as chairman of the AWSDB Upper East Region as well as the president of the overall AWSDB. Involvement in various development projects had a positive effect on all projects as well as on his personal livelihood.

¹⁹⁴ Mr. J. A. Akia (member of WSDB in Sirigu), interview transcription, 21.01.2005. Being the chief's representative hinders him from calling for a meeting of the WSDB. It would mean that the chief is calling and people might receive that as abuse or inappropriate use of powers, Mr. Akia fears. Also criticizing what is happening is not only an individual thing - people do not like to hear the truth - but would also fall back on the chief. Therefore, Mr. Akia keeps his opinion for himself. The chief according to him is always a target of accusation.

¹⁹⁵ Mr. H. Bawah (water consultant), informal conversation, 2004.

Instead of relying on existing local institutions for money collection, it was mainly other channels, which were used to mobilize the required money (such as the migrant communities, proposals to DA and donors, credit from AWSDB). The second WSDB is less localized and more mobile, both in terms of ideas, contacts as well as in spatial radius of activity.

9.5. Conceptual and institutional changes

9.5.1. Community – from user group to administrative unit

Any new small town water system follows a previous water supply, may it be hand pumps, wells or surface water bodies. All water supply systems embody a property regime. There are determined rights to own, use rights as well as established rights and ways of decision-making. Because both, the rural as well as the small town water system are under the same drinking water policy and management paradigm of community-based management, politicians and researchers did not pay much attention to the practical and conceptual changes, which go along with the changes in water supply.

Empirically, community ownership means very different things according to the context. A hand pump is owned by a number of compound houses, which are the immediate water users, whereas in a small town system, the communal ownership is with the administrative entity and not with the immediate users as such. The water user community is rather imagined. It includes all inhabitants of the small town – even those living at its periphery and depending completely on hand pumps or streams.¹⁹⁶ Often, the pump communities in the catchment of a piped system are denied their former property rights because the ownership is transferred to the small town (or the DA to be exact) and the water system is then managed by the local WSDB. Although communal ownership remains, the property relations practically change either by the expropriation of the pump communities or by the sale of rights from the pump community to the district/ small town. Thus, the legal framework in this case destroys at the same time what it supports – the direct ownership of water supply facilities by the immediate users. Instead of decentralizing the water management, it decentralized the management (from state management to local WSDBs) and at the same time re-centralizes it (from rural pump communities to central small town WSDB). The

¹⁹⁶ The community contribution of 5% construction cost often fails because all inhabitants are expected to pay their share for the system, whilst many inhabitants do not see the system as being of any personal use.

ignorance of different and contradictory concepts under the same terminology may lead to questionable practical outcomes and unintended organizational frameworks (see Eguavoen and Youkhana 2007).

A positive example is Zebilla where pump communities were paid out by the DA and WSDB, when their hand pumps were subordinated to WSDB management. Since then have to pay water tariffs for them as all other users of the system do for the stand pipes.¹⁹⁷ This example seems not to be the usual case. In Sirigu, the hand pumps in the catchment of the piped system were expected to come under WSDB management. Compensation was not yet thought of. This would mean in fact, that pump communities would be expropriated from their hand pump, for which they had contributed capital cost (the community contribution) and deprived from their existing use rights and decision-making rights. This was justified with the argument that if the pumps would still be opens for use, the people would continue to frequent the pumps instead of the standpipes and refuse paying water tariffs. Not to endanger the cost-recovery of the water system, the WSDB and consultancy intended to lock the hand pumps and keep them for emergency cases.¹⁹⁸ It is doubtful whether this is possible to realize in practice. In Basingo Asudoone, for example, where 85 compounds fetch from one functional and a second malfunctional hand pump, it would be only one standpipe replacing these pumps. The money collection for an additional borehole, which took about two to three years, the application process to become a NCWSP project community as well as the final delivery of the third hand pump would turn out to be wasted effort, if such a regulation would be implemented. More serious, the water supply situation in the sub-section would not change for the better.

9.5.2. Payments for water – from borehole fee to water tariff

From the mid 1970s until 1989, a small town water system delivered services to Sirigu. One professional and trained attendant, who was employed by GWSC and supported by a night watchman. The system was managed centrally from Navrongo. The attendant's tasks were to operate the system and to collect the tariffs from the compound houses.

