

Community Needs Assessment and Local Water Governance Appraisal in the Upper East Region, Ghana

Draft Report

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Glossary

Community Needs Assessment and Local Water Governance Appraisal in the Upper East Region

Background of the study

This study was undertaken as part of the Challenge Program Project 40: “Integrating Governance and Modeling”. The objective of this project is to research the use of integrated simulation models as decision-tools in multi-stakeholder negotiation processes at the sub-basin level. Project sites are the Volta-Basin (White Volta sub-basin, Ghana) and the Andes basin (Melado sub-basin, Chile), where construction of agent-based simulation models that combine economic, institutional and hydro-meteorological sub-models is already underway. The project focuses on the following activities:

- (1) The analysis and strengthening of multi-stakeholder governance structures in the two project sites (Sub-Basin Management Board in Ghana, Water User Associations in Chile),
- (2) The identification of problems, policy options to address the problems, and criteria for the evaluation of policy options by the stakeholders,
- (3) The extension of simulation models to incorporate the impact of climate change on land and water use decisions of risk-averse producers,
- (4) The evaluation of alternative policy options, as identified by stakeholders,
- (5) The development of decision-support tools that present and visualize the outputs of the simulation models in a form that is useful for the stakeholders,
- (6) The actual use of the decision-support tools in negotiation and planning processes in the multi-stakeholder governance structures.

Objectives of the study

Concentrating on objective 2 of the project outlined above this study was conducted with the aim of assessing the priorities, needs and constraints of communities in the Upper East Region, both generally and specifically with regards to irrigation and domestic use of water.

Specific objectives were to:

- provide an overview over the area and document crucial water issues at the community level
- provide a first insight into local water governance: identifying actors and procedures, both in terms of domestic and agricultural water uses
- assess constraints, problems and conflicts in the community’s water situation
- identify links between communities and external agencies, and
- prepare grounds for further research

Background of the study area

The survey was conducted in the Upper East Region (UER), the poorest of all the 10 administrative regions of Ghana. It lies between latitudes 10° 15' and 11° 10' North and longitudes 0° and 1° West. The region is bordered to the west and south by the Upper West and the Northern Regions of Ghana. To the east and north the region shares boundaries with the Republics of Togo and Burkina Faso respectively. The region is divided into eight administrative districts: Bongo, Builsa, Garu-Timpone, Kasena-Nankena, and Talensi-Nandom Bawku West, as well as the Bawku East and Bolgatanga Municipal and Bolgatanga Municipal assemblies. According to Ghana's year 2000 population and housing census (GSS, 2002) the region has a population of 920,089, made up of 442,492 males and 477,597 females, and with intercensal population growth rate of 1.1%. Indeed, the Upper East Region has the highest population density (104.1 persons per sq. km) of all regions of Ghana. However, over 80% of the population live in rural areas where the availability of water (both for domestic and agricultural uses) is generally scarce and uncertain.

Agriculture is the major economic activity with subsistence farming being the main feature. But the region has a single, very short rainy season from May to October, characterized by moderate – though erratic -- rainfall. Annual rainfall received in the region averages about 1000 mm. The area, like most parts of northern Ghana, is characterized by a single growing season. The uni-modal rainfall regime peaks around August and is often associated with floods and droughts that may occur in the same season. In addition, rainfall is often very intense, producing considerable runoff experienced within a very short time of rain. There is a long dry season, lasting from November to April. This often results in the drying up of most natural sources of water in the area, so that years of little rain or prolonged drought have great implications for year-round water availability for domestic use, livestock consumption and dry season gardening, which constitute the major uses of water in rural communities in the Upper East Region of Ghana.

Methodology

Data collection time frame

Fieldwork: 24th of May-29th of June 2005. The fieldwork consisted of initial visits to prepare the ground, organize stakeholder meetings and set up schedules, followed by second visits when the actual stakeholder group discussions were undertaken. The group discussions took about 2-3 hours and two communities were visited per day.

Research Approach

While developing the field method, we discussed the virtues of approaches that work with big community groups as opposed to those that focus on individual or small group interviews. To avoid raising high expectations through fancy RRA community meetings, we decided to interact only with a smaller selected group of interview partners.

One factor that we only realized in the field, was that even group meetings that are intended to be small, are public events. As the communal meeting place is normally centrally located, a number of stakeholder meetings grew in size throughout the discussion. This was especially obvious before the first rains started, when water needs were perceived as very pressing and community members had no work to do. So the number of participants of stakeholder meetings ranged from 8 (after the start of the rainy season at a rather remote meeting point) to more than 50 (before the start of the rainy season at a central meeting point).

As the main aim of this field research was explorative, the approach was to nurture a discussion following a guideline of open ended questions. Below we have outlined 9 areas of interest, which we tackled in the discussion. Each consists of one general opening question that is followed by a number of more concrete questions as the discussion goes on. As the crucial issues differed between communities, the questions in brackets were only general guidelines.

As often occurs, we observed a tendency that a small number of participants did a great proportion of the talking. To allow everyone to voice their concerns we decided to include a small group exercise in the course of the meeting. After some introductory questions the group was asked to split up in groups of 3-4 to discuss their biggest water related problems in the community. One speaker was to give feedback to the big group afterwards.

Field study plan

The interviews were supplemented with observations about general and water infrastructure in the villages and documents collected at the different institutions at the district and community level.

General: Road network, proximity to urban centers and services: schools, markets, clinics, electricity, phone lines

Water related: Sources of drinking and irrigation water, functioning of infrastructure, different water uses (irrigation, livestock, domestic, other)

Questions for community visits

Major **constraints/problems/conflicts** within water governance: What are the biggest water related problems in the community? (*General question, encourage all participants of the meeting to voice their views, work in small groups with feedback to main group*)

Actors: Who are the **actors** in the local water sector (NGOs, Gov: political and administrative actors, CBOs, private sector)? (*What are their roles? How do they interact, for example in the process of site selection?*).

Procedure of establishment of infrastructure: How was water infrastructure established? (*When? Who supported (NGO, gov)? How did it start? Was it a community initiative? What was the community contribution? How did you organize to collect the contribution? How does the contact and the procedure go?*)

Rules: What are the By-Laws and norms of WUAs, are there other water related rules? (*How important are they in practice of WUA? Is there community ownership of By-Laws? What was the impact of NGOs, government officials, in formulation of them? What are typical issues where norms are broken? What are possible sanctions? Which ones have been taken already? What happens if someone goes on to disobey? Which outside actors are involved in sanctioning?*)

Access to water: What are the water allocation mechanisms? (*What are mechanisms for dam areas? Are there mechanisms for domestic water? For non-dam irrigation areas? Equality of access to water?*)

Access to land: What are the criteria for irrigation land distribution at irrigation sites? (*For how long is land allocated? Has any change in mode of distribution occurred in the past? How is the handing over between wet and dry season organized? Are there special measures for drought? Is there compensation for landowners, and how is it organized? Who oversees allocation of land? Do original owners have a say in the allocation? Equality of size of plots? Are there contractual agreements on land redistribution and if so, between which actors?*)

Pricing: Do people have to pay for water? How is the pricing (if there is any) of domestic or agricultural water organized? (*Decision process, who decided, have there been amendments in the past? How much, based on what, when do you pay, what about non-payment? Are there criteria to excuse some users from paying fees? What happens with the money? Who decides on what you spend money? Who keeps it? How much do you have on the bank? When did you last spend some of this money, for what?*)

Collective Action: Which are the water management activities that need collective action? (*How is that organized? How many are involved? Does it work well? How*

strongly can free riders impact on common result? Are there sanctions for free riders? If collective action fails, are there individual solutions? When and how does it work well?)