¹⁹⁷ Mr. E. Avoka (WSDB member in Zebilla) and Mr. D. Isah (water system operator in Zebilla), interview, 14.12.2004; Mr. O. Mahama (WSDB chairman in Zebilla, chairman of AWSDB of UER), 02.03.2005

¹⁹⁸ Mr. P. Anoaah (WSDB chairman in Sirigu), informal conversation, 2004/ 2005/ 2006.

“Firstly, the compounds had to pay 50 Pesewa monthly each, later it was increased to 1 Cedis. Market people did not need to pay but only the compound houses. I went from house to house but people, especially old men, did not understand why they should pay for water and refused. They said that water is for free and should not be charged. I tried to explain them that the operational cost of the piped system has to be recovered but most of the houses still refused paying. Because of the general refusal to pay the monthly fees, the pump was finally removed and brought to Navrongo. I have warned the people in Sirigu and told them not to allow the engine to go, too, because once taken away, it might not return to Sirigu.”¹⁹⁹

Either there was no attempt to stop the GWSC staff, which picked up the engine to bring it to Navrongo or the community failed in stopping them. The engine and pump were removed in 1989 and were lying since then in the yard of Navrongo GWSC. According to one of the former attendants, it was only at the end of 2004, that they were brought away from the GWCL compound. After the abandonment, the technical artefacts of the water system started to break until they were not usable any longer. The rehabilitation effort by CIDA started only five years later.

The attendant’s account can be validated with GWSC documents, which indicate clearly the growing deficit between revenues from water fees and expenditures for the operation of the small town water system. The problem of payment refusal was Sirigu specific but also showed up in three other villages in the record (GWSC 1985) and reports of the attendant. Revenue collection at other places did not face such serious problems with willingness and ability to pay, although the amounts collected were not sufficient to cover the cost of operation.

Table 26 GWSC Statement of income and expenditure on Sirigu water system. From January-March 1985

	Billings	Collection	Govt. subsidy	Other income	Total income	Personnel	Fuel & lubricants	Total cost ²⁰⁰	Deficit
Sirigu	11.652	-	9.924	NIL	9.924	21.370	6.271	27.641	17.717
Grand total	1.736.662	778.049	3.142.693	219.554	4.140.296	4.479.098	1.881.551	7.174.802	3.034506

Source: GWSC (1985)

As discussed in chapter four, in the local view, the old small town system had been shut down due to technical default, which was obviously not the case. Local people remember that the

¹⁹⁹ Mr. P. Ayamga (former GWSC operator of Sirigu water system), interview summary, 18.02.2005

²⁰⁰ In Sirigu, there was only cost for personnel and fuel. Other systems demanded additional expenditures for electricity, chemicals, contractual services and other services.

groundwater was not sufficient to feed the system, that the pump broke or that there were technical problems with the generator. Thus, they do not perceive the behaviour of the users to have any impact on the loss of the previous water system. It is very difficult to trace back the events or information flows between the GWSC and the local users. Although the attendant stated to have warned the villagers, the official policy of GWSC was probably to take advantage of the local knowledge gap to avoid confrontation with the village authorities and water users.

So far, water as a resource is not a commodity in the village. It only becomes a commodity when additional labour is invested to make the resource available for others (compare chapter six). Thus, the price of water is the price of the service, not of the resource. Recent arguments of the WHO fully reflect this local perception. The human right approach to water clearly states that *“fresh water is a legal entitlement, rather than a commodity or service provided on a charitable basis”* (WHO 2003: 9). One could argue that the introduction of a payment scheme for piped water is also the payment of a service (the production of piped water, the improvement of a quality, the maintenance of an infrastructure) but this does not reflect the local perception, in which the service starts when the water comes out of the hand pump or tap and not before. Water is rather interpreted as a commodity with a (more or less) fixed price in such context. Still, what is established is far from being a water market (for a discussion of this development from common/ social good to economic good in Ghana, see Bacho 2001b).

For the water system in Sirigu was not yet in place during the time of research, no payment scheme was yet fixed. But such a scheme was already in the planning phase: *“The water tariff will be based on water production costs and overhead projections. Thus with the present water demand of 185 m³/d and estimated production cost amounting to approximately ₵10.000.000 per month, the cost of 1 bucket (18 L) will be about ₵33. The WSDB/ Community will determine the selling price of water in consultation with the community and the District Assembly”* (Afrowood 2005). Although the amount of ₵ 33 seems very little, water will become unaffordable for most of the people. One reason is that the amounts are calculated on a minimal use basis. It is not outspoken but assumed that water requirements are translated into a mixture of potable and non-potable water sources. Usually, this is the case in rural areas where streams and ponds are accessible. But seasonality plays an important role. In a research site like Sirigu, where regular single source situations occur, all water requirements need to be covered by (potable)

groundwater during some months of the year. Women in the community meeting scheduled by WSDB and consultant were asked how many buckets they need. Their answer was clear and consent: four buckets a day a person (see chapter six). Despite this, the number of two buckets was recorded in the notes. Another reason is that the most probable water tariff is 100 Cedis per bucket and not 33 Cedis due to practical considerations.²⁰¹ This price was suggested by WSDB and villagers during community meetings for a size 34 bucket. Even when considering rainy season and the use of surface water sources, the tariff is still remarkable. The difference between minimal use + minimal price calculation and maximum use + maximum price is huge. The first one seems affordable whilst the second leads to a situation, in which local ability to pay is clearly exceeded for most of the people.

Box 30 From borehole fee to water tariff – exemplary calculation

There are four households in the exemplary compound. The inhabitants are the *yidaana* with two wives, his first son with one wife and five children, his second son with one wife and two children and his elder brother's widow with three children. The compound would pay different amount of borehole fees, if it was member of these pump communities:

Gunwoko Tingino	(6.000¢ per compound)	6.000 ¢ per year
Busongo dam	(4.000¢ per woman, 2.000 ¢ per man, widows no fees)	22.000¢ per year
Busongo	(5.000 per adult)	40.000 ¢ per year
Basingo Tenlongo	(3.000 per household)	12.000 ¢ per year
Tangasiya	(4.000 per cooking place)	16.000 ¢ per year
Piped water	(33¢ per bucket, 2 buckets per person per day)	43.3620¢ per year
	(100¢ per bucket, 2 buckets per person per day)	1.314.000¢ per year
	(100¢ per bucket, 4 buckets per person per day)	2.628.000¢ per year
	minimal calculation (6 months/ 2 buckets/ 33¢)	18.067,5¢ per month
	maximal calculation (6 months/ 4 buckets/ 100¢)	109.500¢ per month

Source: Pump Committee Survey, 2005 and own calculations

The numbers show that it is not only non-willingness to pay, which has to be considered but also inability to pay, which will concern many households. The water tariffs have to be generated by non-farm activities, additional to the money, which the community has to mobilize to pay back the AWSDB credit of 50 million Cedis plus interest. It is unlikely that the payment for the credit can be generated through the setting of a water tariff because in such a case, the tariff must be much higher and becomes completely unrealistic. Thus, there will a money collection in addition to the payment of the regular water tariff.

²⁰¹ There are coins for 100 ¢. Smaller coins are rather uncommon.

One can only speculate about the reaction of the local water users and the WSDB. One possible scenario, which proved a typical strategy in other small towns, would be the introduction of low flat rates, which do not consider the real price of water but what people are willing and able to pay. This would constrain cost-recovery of the system and endanger its sustainability. A second scenario could be that users shift to low quality water sources for all purposes, which do not require good quality water. Moreover, they could increase water saving practices. Both would not improve household water supply but increase workload and the risk of water washed diseases. The third scenario would be that people generate additional income to be able to pay the water tariffs. This would lead to a further increase in non-farm activities among the households, which presently rely solely on the agro-pastoral livelihood strategy. A fourth scenario foresees the change of expenditure patterns within the household. Money spend on household water supply would then be missing for other purposes. A mixture of all scenarios seems probable. A fifth scenario – the uprising of the pump communities against the WSDB - seemed very weird to the local people, who discussed the issue.

It is possible to speculate about winners and losers of the water projects but, of course, a further collection of data, when the water system operates would be useful and give detailed insight and validation. According to my speculation, it is the household supply in the compounds outside the market area, which will be not only more expensive but also less reliable with the introduction of the piped water system. But this depends strongly on the decision taken about the hand pumps. Only if they remain regular sources of water and are included in a general payment scheme within the catchment of the piped water system, the water supply will improve in such village sections. The water supply in non-poor compound houses will benefit from household connections, if the system operates reliably, also because neighbours will fetch their water from such household connections instead of walking to the standpipe. (This may enhance prestige, influence or even lead to additional income generation by the sale of water to the neighbours.) The water supply at the market site for dwellers and shop owners will surely gain from the system but water carriers will not be required any longer or to a lesser extent because the shop owners who employ them presently are willing to invest into a household connection. Further, depending on the waiting times at the standpipe, the possibility to gain income for vendors of cool and ice water may also reduce because market customers will fetch water themselves when

they are thirsty. But as the Uganda case study (Davis et al. 2001) illustrated, nobody knows whether owners of micro-enterprises will invest in household connection as they state before the implementation of the water project.