Selection and change of leadership: How are the leaders of different water governance bodies put into their position and what are procedures for change of leadership? *(What is the length of term? How does the election/selection go, peaceful, “revolutionary”, no changeover at all? How does handover go: can new administration assess work of old committee? Is it clear and generally agreed upon, who is in charge? Gender issues in leadership? Can people contradict leadership, can they ask for accountability? Has it happened? What was the result? How long is the current chairman in his position? How often and how many times have you changed your leaders?)*

Interviewees

- chief, elders, tindana (we need a short description on the tindana as being a traditional position for the person in charge of land allocation decisions)
- District Assembly man/woman, unit committee members
- WUA (Water Users’ Association of dam)
- WATSAN (Water and Sanitation Committee of boreholes)
- women’s group and other local water users
- local NGO (if existing)

Selection of villages to visit per District:

All communities, apart from one, had a dam (though not always functioning) and most were not connected to the Ghana Water Company Ltd network for domestic water. So there were both WUA and WATSAN committees. The choice of communities followed the idea of variety to allow for a diverse overview over the water governance in the Region. The additional non-dam community was visited because they are part of a new river-irrigation scheme under which community groups access loans to buy pumps for irrigating close to riversides. Criteria for the selection of dam-communities were:

- diverse governance structures (more participatory or authoritarian, with and without change of leadership)
- productivity (high and low, cash crops and local food)
- accessibility (community close to and far from major roads and markets)
- diverse outside actors involved (governmental actors and NGOs)
-

Note: The choice of communities followed a previous assessment of the situation in 2003 (see Gyasi, 2005). For some districts, like the small Bolgatanga District that mainly covers the municipal area, there was a very limited choice of sites – as opposed to the Bawkus that host the majority of dams in the Region. Table 1 below presents the list of villages included in the survey.

Table 1: List of villages and their geographic locations

District	Name of community	Location of dam	
		Latitude	Longitude
Bolgatanga Municipal	Dorungo*		
	Sumbrungu	10° 49.732N	0° 56.208W
Talensi-Nabdam	Winkongo	10° 42.644N	0° 51.637W
	Baare	10° 44.224N	0° 47.736W
Bongo	Bongo Central	10° 42.644N	0° 51.637W
	Dua	10° 53.253N	0° 46.827W
	Dua Apowongu*		
Kasena-Nankena	Paga-Nania	10° 58.989N	1° 06.720W
	Doba	10° 51.611N	1° 02.038W
	Kaasi*		
	Kodorogo*		
Builsa	Sinyansa	10° 37.894N	1° 16.410W
	Wiaga – Yisobsa	10° 39.887N	1° 16.067W
Bawku West	Tonde	10° 53.200N	0° 26.169W
	Saka	10° 57.730N	0° 26.040W
	Kabore* (River irrigation site)		
Bawku Municipal	Binduri	10° 57.860N	0° 18.576W
	Kpalwega	11° 02.044N	0° 16.398W
Garu-Timpana	Bugri	10° 58.439N	0° 08.109W
	Wuriyanga	10° 53.317N	0° 04.110W

*GPS reading yet to be taken

Analysis of community water sector

Features of common water sources in the study area

The major sources of water in the region are rivers, streams, groundwater (bore holes fitted with hand pumps, wells, etc), springs, natural ponds, dams and dugouts. Rain water is also harvested (captured) during rain storms using calabashes, pots and drums for use in homes. In communities where no interventions have been made to provide potable water, the people depend on rivers streams, ponds or wells for their water needs (including drinking and other household uses, livestock watering, building as well as dry season gardening). The major rivers in the UER are the White Volta, the Red Volta, Sissili and Kulpawn. In addition to the rivers, there are a number of small streams that flow through the region. In spite of the considerable run-off that is received in the region, most of these waters recede and many of the water bodies dry up during the long dry season. Indeed, many of the rivers are reduced to a series of ponds during the dry season.

In most of the survey communities underground water is accessed through hand dug wells and bore holes. Figure 2 below shows features of some of the water sources in the region. In the areas where the water table is high community members construct hand dug wells. These are often constructed with simple tools such as pickaxes and shovels, and can be as deep as 30 meters. Some communities received NGO support to dig and protect their wells and to fit them with hand-pumps. In addition, in some communities, the wells are protected, being lined with concrete materials or rocks to ensure their durability. In some communities brick walls are constructed around the water points. Water from the wells is usually drawn manually using buckets. Although not very safe to drink, wells remain a major source of water for many rural communities in the study area.

In the traditional irrigation systems practiced in many places in the region, shallow wells (up to about 3 meters deep) are dug in low lying areas of river banks in the dry season and the water is drawn to irrigate crops. In a number of communities however shallow wells are important sources of drinking water, especially in the dry season. Problems associated with shallow wells include pollution from free disposal of human and animal waste, household refuse, leaves, etc; and drying up especially during the dry season.

Interventions in community water sectors

Over time, there have been some interventions in the water sector aimed at providing the rural dwellers with water for domestic and agricultural use. Bore holes and wells fitted with pumps and dams are the main water systems that have been constructed in the area by governmental and non-governmental organizations to provide water for both domestic and agricultural use.

Bore holes are drilled by machines and can be up to 50 meters in depth. Among the water sources in the rural communities, bore holes water appears to be the safest. Public agencies and NGOs have therefore constructed bore holes in many communities in the region to improve public health. (Osman: How many communities visited have boreholes?) Indeed, in many rural communities all over the world, underground water has turned out to be safe and a reliable source of water. However, the geological conditions of some parts of the region make them poor yielding areas for underground water (see Bacho, 2001). It is therefore not surprising to notice that some bore holes and wells yield very little water or dry up during the dry season. Bore holes and wells also serve other water needs of the communities: In many places drinking troughs are constructed at the water points through which the bore holes / wells can be used to water the livestock.

The drilling of bore holes in the area has indeed reduced the dependency on wells, streams, ponds and harvesting of rain water to meet domestic water needs. Dams and dugouts are constructed to harvest water mainly for dry season gardening and livestock watering. Indeed, availability of both dams and bore holes in some communities has greatly impacted on water availability for gardening, livestock watering and domestic

use. The dams provide a lot of economic opportunities farmers in the dam communities, where the water is mostly used for dry season crop production and livestock rearing, in addition to some domestic uses (including home construction).

The two major irrigation systems in Ghana, Tono and Veia, are located in the region. Tono is situated in the in the Kesena-Nankena while Veia is located in the Bongo District. A semi-autonomous public agency, the Irrigation Company of the Upper Region (ICOUR) manages these schemes. Apart from the irrigation of crops and livestock watering, the two systems are the main sources of drinking water for the nearby urban and rural communities. The Ghana Water Company Ltd. has water treatment stations at Veia to provide water for the Bolgatanga Municipality whilst the company's water treatment plant at Tono serves the Navrongo and Paga environ.

Apart from the two major irrigation systems, many rural communities in the region depend on small dams and dugouts for dry season gardening, livestock watering and domestic water needs. There are over 200 community dams and dug outs in the region.

Under the first phase of the Upper East Region Land Conservation and Smallholder Rehabilitation Project (LACOSREP) funded by IFAD and the Government of Ghana, 36 dams and 8 dugouts were constructed/rehabilitated. Twelve (12) new dams were earmarked for construction under the second phase of the project which was officially due to end on March 31, 2005.¹ The only difference between a dam and dugout, in the definition of LACOSREP, is that while a dam has an outlet with a valve for releasing water for irrigation downstream, a dugout has not. The irrigation systems provide secure sources of water for dry season gardening, a major source of income for many people in the region. The dugouts were initially intended for livestock watering, but the farmers also use the water for dry season gardening and domestic uses (including drinking, washing and home construction). Farmers in non-dam communities use water from ponds and shallow wells for gardening which they draw using buckets and calabashes. Others use pumps to draw water from rivers and streams irrigate their crops.

The feeling is that the availability of water sources in a community has a significant impact on the livelihood of the people. In communities with scarce water resources, drinking water as well as water for the livestock is a major problem especially in the dry season when many water systems dry up. Women and children were said to trek long distances to fetch water. Table 2 below presents the major characteristics of the water systems found in the survey villages.

Panels A-F of Figure 1 below are pictures of some of the main sources of drinking water in the rural communities in the Upper East Region of Ghana.

¹ This phase of the project which begun in the year 2000 has been extended to end in June 2006. The first of the project however started in 1991 and ended in 1997.