9.5.3. Community-based management – from minimal to professional

In the paragraph on local capacities, it was already mentioned that minimal management is a functional strategy for rural supplies but not for water systems. To make a piped system run 24 hours, to provide reliably the best water quality, to operate it to its full potential, to act appropriately to technical disturbances, to maintain it correctly and to make it work on a cost-recovery basis requires professional management. Water professionals employed by GWCL as well as by private enterprises may face lack of equipment, resources and incentive for efficient work (Haffner 2005, Youkhana 2005). But they usually know how a system should be ideally run to fulfil all tasks because they have are professionally trained, have experience in their work and perform it as their job. Community-based management builds on the voluntary work of non-professionals – even though they may have participated in training workshops for capacity building. This fact is somehow obvious but it should not be dismissed at all.

Imagine, for example, that inhabitants of a small town in Europe would be confronted with the management of their piped groundwater scheme or a sewerage plant. Voluntary laymen would receive some training workshops and then carry out all responsibilities. (The chance to get a plumber, or a book keeper or any other skilled unemployed person into the team is much bigger in Europe.) These volunteers should then manage the facility as efficient as a professional enterprise - without or very little payment. This is a questionable expectation addressed to local water users. In Ghana, as in other countries without a welfare system, people usually have time-consuming income-generating activities, which they pursue. Further community work also carries the potential to make oneself socially more vulnerable as one may turn out be the target of anger, accuses or overdrawn expectations of other community members (besides the potential to gain social prestige if others are happy). Some small town communities opted out when they were given the chance to participate in community management and decision-making. People will spend time on such voluntary activities because they are either very committed, because they were appointed or because they have some personal agenda. At times, it may be a mixture of all factors. One could argue that community-based management in water management is a vehicle

for the state to withdraw from its organizational, political and financial responsibility to provide public utilities on the cost of a few local volunteers.

9.6. Conclusion

Data and water rights for hand pumps were compared with data from small town water systems. The comparison shows that there are rather continuities between the former rural management and the rural management under the NCWSP. Major conceptual and institutional changes occur between the management of hand pumps and small town water systems. The user community becomes abstract and is rather imagined than a face-to-face community. The operation, maintenance and decision-making are not with the users but with the WSDB and their operational staff. The payment of water tariffs and not the membership in a water user community regulates the access to water and its allocation. Water becomes a commodity to some extent.

Community-based management is a political concept. As can be seen from the rural management before the NCWSP, local user groups always managed their water facilities. This is also true for the time of centralized management of rural hand pumps by the GWSC.²⁰² Presently, there are three kinds of existing local or community-based management regimes: (1) local management of facilities, which are not considered by NCWSP (streams, shallow wells); (2) local management of hand pumps under NCWSP; and (3) local management of small town water systems under NCWSP. Conceptual and institutional differences, which occur with the introduction of a piped system are ignored on policy level, where the change from a rural to a small town management system is argued simplistically in terms of technical and institutional up-scaling. Empirically, this is not the case. A more differentiated view and policy and the recognition of continuities in local water management could be the key to tackle two different management challenges in a more appropriate way.

Despite the numerous problematic factors presented, community-based management of small town water systems can be a valuable option. It was even argued that presently the time is ripe for *“community management to grow up from being an interesting pilot approach to become a paradigm for rural water supply throughout the world”* (Schouten and Moriarty 2003: 11). If

²⁰² GWSC was in charge of technical aspects of hand pumps only. Local user groups performed other aspects, like water allocation, site cleanliness, sanctions against undesired behaviour at the pump etc. Other non-improved local water sources for household uses were not considered by the NCWSP.

community-based management is perceived, organized and implemented as a means to equip the water users with more voice and decision-making power over their water supply, it is surely favourable. But from my point of view, this is not limited to the community-based management option, for also in GWSC or PPP this could be implemented in form of user representatives or water user by-boards. Community-based management of piped water system is surely not favourable if used as a means by the state to withdraw responsibility for utility services. Small town communities need a lot of frequent and reliable support in form of technical and management expertise, finances and legal context to manage their systems in a sustainable way. It is not just knowledge (training workshops for community volunteers) but also accessible, reliable, knowledgeable people (water experts for monitoring, supervision and support) which are required. The state should make sure that this support is provided by legislation, state agencies, administration, donors or private companies.

10. Final conclusion and policy recommendations

*“...a wealth of data accumulated for nearly one century,
has not yet been systematically analysed and presented to inform policy decisions.[...]
every new sector intervention begins by trying to rediscover the wheel”*
(Bacho 2001b: 13)

The study shows how the resource water is interwoven with rural and peri-urban livelihood systems in Northern Ghana. The management of household water serves as an example for analysing the interplay between natural, and socio-political environment. The final conclusions can be summarized as follows:

- Water shortage is a result of a conglomerate of environmental and socio-political factors. Local household water security depends on resource availability, accessibility, usage, and water quality (as stated in publications of the GLOWA-Volta project, e.g. Osai-Asare 2005) At the research site, local water availability increased in dry season due to opening up of groundwater resources and the implementation of several well drilling programmes. The local community benefited from the national drinking water program NCWSP by receiving additional water points.
- The community-based water management paradigm proved to be a successful political strategy because it was based on already existing local management practices (without recognizing them explicitly). NCWSP policy was only partly and selectively translated into local water law and allocation practice by local water users.
- Generally, local institutions and in particular WRM institutions are strongly embedded, interrelated and linked with each other. Their robust character reduces their proneness to ad hoc changes, as they are intended by institutional design. Existing local institutions, which were directly informed by the natural environment, persisted, such as the norm of non-exclusion from water.
- The politically intended human right to water was already established and realized in the local water right regime as a norm of non-exclusion. Even though a higher number of dry season water points exist than ever before and access improved through the

implementation of the NCWSP policy (via the increase of water points) access became more restrictive. In addition, water user's choice also became less flexible through the implementation of the NCWSP because use rights became linked to formal membership in a pump community, which owns the water supply facility.

- The management of small town water systems by local, non-professional and voluntary water users was perceived as problematic by the author. In the course of change from hand pumps to small town water system supply, a number of conceptual and institutional changes manifest, which were not yet given appropriate attention in the NCWSP policy. Among these concepts are 'community', 'payments for water' and 'communal management'; they mean very different things regarding hand pumps and small town water system. Problems resulting from these conceptual changes, as well as other well known problems were observable even before the piped water system was constructed and delivered to the user community.
- Water as a resource is relevant for almost each and every component of livelihood and society. Regarding poverty alleviation, micro-enterprises were of interest. They were pursued as a complementary livelihood strategy to balance constraining effects of climate change in farming. Many of the micro-enterprises relied on relatively small but unneglectable amounts of water as necessary resource input. Such water uses were locally summarized under the household water right regime. Some belong to the category of small-scale water enterprises.

A number of policy recommendations can be derived from the empirical insight. A part of them already support existing recommendations by GLOWA-Volta project members and Ghanaian scholars.

- Productive household water uses should be acknowledged more in national drinking water programs. It is only then that such uses can be fully integrated in policies and national planning, and supersede the present situation in which the approach is successfully used by a number of NGO- and donor-driven projects but not applied systematically as poverty alleviation strategy. A process of political rethinking would lead to more studies to learn about the economic potential of productive household water

in the country, an increase in the formulated and targeted water amount per person per day (presently 20 l/c/d) and a group of Ghanaian water professionals whose work will centre on the extension of productive uses of household water.

- Politicians should not neglect non-potable water sources. Whilst there is a political response to the need of potable household water in form of the NCWSP, the intersectional character of household water is still not recognized fully on decision-making level. Therefore, some questions concerning household water provision fall into a grey zone between the water sectors and run a risk of receiving too little policy attention. Integrated Water Management requires a more holistic perspective. The more holistic approach of the Ghanaian “Water Supplies Division” of the MWH, which was used until 1966 was more appropriate in this respect.
- The continuation of the community-based household water management paradigm for rural water facilities is advisable. The policy to equip water user groups with tools, knowledge, and institutions to make them more capable in the management of their hand pump management proved to be the right strategy. For the area mechanics and DWSTs to be supportive partners in managing water user communities, the DWSTs have to receive more material support, such as funds for diesel to conduct more inspections of the state of the hand pumps (to detect communities, which are not yet able to maintain their hand pump or need help) and show presence in rural areas (to be recognized as supportive partners by the local population and be easily approachable). Regular fresh-up training for hand pump care takers should take place once in a few years. The work of CWSA should be strengthened by equipping the agency with some power in the form of an official mandate to sanction activities by donors and NGOs, which do not follow CWSA guidelines.
- The practical outcome of the 5 % rule and its implication for the provision of water facilities should be subject of more research. If other studies reaffirm its purely political character and constraining impact on water projects, it should be revised. It seems that the different economic situations in the country require a more differentiated regulation because poor project communities are not always able to accumulate the requested

amount and other institutions (DA, donors, etc.) have to step in anyway by taking over the financial commitment of the communities. Project cycles could be reduced and coverage could be increased faster if the capacity of poor project communities were not over-estimated in the first place.