Table 2: Features of community water systems in the survey communities_

Water infrastructure	Main features/ Accessories	Decision to provide the intervention	Role of community during construction	Operation and maintenance responsibility	Majors uses
Deep Wells	<ul style="list-style-type: none"> • Often lined with cement walls • Covered to reduce pollution • Some with watering troughs 	<ul style="list-style-type: none"> • Community initiative, sometimes NGO / Government Intervention 	<ul style="list-style-type: none"> • Community contributed labor and stones 	<ul style="list-style-type: none"> • Community 	<ul style="list-style-type: none"> • Household uses • Livestock watering • Home construction • Gardening in dry season
Shallow Wells	<ul style="list-style-type: none"> • About 1-3 m deep, not lined and not covered 	<ul style="list-style-type: none"> • Community initiative 	<ul style="list-style-type: none"> • Individual Community members or small groups construct shallow wells independently 	<ul style="list-style-type: none"> • Users 	<ul style="list-style-type: none"> • Mainly gardening, wells serve one or more individual plots • Domestic uses in some communities
Bore holes	<ul style="list-style-type: none"> • Hand pumps • Cemented walls • Some with Watering troughs 	<ul style="list-style-type: none"> • Government or • NGO decision in the past • Now community oriented approach 	<ul style="list-style-type: none"> • No community contribution in the past • Now cash (5% of construction costs), labor and other materials (e.g stones) 	<ul style="list-style-type: none"> • Water and sanitation (WATSAN) committees in the communities 	<ul style="list-style-type: none"> • Household uses • Livestock watering • Home construction
Small town water system ²	<ul style="list-style-type: none"> • Overhead reservoirs • Network of pipes 	<ul style="list-style-type: none"> • demand-driven • largely donor funded 	<ul style="list-style-type: none"> • District Assembly contribution 	<ul style="list-style-type: none"> • WATSAN 	<ul style="list-style-type: none"> • Household uses
Dams	<ul style="list-style-type: none"> • Control valves • Spillways • Canals • Laterals 	<ul style="list-style-type: none"> • Government at first (LACOSREP I) • Demand driven (LACOSREP II & NGO dams) 	<ul style="list-style-type: none"> • Labor and stones (initial stages of LACOSREP I) • None (later stages of LACOSREP I & II) 	<ul style="list-style-type: none"> • Water Users' Associations (WUAs) 	<ul style="list-style-type: none"> • Livestock watering • Dry season gardening • Fishing • Home construction • Other household uses (drinking and washing)
Dugouts	<ul style="list-style-type: none"> • large excavation / embankment in low lying area to harvest runoff 	<ul style="list-style-type: none"> • Government • NGOs 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Livestock watering • Home construction • Dry season gardening

² Only one of the communities visited (i.e., Binduri) has a small town water system but it is out of use. The system has long broken down.

Figure 1: Typical water systems in the rural communities of the UER

A. Hand dug (deep) Well lined with stones	B. Hand dug (deep) well protected with cement wall & cover

C. Hand dug (deep) well fitted with pump	D. Borehole:

E. Borehole with watering trough	F. Shallow well

Somewhere before here, we need to summarize the communities in terms of how many have dams and dugouts (I guess all but one?); of these how many have dams that are currently functioning.

Multiple uses of the water systems

Domestic Water

Here a short description of domestic water sources vis-à-vis irrigation water sources

Irrigation Water

The main uses of water from the dam reservoirs are: livestock watering, dry season gardening, drinking and washing as well as home construction. Livestock is a major source of income for many of the households and also plays a very important role in the funerals and the traditional dowry system in the area. Lack of water affecting livestock therefore impacts significantly on local livelihoods. In the dry season the animals have to roam far in search of water, and stock losses often occur due to death or theft. In those communities visited that had a dam, this reservoir was the main sources of water for livestock during the dry season, when most of the water sources (seasonal streams) dry up. In those communities that do not have a dam or where dams were dysfunctional, local farmers recorded the death of livestock and poultry (especially guinea fowls) through thirst.

Crop irrigation, however, constitutes the largest consumer of the dam water. Those with access to land in irrigation areas describe vegetable gardening as their main activity and source of income in the dry season, when the majority of the people in the region are idle and have few economic opportunities. Thus community members see dams as an important intervention; one that reduces migration of the youth to urban center in search of jobs, which many community members feels is a cause of certain social problems.

The reservoirs of the community dams and dugouts also serve as fish habitats and the source of protein for many of the rural dwellers. Efforts have been made by the fisheries department of MoFA to stock some of dams with fingerlings, as a way of promoting fish culture in the region.

In some communities, the dam remains a major source of domestic water supply available to many households in the study area. The dam water is also used for home construction. Therefore the importance of non-agricultural uses of dam water in livelihood strategies has implications for irrigation management and water rights as increasing water scarcity challenges existing water allocation mechanisms. In the event of scarcity communities develop hierarchies of water uses according to their importance. It

was generally agreed that the most important water use was human drinking water, closely followed by watering livestock. Only if these two needs were secured, the excess water was to go into irrigation farming and other uses like construction.

[Here it would be nice to have a table to summarize the above information; e.g. to have a column with water sources noting how many communities have each of which type (as in Table 2 above, but summarizing number of communities with deep wells (and a separate row for how many with deep wells lined with cement, how many with watering troughs, etc), and perhaps types of uses and users across the row – if the information collected allows us to match uses/users with each source of water. If not, a separate table summarizing uses/users (e.g. how many communities use dams for fishing, how many for livestock watering, how many for gardening, etc.) would be very useful]

Actors in the community water sectors

I think we need to break this down a bit more between domestic vs. irrigation water use

The actors/stakeholders in the community water sector in the Upper East Region are the primary users and development agencies, including both government organizations and non-governmental organizations (NGOs). The primary users of the water systems are the members of local communities. In all the communities visited, the primary users are directly responsible for the management of the water systems.

It was visible in the area that many governmental and NGOs have played very important roles in the rural water sector in the region, sharing common objectives and promoting similar water systems like bore holes, wells, dams and dugouts. The Community Water and Sanitation Agency (CWSA), and in the past, the Ghana Water and Sewerage Cooperation (GWSC) have been the main governmental actors in the domestic water sector in the rural communities. Indeed, CWSA is currently the government agency responsible for rural water supply as well as small town water system, while the Ghana Water Company (GWC) focuses on urban water supply. IFAD-funded LACOSREP and the Ghana Irrigation Development Authority (GIDA) of the Ministry of Food and Agriculture are the main actors in the rehabilitation and construction of community dams and dugouts for agricultural use in the UER.

International organizations and local NGOs are credited with most of the water systems in the rural communities in the Upper East Region. The one most frequently associated with the drilling of boreholes in the region is the Canadian International Development Assistance (CIDA). Other NGOs that were mentioned in the survey communities as actors in the sector include, Adventists Development and Relief Assistance (ADRA), Action Aid, The Catholic Church, Rural Aid, and World Vision International. Apart from LACOSREP, the Village Infrastructure Project (VIP) of the Ministry of Food and Agriculture, as well as NGOs such as, Action Aid, the Red Cross Organization, and the Catholic Church have also been in the forefront in the provision of dams, dugouts and

The Irrigation Development Authority (GIDA) is the key institution responsible for the design of irrigation schemes in the Region. GIDA also doubles as the consultant on IFAD-LACOSREP for the construction/rehabilitation of dams and dugouts. Private contractors also play significant roles in provision of water (drilling of boreholes, construction of dams, etc), both for domestic and agricultural use. Similarly, both government and private sector organizations (including NGOs) are involved in training and community sensitization activities in the water sector in the study area. Table 3 is a matrix that simplifies the roles key organizations play in the water sector in the study area.

Table 3: List of organizations and their roles in the community water sector in the UER

Organization	Role in community water sector
Ministry of Food and Agriculture, UER	Extension education on irrigation management and water conservation
LACOSREP	Rehabilitation and construction of dams and dugout for dry season gardening and livestock watering
IFAD	Funded land and water conservation projects in the UER
GIDA	Design and supervise the construction of irrigation infrastructure (dams, canals, etc). Also Involved in dam construction.
CIDA	Funded construction of bore holes in the region
CWSA	Establishing community water systems with donor support
Department of Cooperatives and Community Development	Organizing WUAs into cooperative societies; training in group dynamics, financial management
Rural Aid	Construction of wells and training on water hygiene. Sponsored by Water Aid
Action Aid	Funded construction of dams for dry season gardening
Red Cross	Funded construction of dam for irrigation
World Vision International	Construction of bore holes
Catholic Secretariat	Funded construction of community dams
TRAX	Training in land and water management, fund construction of boreholes
VIP	Fund rural development projects including water systems

Ministry of Health	Education on water health
DISCAP	Capacity building in water management
Onho Transboundary Project (FAO funded)	Successful eradication of oncho, seeking the socioeconomic development of the now oncho free zones
Guinea worm eradication program (funded by WHO)	Funded construction of community water system as part of program to combat guinea worm infestation in the region.