- The policy priority for communal management of small town systems should be rethought. The inclusion of water users in decision-making processes concerning their water supply should be continued and expanded. Communal management does not provide an adequate solution to the typical management problems of such water systems. Water user may be able to fulfil this task successfully if they get strong professional support of water experts. The withdrawal of the state from this area of water supply should be revised, for state support in the form of subsidies and clear regulation of management responsibilities is essential and indispensable.
- Research in water management should be conducted in a way, such that it takes the different natural and socio-political environments found in the Volta River basin into consideration. Different social organizations, poverty status, infrastructure, education levels and water availability lead to different local institutional frameworks and peculiar problems in water management. It is not in all cases appropriate to introduce and implement rules and regulations, which have proved to be successful in Southern Ghana due to the persistence of the North-South divide.

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| GLOWA-Volta research project | www.glowa-volta.de |
| Community Water and Sanitation Agency, Acca/Ghana | www.cwsagh.org |
| Sirigu Women Organization for Pottery and Art | www.swopa.org |
| NGO Afrikids, London/UK | www.afrikids.org |
| International Water History Association | www.ihwa.net |

Appendix

Appendix 1: Questionnaire for pump committee survey

- A name of pump community
- B village section/ description

General information about the pump (observation and additional information)

- a. registration code (CWSA, Catholic Diocese)
- b. type of pump
- c. foundation
- d. gutter or soak away?
- e. state of pump
- f. pump site (shade giving trees, waiting places etc.)
- g. info from Nicola Martin if available (water quality/ water table)

I. Size and members of pump community

- 1.1. How many compounds fetch water from your pump?
- 1.2. Which one is the furthest compound to the pump?
- 1.3. Can all compounds reach the pump during raining season?
- 1.4. Has the number of compounds using the pump reduced or increased within the last years? Why?
- 1.5. What are the conditions for a new compound to join your pump community?

II. Financial Contributions

- 2.0. How much did the initial compounds pay for the provision of the borehole?
- 2.1. How much do people have to pay to use the pump?
- 2.2. Who has to pay? Who does not need to?
- 2.3. When are the fees to be paid?
- 2.4. Do you take fees for water use that is not household water use? For what and how much?

- 2.5. What will happen when people intentionally refuse paying they fees?
- 2.6. How many compounds cannot contribute fees but benefit from the pump?
- 2.7. Which ones are that? Why can't they pay? Do they receive other support from the community?
- 2.8. Does the committee has an account? Who is allowed to draw money from it?
- 2.9. If it is a mission borehole, who brings the money over to the office in Bolgatanga/ Navrongo?

III. Pump Committee

- 3.1. Have you got a pump committee?
- 3.2. How did the committee come into existence?
- 3.3. Who is member of the committee? Why?
- 3.4. Do committee members hold other responsibilities in the community?
- 3.5. Did committee members play a crucial role during the provision period of the borehole?
- 3.6. Has the membership of the committee changed within the last years?

IV. Bookkeeping

- 4.1. Do you keep a book? Can we see it?
- 4.2. Who writes it? Does the bookkeeper need help by literates to keep the book?
- 4.3. If you cannot read how you do know that people have paid?
- 4.4. What other information do you keep in your book?

V. Problems with the pump

- 5.1. Who is in charge of repairs?
- 5.2. Has there ever been a breakdown of the pump? When?
- 5.3. How long did it take before it was repaired and functioned again?
- 5.4. Is the money collected enough to take care of the repairs?
- 5.5. Have ever had problems with the quality of your water? Which one?

VI. Neighboring pump communities

- 6.1. Which ones are the next pumps from your pump?
- 6.2. Do some compounds pay contribution for two or more pumps?
- 6.3. Do some compounds pay contributions to receive a new borehole?
- 6.4. Do you allow people and livestock, which are not from your community to fetch and drink water from your pump? Describe situations when you do and situations when you don't.
- 6.5. Are you allowed to use other people's pumps?

VII. Community Labor

- 7.1. Does your community contributed labor work for the maintenance of the pump site?
- 7.2. Who is responsible for what?
- 7.3. Is it rather easy or difficult to call people for community labor (also apart from tasks which concern the pump)?

VIII. Problems in this pump communities

- 8.1. Did/ Do you have any problems within the pump community?
- 8.2. Are you pleased with the way your pump site looks? Have you got any idea how to improve it?

IX. Additional information

Appendix 2: Questionnaire for semi-structured interviews with project communities

- When and how came the idea up to pursue an own borehole?
- What are the main reasons for a new borehole?
- Which people play a crucial role in organizing the community? Why? What do they do?
- When did the efforts start?
- Where have you applied for a new borehole? Who are your contact people?
- How many compounds are joining your effort? Which ones?
- Which boreholes are they using now? Are they from different pump communities or the same one?
- Do you hope to mobilize more compounds to join you? How are you doing that?
- How far have you gone with the procedure till today?
- What difficulties have you met?

Appendix 3: Questionnaire for compound survey

Ask a group of adult people (2-3) belonging to different households within one compound house! At least one should be a woman.

Name of compound head?

Compound code?

I. Information about the compound

1.1. *Deto tulɛ n boi nyama yire wa?*

[How many households live in this compound?]

1.2. *Ani la ani n boi det ɔ la p ɔ sum?*

Budasi dela bale? P ɔ gsi dela bale? K ɔ mkɛgsi dela bale? K ɔ mpigsi dela bale?

[Who belongs to the single households? How many men, women, youth and children?]

1.3. *Nasaabugum pa'ɛ nyama yire?*

[Are you connected to the national grid? Do you use solar energy?]

II. Economic situation of the compound

2.1. *Nyama iti la beni nyifa ligeri ya yire wa puan? Ya k ɔ ri mɛ? Ya leeberi mɛ? Ya tuni la g ɔ mina tuuma? Nutundina ti ya tari? Ya ugeri mɛ?*

[What sources of income has this compound? READ OUT: farming, petty trade, government job, business, handicraft, livestock rearing]

2.2. *Fom nutatum la fu tadaana yire nusalutum ani la gwam fom zi'a?*

[How do you judge the economic situation of the compound compared to the one of your neighbours?]

2.3. *Nyama k ɔ ri la bem?*

[Which crops do you farm?]

2.4. *Fum tari la nosi la kiine bale? Kurikuri doma bale? Nii bale? Busi bale? Piisi bale?*

B ɔ nsi bale?

How much livestock belongs to the compound? READ OUT: Poultry, pigs, cattle, goat, donkey, sheep]

(If the respondent does not know about the other households, ask them individually.)

2.5. *Nyama yire tari b unŋa torigo? Kuti weefo? Pupu? Loose? Ko'om guligo? Ya tari deo ti a bona tiŋe bii daa puan?*

[Does your compound own any of following items? READ OUT: donkey cart, bicycle, motorbike, car, market drum, a room/ business room in the market/ in town?]

2.6. *Nyama yineera ha deo bona daam bi tari deo bona daam k ɔsa?*

[Has anybody from your compound rented a room/ business room in the market/in town?]

2.7. *Fu tari k ɔma ti ba sina sukuu zi'a de dana Sirigu? Nera yese siɲe zi'a ti la ta tum?*

[Have you children schooling outside Sirigu? Is somebody migrating for work?]

(Were they counted in 1.2.?)

ASK NOW MEMBERS OF SINGLE HOUSEHOLDS!

2.8. *Fum nye la si la sukab ɔra aɛ yuune wa puan? (Kimoliga, naara, zukan) Dea la duna yuune wa ani la gwani dia etigo puan?*

[How much of millet/groundnuts has your household harvested this year? How was the harvest compared to the one last years?]

2.9. *Ya yire duma bingri ligeri biɲera zi'a?*

[Does your household have any savings?]

2.0. *Di p ɔɔsigo tabelɛ ny ɔke ya yo? Dina winum? Beni n soi?*

[Has your household experienced food shortages? When? Why?]

III. Compound water provision

3.1. *Sanire tam ya nyeti ko'om la be? Buliga bii, b ɔka bii, pumpi bii, m ɔgre puan?*

[Which water sources are available for your compound in raining season? **READ OUT** : well, stream, borehole, dam]

3.2. *Zi kana miɲa ko'om n lɛm nyama yire wa?*

[Which water source is the nearest to your compound?]

3.3. *Ko'om buna miɲa buri ti ya yire la duma yuri?*

[Which water sources do you use for your household (**exclusive livestock**)?]