Can we add a column that notes in how many communities each of these actors is involved?

Procedures and community initiatives in community water systems in the UER

Drinking Water

It was observed that most of the water systems provided by CIDA were established in the guinea worm endemic areas. Indeed, the bore holes were established as part of measures aimed at eradicating the disease from the affected areas. In many cases community involvement was low and there were no contributions from the beneficiary communities towards the establishment of the water systems.

In a number of cases the ADRA interventions were linked to other development programs that the NGO has with the beneficiary communities. Accounts were made of needs assessments conducted in the by some external agencies, including the NGOs working in the area that identified water as a priority of the people requiring urgent intervention. In many cases however, interventions have been prompted by community initiatives, in line with the paradigm shift in the approaches to community water delivery. The strategy now is to make community water supply “demand driven”. This generally requires communities to mobilize resources for the establishment and management of collective resources such as community water systems. Once established, the responsibility for the maintenance of the system is handed to the beneficiary community.

Thus, community initiatives and contributions have become central in the construction of bore holes. Prospective communities apply to the District Assemblies for the bore holes. The district CWSA teams evaluate the application. The assembly then collates the selected applications into the district’s yearly project plan which is submitted to the regional CSWA for review and onward submission to the World Bank for approval and funding support. The beneficiary community and the district assembly are expected to bear 5 percent of the cost of constructing the water systems. This commitment fee is meant to instill in the communities a sense of ownership of the water system. It is assumed that shared rights and responsibilities provide the basis for addressing problems of production of the collective good or service and distribution of the benefits. The beneficiary communities are therefore encouraged to contribute resources for the establishment and management of the collective resource.

In almost all the survey communities the 5% contribution amounted to Two Million Cedis (¢2,000,000.00)³ for one borehole. With regards to the demand-driven approach, the dilemma has been the ability of resource-deficient communities in the rural areas to access this facility. While some (How Many) communities in the study took some few months (2-3 months) to mobilize their contributions, others have taken more than two years to realize the required commitment fee (how many), (Osman: are there any communities that still have not mobilized their contributions? Does the bore-hole only get dug after the total contribution is made? If not, are there communities that have a borehole but haven't fully paid their contributions? How many?).

The method for assessing individual contributions have differed from community to community. Contributions were raised either per compound head, per women in the compound, or per both men and women, and the amounts paid depended on the population of the beneficiary sections of the communities (what is the breakdown; how many per compound, how many women only, how many both?). Thus, in some communities the commitment fee was allocated to compounds, in which case the head bears the contribution of the members of the compound, in others both men and women make contributions, and often women making half the contributions of men (even though there are more women than men on a single compound (is that correct?)). In other communities, the contributions are shared among only the women in the community, but often it is the husbands who pay. In (Number) communities, agricultural produce was accepted from those who did not have cash to pay; the market value of the produce had to equal the cash contributions each member was expected to make. Also, the beneficiary communities must open a bank account into which funds collected for future maintenance requirements are deposited (do all communities with boreholes have a bank account?). Surveying and drilling are supposed to start as soon as the community pays the commitment fee (but, is that always the case?). It was noted that most of the communities were asked to indicate three locations in the community they would prefer to have the water points sited before test drills are performed to ascertain the suitability of the sites.

Irrigation Water

In the case of community dams for irrigation, many (how many? What proportion of total dams?_ of these were first constructed in the late 1950s and early 1960s to promote dry season gardening and provide water for livestock especially in the dry season. The communities thus could not remember the selection criteria and the extent of community involvement during the construction phase. The majority of these dams were however rehabilitated in the 1990s under the first phase of IFAD funded LACOSREP (need to give a short description of the two phases, and the timing of these phases (a total budget for each phase plus the number of dams built in each phase would also be good). (Also, How many communities had dams rehabilitated, how many are in the process, how many have not had rehabilitation but have tried to access funds, how many have not had rehabilitation nor have attempted to secure funding for rehabilitation?). In general, it

³ Cedi (¢) is the Ghanaian currency. US\$1.00 was equivalent to ¢8900.00 at the time of the survey.

appears that most beneficiary communities did not make any formal request for the rehabilitation of their dams, and the procedure for selecting dams for rehabilitation remains unclear. There however appeared to be an effort on the part of the project implementation unit (of LACOSREP?) to instigate community involvement in the rehabilitation program at an early stage (early stages of the LACOSREP program?). This was done through the adoption of labor intensive techniques that enable beneficiary communities to directly participate in the rehabilitation process through a food for work program supported by the World Food Program (WFP) (In how many survey communities was this approach followed?). It was hoped that this would promote a learning process that would build the capacity of the users to maintain the infrastructure. However, labor intensive rehabilitation was not continued (at what point (what month and/or year), because it turned out to be slow and project deadlines were not met. [Can we add a bit more on this? Perhaps, Osman you could refer to your dissertation, and discuss: the fact that communities where labor-intensive rehabilitation was followed, maintenance and cooperation does appear enhanced. However, conflicting project objectives for the provider (e.g. finish projects in a timely manner vs. build capacity of water users).

The processes for selecting beneficiary communities for dam rehabilitation/construction in the second phase of the LACOSREP, appears to have been streamlined in order to make it demand-driven. Communities complete application forms that they obtain from the district project coordinating unit, which spells out some requirements that prospective communities must fulfill, which among others includes the commitment on the part of the community to ensure that they will constitute at least 30% of the beneficiary farmers (who would be the other beneficiary farmers? In the communities sampled, how many farmers are not from the beneficiary community? How is community defined in this second phase? What are the other requirements that communities must fulfill?.

How many of our sample communities had dams/dugouts constructed/rehabilitated by others outside of LACOSREP? Eva, don't we have an idea about the requirements/process followed by these other players?

Linkages and information flow

Domestic Water

For the domestic water systems in the rural communities, information generally flows to and from the local WATSAN through to the CWSA of the district assembly, to the regional CWSA, up to the head office at the Ministry of Works and Housing. In the majority of cases, however, the communities visited received information about the "demand-driven" approach to community water delivery through their Assembly person responsible for that area, who had been briefed about the paradigm shift in District Assembly meetings as well as stakeholder meetings organized by the CWSA. In most of

the villages we visited, the Assemblypersons were also paramount in facilitating communities' application for bore holes.

Irrigation Water

With respect to information flows regarding dam construction and rehabilitation, information for agricultural water use and irrigation generally flows to and from the water users' association through to the Agricultural Extension Agents (AEAs) of the Ministry of Agriculture (MofA), and in parallel, to District Development Officer (DDO); then to the District Director of Agriculture and the Regional office of the Ministry of Agriculture, which is also the Project Coordination Unit of LACOSREP. In (how many) of the survey communities, people learned that it was possible for them to apply to get LACOSREP funds to rehabilitate their old and broken down schemes or construct new ones from either the AEAs, or neighboring farmers who previously benefited from such rehabilitated irrigation schemes.

Apart from the roles of the Assemblypersons, Unit Committees, and Area Council members, traditional authorities have also often been the main drivers of village development initiatives; this appears to have been the case in at least (how many) survey communities. In (number of communities), former community members who now live outside try to maintain links through which development initiatives are channeled, while being the mouths of their communities to the outside world. Finally, community meetings to discuss ways of solving pressing problems facing the community remains one of the main ways for farmers to articulate development concerns in the area.

Governance of water systems

Domestic Water

In the case of boreholes, selected members of the beneficiary communities constitute Water and Sanitation (WATSAN) Committees who are granted the responsibility of managing the water systems. Members of the committee are often selected in a community meeting. The committees include both men and women, often with a respectable proportion being women, to recognize the roles of women as dominant stakeholders in domestic water provision

(Osman: Do we have any figures on the number of men and women committee members per community? Do we have information on the number of boreholes operating in each community?)

The involvement of the WATSAN committees begins with the establishment of the borehole. The committee is tasked with the day to day management of the water systems, and is tasked with bringing to the attention of the users anomalies noticed in the use of the boreholes. Members are trained in requisite skills and given simple tools to operate the systems efficiently and undertake maintenance works that do not require much technical expertise. Maintenance requirements beyond the capacities of the WATSAN

committee members are however reported to the water and sanitation agency of the district assemblies, as well as the organizations that constructed the systems. Apart from maintenance, the committee members mobilize the users in the beneficiary community to clean the area surrounding the water points. The committees also collect water levies to meet future maintenance requirements, especially for the purchase of spare parts, which they deposit in the community's bank account opened for that purpose.

Although the boreholes are controlled by specific communities within the village who contributed to the establishment of the water points, it appeared that the water sources are shared and that the whole community benefits from the intervention. However, members who fail to pay water levies or fail to participate in the maintenance of the system can be prevented from benefiting from the system. (Osman: How? In how many communities is this a problem?)

To facilitate sustainable management of the boreholes, water users developed bylaws that define not only the responsibilities for sharing costs and returns but also acceptable behavior within groups. Indeed, we observed that, for both domestic and agricultural water uses, there exist institutions that define group norms and the share of individual burden towards the provision of the collective good, and how the collective good will be allocated among members. Generally, community members expressed a feeling of community ownership in the bylaws, notwithstanding the fact that, in many cases, the project implementation units, presented some guidelines, which could influence the rules and regulations eventually adopted by the user groups. Nonetheless, the extent to which water users actually met their obligations as per the bylaws differed across communities; we consider this below in the section on collective action.

In the case of the hand dug wells, there appear to be no formal organizations or committees for their management at the community level. Many of the hand dug wells in the survey communities are privately owned and maintained, although they are accessible to the entire community. (Is this always true? Does the private owner have (any) authority to restrict access in some communities, but not in others? Are there conflicts over access to this water source?) No fees or levies are collected nor are there formal arrangements for maintenance. Wells provided by IFAD-LACOSREP are however under the management of the WUAs as discussed below. They have been constructed close to the community dams to provide water for the irrigators.

Irrigation Water

The local unit of organization responsible for the management of the community dams is the Water Users' Association (WUA). In many of the communities, the WUA is an umbrella organization of user groups made up of gardeners, fishermen and livestock owners. Elected representatives of the user groups constitute the dam-site management committee, which is responsible for the management of the system. In many instances however, the livestock owners' association turns out to be less active, since the group is largely made up of the same people who constitute the gardeners' association.

Fishermen's associations usually represent a small fraction of the communities' populations. (Can we put in a table, or some figures, on how many WUA's have each of the three types of user groups?)

In most cases the term of committee members is 3 years. Elections are preceded by nominations of names of members for approval, and voting is conducted if more than one person is nominated for a position. The executive committee is made up of men and women, but none of the communities visited has a woman as a chairperson. Women tend to hold less important positions like trustees and assistant treasurer. The main functions of the associations include mobilizing community effort towards the maintenance of the dam and irrigation infrastructure, which includes

- protection of the catchment area of the reservoir to limit deposition,
- sealing of cracks in the dam embankment,
- cleaning and maintenance of the irrigation system including valves, canals and drains,
- collection of levies for maintenance, as well as
- conflict resolution.

Collective action in the management of the community water systems

Domestic Water

The main areas of collective action for the domestic water points in the community include:

- cleaning (weeding and sweeping) around the water point,
- collection of stones for lining and
- contribution of money towards maintenance.

As mentioned above, the local WATSAN committees are responsible for mobilizing the communities to undertake these collective activities. The committee prepares a schedule for cleaning and other maintenance activities. In (how many communities), the responsibilities for cleaning and routine maintenance rotate from compound to compound, whereas in (how many) communities, all users are expected to perform the communal work at the water points on days set aside by the WATSAN committee. Gender specific roles were also observed in a number of communities in communal maintenance work, e.g. women often sweep while men weed. In other communities however the responsibility of cleaning the water point is often assigned to those who could contribute fiscal cash to the establishment and maintenance of the boreholes (I don't quite understand this last sentence. Are you saying that those with greater cash resources who did contribute (the "most"?) to the establishment of the borehole are also expected to maintain it?, that is, is this an example of exploitation of the rich by the poor?).

A major frustration voiced out by many of the WATSAN committees we interacted with was the tendency of some community members to free ride on the collective efforts of others. (In how many communities was this mentioned?) Deliberate actions of some people to avoid taking part in maintenance schedules or refusing to pay their water levies were frequently mentioned as key constraints the WATSAN committees face (In how many communities was avoiding taking part in maintenance mentioned vs. in how many communities was refusal to pay water levies a problem?). While in some communities nothing is done to discourage free riding, in others actions taken range from verbal appeal and payment of fines to physically barring access to water points for those who consistently fail to participate in maintenance activities without tangible excuses. (How many communities said nothing was done, vs. those who employed verbal appeals, those employing fines, and those implementing restricted access physically?)

In spite of the temptation for some individuals to free ride for selfish gains, (how many) communities have been able to construct watering troughs through which livestock can drink water from boreholes. (How many) number villages have also dug own dug wells, and applied directly to the District Assembly to provide cement lining. Both men and women are said to actively participate in such communal activities. While men are most often involved in digging the deep well, women remove the dug-up material. Women also organize food and water for the people digging the well. Despite collective action mobilized to dig well, in (how many) villages community efforts to dig wells have been unsuccessful due to heavy rocks found just below the surface. Additionally, one community reported that members have dug as deep as 30 meters but still did not reach water.

Irrigation Water:

Typically, the most important maintenance activities carried out by user groups of dams include:

- maintenance of the irrigation system (comprising control structures, network or canals, laterals and drains),
- maintenance of dam infrastructure (dam wall, spill way, and reservoir),
- grassing of dam embankment and bunds against erosion,
- protection of the catchment area (grassing, bunding, tree planting, etc., to control erosion), and
- protect crops from grazing animals.

(Is there any way to summarize how many communities actually undertake (or said they undertake) each of the above-mentioned activities?)

Work is carried out collectively with all members working side by side. Often, formal announcement of impending work is made to all members. (How many) WUAs have developed maintenance cultures that require them to undertake periodic walkthrough

inspections to ascertain the health of the irrigation systems and to inform themselves of the interventions required. Decisions on water maintenance schedules, water distribution arrangements as well as the amount to charge for irrigation water for a particular season are jointly taken at a general meeting of the WUA (the latter refers to how things “should” be; do we have any information on how many communities actually do make all of these in a general meeting? Are certain decisions more likely to be made by the directorate, whereas others are more likely to be made in the general meeting?). The choice of time rotation arrangement for water distribution can improve water supply to various parts of the schemes. Often the schemes are divided into sections and water is opened for a section at a time, following a pre-arranged time schedule (how many communities have time rotation arrangements; and for those that do not, what other distribution arrangements exist?).

There were some interesting observations made in the non-dam communities in the study area that illustrate collective efforts to achieve common goals. It is, for instance, very common to find 2-4 people coming together to dig wells in the dry river beds for each other to irrigate their crops in the dry season. Different approaches to protecting crops from grazing livestock were also recognized. In most of the schemes the gardeners have collectively constructed mud walls to fence the irrigation area. In others (how many), however, farmers guard their plots to drive away the grazing animals, but it was not clear the extent to which this activity is collectively organized. Nonetheless, as echoed in the comments by WATSAN leaders, the reluctance of users to participate in maintenance activities was a major problem for (how many) of the WUAs.

Water pricing

The communities need to mobilize resources for the establishment and management of the water systems. This requires a reliable source of financing to meet the cost of maintaining the water systems.

Domestic Water

In most of the communities visited the people made it clear that they do not pay for water but make financial contributions towards the maintenance of the water systems. It was observed that decisions on the amounts of money to be contributed are often taken in community meetings when suggestions of amounts to be paid are put forward and consensus reached on the amounts that are acceptable to the majority of the people. The levies varied considerably across communities, and also reflected the financial constraints the majority of the people face. The time and mode of payment also varied. Fees/levies are either collected per month or annually, although it was evident that in some communities levies were collected only when there was the need to purchase spare parts (how many were monthly, how many annually, and how many ad hoc?). While in some communities women pay between ₪500 to ₪2000 per month, women in other communities pay between ₪2000 and ₪10000 per year.. In (how many) communities, fees were not collected per woman but per household. Additionally, in (how many) communities, each woman contributes a bowl of rice after each season’s harvest. The

produce is sold and the amount realized kept to meet future maintenance needs. Apart from poverty, some community leaders cite as the reason for the apparent low levels of levies is the fact that alternative contaminated sources of drinking water exist in some communities, so that high water tariffs can result in poor households resorting to such sources. (are there any communities that “scale” water levies (i.e. they charge poor households less than rich ones?)