3.4. *Taam buna miɲa yuune la puan ti ya ageri ko'om bini?*

[Which time of the year do you use these water sources?]

3.5. *Ya dusi nyuuri ko'om la be uune ni san ta wii?*

[From which water source do your animals drink in dry season?]

3.6. *Ya teesini ya ko'om la zi'a yuuma n tole la yo? Beni n soi?*

[Have you been changing your water sources within the last years? Why?]

3.7. *Ya teesini pumpi duma yuuma n tole la? Beni n soi?*

[Have you been changing your borehole within the last years? Why?]

3.8. *Ya tari lore bii kuteweefo bii pupu ya ageri ko'om bii ya tu'uri la zuto ma'a?*

[Do you use vehicles to fetch water?]

IV. Water fees and contributions

4.1. *Zi sina puan ya y כרי la be dee agera? Pumpi, m כgre?*

[For which water sources are you paying contributions? **READ OUT:** Borehole, dam.]

4.2. *Ya y כרי gana pumpi a yila puan? Kuna pumpi miya?*

[Have you been paying fees for more than one borehole? For which other one?]

4.3. *Beni ti ya tara gana pumpi ayila?*

[Why do you use two boreholes?]

4.4. *Ya lagesi ligri ti ba ee Ko'om zi'a pa'ase?*

[Have you paid any contribution towards a new water source? Which one?]

4.5. *Ba taε tu pumpaalega miηa b כ ya?*

[Has the new water source been provided yet?]

4.6. *Ya po agera pumpaalega la ti po lagesε lirigi ti ba tu la?*

[Are you user of the new water source you have paid contribution for?]

4.7. *Fom doti la dena zoa yora fo kom yero la lagesigo?*

[Which sources of income do you use to pay your water fees and contributions?]

4.8. *Ani n y כרי pumpi la sanε bii ככoro? Yidaana bi nera woo?*

[Who is paying the water fees of the household/ compound?]

V. Compound water usage

5.1. *Kobuna miηa ti ya tari nyuura bii pεera l כger כ?*

[What kind of water do you use for what purpose?] **Multiple answers possible**

5.2. *Ya kelum tara ko'om εta la beni ya yire wa puan?*

[What are other important compound water usages?] **keynotes**

5.3. *Ya boti ko'om la nyua ma'a iηabii ya bo tara bu tuna la tuuma a se'a?*

[Do you need water for your business (**apart from farming**)? For what business?]

VI. Compound sanitation facilities

6.1. *Ya siηε la be εta bangira?*

[What sanitation facility do you use?]

6.2. *Ya boti ti ya yire wa tara bangira yo?*

[Are you interested in getting a household/compound latrine?]

VII. Borehole management

7.1. *Ani n loe ya pumpi wa zuuduma?*

[Who appointed/elected the members of the pump committee?]

7.2. *Bana n de ya pumpi wa zuuduma? Ba po tara tuuma a se'a ya tiŋa wa puan yo? Beni ti ba daa loose ba?*

[Who is member in your committee? Do they hold other responsibilities in the community? Why were they chosen?]

VIII. Participation in water development

8.1. *Nyamam gingiŋa wa dike ya neŋa lu ko'om yela la gwani gwani?*

[How have people from your compound participated in water development projects?] **READ OUT OPTIONS**

8.2. *Pogesi dike ba neŋa lu ko'om yela la gwani gwani?*

[How have women from you compound participated in water development projects?] **READ OUT OPTIONS**

8.3. *Ya san tara yele bii ya boti sungre ya pumpi wa puan, ani ti ya wan soke?*

[Who is the person you would ask for information or help when you have problems with your water source?]

8.4. *Ani ti ya wan soke bii nye po'ore ya sam b ɔta ti ba eŋe ko'om b ɔ ya?*

[Who is the person you would ask for information or help if you want to get a new water source?]

VIII. Opinion

Discuss small rather than ask. Take notes.

9.1. *Yele ana miŋa ti ya nye ti la dena daay ɔ ya pumpi wa puan?*

[What problems do you see when you look at your water provision?]

9.2. *Beni ti ya nye ti la dena daay ɔ ya pumpi wa bisaga puan?*

[What are the problems you see when you look at the management of your borehole?]

9.3. *Ya ti'isi bem ti beni n wan eŋe bii n nari ti la eŋe ti yele la maale?*

[How do you think these problems can be/should be solved?]

9.4. *Ya tara yele ti ya yele bii s ɔse pa'ase yo?*

[Is there anything else that you would like to say?]