Irrigation Water

Irrigation water fees are decided by the WUA in a general meeting, often before the irrigation season begins. Rates and mode of payment of the levies varied considerably across dam communities. Whilst in (how many) communities, it is strictly payment before gardening, in (how many others) payments are accepted after harvest. Yet still, in (how many) communities, part payments are accepted before farming, with full payment due by the end of the growing season.

(how high are the tariffs (what is the range)?; how does this range mesh with what “outside” technical experts expect are “optimal” days of labor or money spent for maintenance and repair?). It is argued that when community groups decide on their own about the appropriate levels of tariffs, they are able to define appropriate modalities to cater for the vulnerable members. They often resort to social safety systems that enable them to assist the vulnerable groups including widows, the aged, the sick, strangers, etc. These include staggering the payment of contributions of poor households or planning payment of contributions to coincide peak harvesting times, which enables many members of the community to fulfill their obligations but particularly the poorest who face binding cash constraints during other seasons. In one of the survey communities, outright exemption is granted to the poor and the aged who cannot pay the levies (how many poor and aged benefit, and what proportion is this of the total?). (Also, are strangers really considered a “vulnerable” group by community members (if true, it would certainly be one of the few instances of such behaviour I’ve ever come across, and I think it would be well worth more in-depth study)).

Most pressing water problems as assessed by local stakeholders:

Major water related concerns raised at the community meetings ranged from silting up of the dam reservoirs, lack of portable water to migration of youth to southern Ghana due to lack of economic in the long dry season. The following paragraphs discuss few of the key concerns raised at the village meetings.

Above, we should somewhere put in how many of the 16 dam communities actually have functioning irrigation schemes; then we should remind the readers here how many are well-functioning, functioning, and not at all functioning.

Siltation of dams

The majority of the communities visited (15 out of 16 dam communities) complained about the siltation of their dams. There seems to be a great divide in the problem assessment between the outside actors involved in the dam rehabilitation and the community members. And, more seriously, about the kind of rehabilitation work needed to be undertaken in response to siltation. Silt deposition in the dam reservoirs was mentioned as one of the major factors that led to the breakdown of most existing schemes (how many?). It remains contentious whether removal of the silt or raising the dam wall to restore the designed capacity of reservoir is the best way to solve the problem. Community members complained frequently that: “they (the contractors) didn’t do their work properly because they didn’t ask us what the problem was and they didn’t desilt the dam. Instead they just raised the dam wall”. The position of the rehabilitation actors on this issue is that de-silting of dams weakens the dam wall and leads to leakages (seepage). Besides, they say, it is less cost effective to desilt the dams. They contend that farming in the catchment has been the main cause of siltation, and if the people cannot stop that (which they continue to do anyway) then “what is the justification in spending so much money to desilt the dam only for it to be silted again in a few years later”, an irrigation official asked. WUA members assess that there is not enough water for irrigation in the dam because of siltation, and also mention the resulting lack of drinking water for livestock and frequent incidents of animals getting stuck in the mud while drinking, but little has been done to stop farming in the catchment areas of the reservoirs. (do we know in how many of the 16 dam communities, farming in the catchment occurs?)

Lack of water in the dam

Both faulty infrastructure and lack of rain in the last rainy season were cited as being responsible for the fact that many dams did not carry sufficient water. Only 7 of the 16 dam-communities used the full designated irrigation area (this information has to come much earlier). 5 communities did not irrigate at all this year with one dam (Dua dam, Bongo District) being completely dried up. (do we have any facts/figures to compare the rainfall during the last rainy season with “average” rainfall? (does MofA have this?))

Lack of drinking water

Because the research was undertaken around the end of the dry season (and the last rainy season was rather weak) all communities expressed high concern about drinking water. Many of the hand-dug wells dried up. Many of the communities (16 out of 20) complained about having very few boreholes (even in good years?) and noted that women walk long distances to get to water points. Perhaps most disconcerting, all but one community described physical fights between the women fetching water. The most common reason mentioned as the reason for fighting was jumping the queue, which becomes a serious affair at boreholes where “you fetch 10 buckets in the morning, then you have to wait for a few hours so it fills up again”. The women described that the fights sometimes lead to serious injuries. Police and clinics are rarely consulted because of the

cost involved, but in some places conflicts had to be settled by WATSAN committees, husbands or village elders. In the community where no physical fights were described the reason given was that they had no central water points like boreholes but relied solely on a high number of hand-dug shallow wells, so there were no assemblage of women fetching water. The time that women spend fetching water was described as a serious problem. One man described: “If the women come home very late from the water point they still have to cook. Then they wake their children up in the middle of the night because they have to eat something - now is that dinner or breakfast?” One other issue that came out of group discussion was that young men in the community with serious water problems are failing to get wives from other villages, as the women insinuate that they do not want to spend the rest of their lives searching and fetching water.

Members of the survey communities also complain that their livestock are dying for lack of water, worsening the poverty situation in the area. The drudgery for women in dry season is even worse, since they have to fetch water not only for the household but also for the livestock. In Dua Apoyungu, the members of the responding groups hinted that because people always converge at the few water points, guinea fowl are afraid to get closer and to drink from the watering troughs. The fowls end up dying of thirst: “... a village which was in the past noted for guinea fowls has now virtually lost all its birds”, a community leader emphasized.

Lack of spare parts

Another concern echoed was the difficulties for communities in remote areas to access spare parts when they are badly needed for the maintenance of water systems. It takes a lot of time for them to get parts to replace damaged or worn out ones.

Migration of the youth:

In (how many) communities, participants complained that especially the youth tended to migrate to Southern Ghana in search of “non-existing jobs” – either for the dry season or permanently. This was an especially frequent remark where communities used the irrigation area only partly or not at all due to lack of water (need a corresponding figure to substantiate this latter sentence (x% in those with functioning dam vs. y% in those without a functioning, or only partially functioning, dam). During the dry season only the elderly remain in many of the non-dam communities. Migration of the youth to the south has become a major concern of the people as many do not return early enough to assist their aged parents on their farms. Many also return with a lot of social problems (including wayward behavior, hard drug use, Sexually Transmitted Diseases (STDs), pregnancies among the young girls, etc). The situation is more worrying when young people migrate with the intent to find money to pay their fees but eventually abandon their education. (can we say something about the gender breakdown of migrants ?)

Importance of dams:

All communities emphasized the importance of the dams for their livelihood. Dry season gardening is considered especially important to them because it can help them through the lean season and because of the possibility to produce cash crops like onion or tomatoes in the gardens. One WUA member stated: “If you have 1/4 acre in the dam area in the dry season it helps you more than 2 acres in the rainy season.” (Baare dam, Tallensi-Nabdham District)

Unsafe drinking water:

When it comes to the quality of drinking water, the picture is rather mixed. While in 5 communities the quality of drinking water was not seen as a concern, in those communities where it was problematic, a whole list of pollutants were named. It was noticed that the shallow wells are not protected and so during the rainy season these water bodies get flooded and for that matter polluted, thereby exposing the people to various diseases. (who noted this, the people themselves? Did they discuss how they might protect these shallow wells, in a cost effective manner, or any other reason why they do NOT protect these wells?)

Property regimes at the dam:

Because the dams only cater for a small portion of the communities’ land, a rather specific property regime was developed for most of the dam areas. While the original land-owners farm on their land in the rainy season, they have agreed to hand their land over to the WUA in the dry season so that they can distribute it to the broader community. But in some of the communities, this regime was not fully implemented. Here the land-owners retained the authority to distribute land, normally benefiting from this right. In these communities, the WUA had a rather weak position because gardeners felt that they had paid for their land already, and did not understand why they should also pay for the water (how many communities described this situation?). Also, if the WUA has no power over land allocation, the sanctioning potential against free riders is rather limited.

Women’s access to irrigation land:

The issue of women’s access to land in the irrigable area is a sensitive issue in some communities. Group meetings with both women and men present might not be the most promising approach of collecting data on this. Still, some first ideas on this issue will be given: For the women in the UER, the irrigation sites are generally the only areas where they can independently acquire rights to land. As dry season gardening allows for cash income in the lean season the women described a strong positive impact of this opportunity. When asked if everybody receives the same size of plots the researchers were often faced with the answer supposed to please them: Yes. But further enquiry often revealed that “Everybody gets the same size of plot... but some people share one plot. You might travel and not need your plot so you give it to someone else...”. Generally it

seemed more common for women to share plots (i.e. to have a smaller amount of land under control) than for men. In many dams not only the size but also the location of one's plots is important, as some plots have more secure access to water than others.

Major water related needs of the survey villages

To get an insight into the major water related needs of the communities the number of times a particular issue was raised by the discussion groups in the village meeting has been tabulated. Table 4 below presents the ranking of community needs as we discovered from the village meetings.

The issue of access to potable water ranks high in the water related concerns listed by the communities. The need for boreholes as sources of potable water was overwhelming. There is a high demand for potable water for both household use and livestock watering, especially during the dry season when most water points dry up. In many communities, water points are too few in relation to the population, meaning that people desperately drink from contaminated water sources particularly during years of poor rainfall. Boreholes thus reduce the incidence of water born diseases in the area. Also, women and children walk long distances and queue for very long time before getting water for their household. It was revealed that during the dry season children go to school late because they have to struggle for water. (It is interesting, from a "gendered" perspective, that though men seem to get preferential access to irrigation and otherwise control land, both men and women seem to agree that the major problem is domestic water – an improvement of which would directly benefit women and children far more than men...)

For the non-dam communities the priority is to get a dam to enable members of the communities to undertake dry season gardening and get to water for the livestock. Availability of dam for both livestock and dry season gardening, the people insisted, will help to reduce poverty in the area. They explained that, with the dams they will be able to grow vegetables not only to eat to improve upon their nutritional status, but also as a source of income, especially during the dry season when they stay very idle. They can also stock the dam with fish to get some protein for the children. It was stressed that the availability of the dam will also stem down the migration of the youth to the south and its attendant social problems.

Desilting of dam is the felt need of many, especially in the dam communities. Silt deposition has shrunk the volume of the reservoirs. In many cases the dead storage which was meant to retain water for livestock watering and other domestic uses is filled with silt leaving nothing for the livestock in the dry season when animals need water most. People in many dam communities cannot farm because of the siltation.

Table 4: Ranking of community water related needs

Community request	Frequency*	Rank
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Desilt dam	32	2
Dam provision	21	3
Expand dam	9	4
Provide bore holes	52	1
Provide wells fitted with pump	8	5
Fence irrigable area	5	7
Health facility	7	6
School	4	8
Sanitary facility	2	9
*No. of times issue is raise by different groups adjusted by the number of groups in the village meeting		

Analysis of Water Needs and Problems

Here, I think we need to look at some correlations amongst different factors, e.g. a table, distinguishing factors by functioning dams vs. non-functioning dams, e.g. types of collective action mentioned, whether or not free-riding was considered a problem, whether or not problems with landlords was mentioned vis-à-vis the authority of WUA's, rankings of different irrigation water problems; when was the dam constructed/last rehabilitated; the number of different uses/users; (total number of community members – do we have this). It would also be nice if we could partition the villages according to rainfall (e.g. communities in “high”, “medium”, and “low” rainfall areas).

A similar analysis could be performed for domestic water.

Village level case studies

This section presents the specific cases of the 20 villages surveyed. Here attempt is made to highlight only community specific issues to reduce repetition as the issues raised in the survey tended to be similar across communities in the Region. The local units of organizations responsible for community management of the water systems (WATSAN committees for boreholes and WUA for dams) were respectively set up by CWSA and IFAD-LACOSREP of MoFA. The procedures for establishing the water systems and the modus operandi of the local organizations were seen not to differ across in the Region.

Dorungo (Bolgatanga Municipal Assembly)

Social and economic Infrastructure

Dorungo is about 6km from Bolgatanga, the Upper East Regional capital. The village is connected to the national electricity grid, but few compounds have electricity. There are no telephone land lines or public phones in the village but one can get reception to cellular phone services in the regions. There is one primary school and a day nursery. The community has no periodic market. People from Dorungo buy and sell at the Bolgatanga market which is marked in a three-day cycle. There is a health center manned by a Nurse. There are about 300 compounds in Dorungo, with each compound containing about 7 households.

Sources of water and actors in community water supply

There is no pipe borne water in the village. The people rely on 2 hand-dug wells, and 5 boreholes as sources of drinking water. There is a community dam for dry season irrigation and livestock watering, which also becomes household water source (drinking, washing, construction, etc) at some periods of the year.

Most of the bore holes in the village are very old were established long ago and the community members present at the village meeting did not remember the specific of construction nor the organizations that funded the construction of the bore holes. However, they could recall two of boreholes were constructed with the assistance from the District Assembly. According to the meeting, the District Assembly asked interested communities to contribute towards the construction of the bore holes. The community was asked to contribute ₵2 million for the assembly to make the difference of the cost of constructing the bore hole.⁴ Men were levied ₵30,000 whilst women paid ₵20,000 each.

Some members of the communities were selected to be trained by the Community Water and Sanitation Agency of the Bolgatanga Municipal Assembly to take care of the

⁴ The Assembly also pays 5%, the remaining 90% comes NCWSA with World Bank funding.

boreholes. They are members of the WATSAN committees. Each borehole has a WATSAN committee. The committees are made up of both men and women (In this community men selected men while women selected women to ensure that women are adequately represented in committees.) The committees organizes the community for cleaning and maintenance activities at the water points and collects water levies the communities have agreed to pay.

Community effort to construct additional boreholes has however been stalled because many people have not yet paid their contributions towards the construction of the new water points.

The Dorungo dam was first constructed in the early 1960s by the then Department of Agriculture., but .rehabilitated in 2002. The community played no role in the construction of the dam. Indeed public officials at that time identified the area to be suitable for irrigation and went ahead to construct the scheme. After several years of neglect the system broke down completely. Following the demand driven approach of LACOSREP the community applied for the dam to be rehabilitated. The rehabilitation work was completed in 2002. About 13 communities (six sections of Dorungo and 7 other sections from neighboring villages) share the use of the dam. When asked whether community was satisfied with the quality of rehabilitation done the answer was negative. According to the community members the dam was silted but nothing was done to remove the silt. Instead, the contract chose to raise the dam wall. They also alleged that the canals were poorly constructed. The contractor ignored suggestions from the community. They complained that just a few years after rehabilitation the dam is full of silt. Cattle often get stacked in the mud in the reservoir as they attempt to go in to drink water.

The local water users' association is responsible for the operation and maintenance of the community dam. Some of the collective maintenance activities the leadership of the WUA claim they organize include cleaning the canals, planting vertivar grass on bunds to prevent erosion and siltation of the dam, and uprooting stocks of trees/shrubs growing on the dam embankment. The WUA also meets to decide on the cropping calendar to ensure that cropping is done about the same time promote transparency and equity in their water distribution arrangements. Indeed, to ensure equity in water distribution the scheme is divided into two. One section is irrigated in the morning (6-11 am and the other in the afternoon (2-6 pm) on each irrigation day.

The WUA also meets the discuss irrigation fees. In the just ended season (2004/2005 irrigation season) gardeners paid ₪10,000 per plot. One hundred and fifty farmers (43 women and 107 men) do dry season gardening at the scheme. Before accepting new member the bylaws of the association are explained to the prospective gardeners. Those who agree to abide by them are accepted when there are vacant plots (which rarely occur). Both the new and old members pay same fees. Land allocation in the irrigation area is done by the WUA. Dual land control arrangements exist between the WUA and the landowners that allow the WUA to use the land in the dry season while the land

reverts to the original landowners in the rainy season who use the plots to grow cereals for their households.

Executive members of the WUA elected at a general meeting. Nominations are filed and election conducted to select leaders. The executive committee has a term of 4 years after which fresh elections are conducted to either re-elect or replace them. The executive committee of the Dorungo WUA is made up of 7 members, 2 women and 5 men. Women are said to be asked to select their own leaders because they shy away from direct participation in elections for leadership positions, especially when competing with men for the same position.

Water related concerns:

- Wells dry early
- Too few water points (boreholes) and far from many members of the communities.
- Many members of the community are facing financial difficulties because there was not enough water in the dam to support dry season gardening.
- Many of the youth in the community have migrated to the south because of lack of economic activities in dry season
- Hand dug wells do not yield enough water. Women spend a lot of time fetching water.
- Women quarrel a lot at water points.

Sumbrungu (Bolgatanga Municipal Assembly)

Social and economic infrastructure

Sumbrungu is about 9km from Bolga, and located on the Bolga- Paga highway. Educational infrastructure in the town includes 5 Day Nurseries, 8 Primary schools and 3 Junior Secondary Schools (JSS). Bolgatanga Polytechnic is also located in Sumbrungu. The town has electricity supply as well as telephone (both land line and cellular phone) services in the town. There are two clinics in the town, both are manned by medical assistants. Sumbrungu has both daily and periodic markets. Like most parts of the region, the periodic market at Sumbrungu is held in a 3-day cycle.

Sources of water and actors in community water supply

The main sources of drinking water in Sumbrungu are boreholes and hand-dug wells. Several of these water points (over 20 boreholes and many more hand dug wells) are scattered across the town, many of which were constructed as part of the program to eradicate guinea worm from the area. Many of the water points, however, dry up in the

dry season. Women and children get up very early in the morning to join queues to fetch water.

Organizations associated with the construction of the drinking water systems in the town include Ghana Water and Sewerage Cooperation, Action Aid , CIDA, CWSA of the Bolgatanga Municipal Assembly, Rural Aid, and the Guinea Worm Eradication Program (support by the WHO). To obtain support from the District Assembly to establish boreholes, the community had to contribute 5% (2 million Cedis) for the assembly and the CWSA to bear the remaining of the construction cost. Each man was levied to pay ¢ 30,000 whilst women paid ¢20,000. For the boreholes supported by the Guinea worm eradication program, the community only had to open a bank account into which water fees meant to meet future maintenance needs be deposited. Sumbrungu was selected to benefit from the support from the guinea worm eradication program because it was a guinea worm endemic area. However, information about the support form from the District Assembly for water was through the Assemblyman of the area who also facilitated the community's application.

At a community meeting some members were nominated and those the majority wanted were selected to constitute the WATSAN committee to oversee the local management of the water systems. Some members of the committee have been trained by the CWSA to handle routine maintenance of the infrastructure, but maintenance requirements beyond the capability of WATSAN committee are be reported to the GWSA. The duties of the committee also include keeping the sanitation of the water point (by organizing the community to clean the surrounding), collect water levies and to see to the maintenance of the system.

In some areas of the town, all household heads pay ¢2000 per month; while in others the levy is ¢5000 per year. Levies collected are deposited in the various bank accounts of the respective communities to be used to procure parts for the maintenance of the systems. Households in the communities, who fail to contribute to the establishment of the water system, pay their levies or participate in communal maintenance activities at the water points are prevented from fetching water at the water points.

The meeting reported several instance of women quarrelling at the water points, often over how many basins of water one has to draw at a time before it get to the turn of others to fetch. The tendency for some women to jump the queues was said to be a major source of conflict at the water points. Conflicts at the water points are resolved by the members of the committee.

Sumbrungu has one dam for dry season irrigation and livestock watering that serves all the sections of the town. However, there are also two valleys in which people from the town irrigate their crops in the dry season by means of hand dug shallow wells. The dam was first constructed in the early 1960s. IFAD funded the rehabilitation of the system in 1997. The rehabilitation of this scheme was done by labor intensive methods, in which

the community members contributed labor to earn some minimum cash payments and food rations supported by the WFP. Community members claim not to have been satisfied with the quality of the rehabilitation work. According to them the dam was not desilted as was expected to restore the designed volume of the reservoir. After rehabilitation, the dam is always seen to be full by the end of each rainy season but the dam water gets finished half-way the irrigation season. There was a seepage problem that was also not checked.

The Sumbrungu dam is managed by the local WUA, the leadership of which is selected at a general meeting. Term of office lasts for 3years. No woman currently holds any executive position in the association. It was claimed that in the previous elections no woman got nominated and none voluntarily offered herself for any of the positions contested. Collective maintenance activities the WUA claims to be organizing include filling of eroded portions of the dam embankment, clearing canals and channels of weed and silt before cropping, sealing cracks in the slabs used to construct the canals. The association also collects levies from members which it uses to finance the maintenance of the scheme. Levies are always fixed at general meetings. The irrigation levy for the past season was ₺20000 per gardener, payable after cropping. People who deliberately fail to participate in maintenance or fail to pay levies will be prevented from gardening the following season. This is the law but no one has been sanctioned yet.

Similar to what pertains at Dorongo the land in the irrigation area reverts to the original landowners during the rainy season while the WUA distributes it to its members for vegetable gardening in the dry season. Crops are irrigated in turns from one section of the scheme to another. Conflicts result often when one diverts water onto his/her field when it is not the ones turn to irrigate. Often conflicts that arise at the scheme get resolved by the WUA

Water related concerns

- No good drinking water
- The bore holes do not yield enough water, women wait for very long time to fetch water.
- Dam is seeping
- Dam is silted
- Valve leaks
- Irrigation area is not fenced, livestock browse on the crops. Spend a lot of time warding off animals.

Winkongo (Talensi Nabdam District)

Social and economic infrastructure

Unlike Dorugo and Sumbrungu, Winkongo is situated in the newly created Telensi-Nabdam District. The educational infrastructure in the village consists of 5 Day Nurseries, 5 Primary schools and 3 Junior Secondary. The Bolgatanga Senior Secondary School is located at Winkongo. Inhabitants of the village attend the Bolga market to buy, sell and socialize. There is however a daily market in the community where people buy and sell petty items. The village has no health post. Serious health problems are either sent to the Tongo clinic or the Regional Hospital in Bolga. There is access to electricity but only few houses have been connected. There is one public phone booth and a commercial communication center which offers telephone services in the village.

Sources of water and actors in community water supply

The main sources of drinking water in the village are boreholes and hand-dug wells. The community has 6 boreholes and 2 wells. Most of these water points dry up, especially during the dry season. Some of sections of the community however rely on streams for water, which always dry up in the dry season. The mode of application for boreholes remains the same for all the villages in the regions, following the demand-driven approach of the CWSA. Household share of 5% commitment fee the community makes for the borehole differ depending on the number of people leaving in that section of the village seeking the water infrastructure. In some sections of Winkongo each household head paid ₵20000 to make the Two Million Cedis requirement from the District Assembly.

Similarly the boreholes in the village are managed by local WATSAN committees. The sizes of the committees in the village differ from community to community, ranging from 3-7. Responsibilities of the local WATSAN committees are similar to those of other settlements in the region, except that gender roles are clearly defined in the committees at Winkongo. Men weed around the pumps while women sweep and clean around to keep sanitation at the water points. Water levies are collected and deposited in banks of the various communities to be used for the maintenance of the water systems. In some sections/ communities of the village both men and women pay ₵20000 each per year as levies, while others the fee is ₵10000. In one community however, only married women are levied, and they pay ₵5000 per year. In all the communities however additional contributions are requested in case the money at bank is not enough to cover of the required maintenance cost.

The communities try to institute measures that would discourage free-riding. If someone fails to pay her water levy or participate in the collective maintenance activities at the water points, the WATSAN informs the entire community about her behavior so that collective effort is made to prevent her from fetching water at the point. However, an observation made at the meeting was that sometimes attempts by non-committee members to prevent defaulters from fetching water result in fighting among the women.

It is not always peaceful when women fetch water at the water points. The problem is that at each point in time one finds so many women at the water points and each trying to get some water for the household. Little disagreements often lead to quarrels and sometimes fighting that gets serious.

The Wiinkongo dam is among the dams rehabilitated at the early stages of the IFAD-funded LACOSREP. This dam was also rehabilitated by the labor intensive technique. Similar to all other community irrigation systems in the Region the scheme is managed by a local water users' association. The executive committee is made of 7 elected members; four are men and 3 women. The bylaws of the association call for the inclusion of women in the executive committee. Women are allowed to make their own nominations. The executive members serve four a year term, after which fresh elections are conducted to elect a new executive committee. There are 78 people farming at the scheme: 42 men and 36 women.

The responsibilities of the Winkongo WUA are similar to those outlined earlier. Irrigation fees are decided on at a general meeting, usually at the beginning of the dry season. After cleaning and getting the system ready for gardening, members are asked to suggest suitable amounts to be charged as fee for the season. Suggestions are made and a vote conducted to decide on the irrigation levy to charge for the season.

The rule at the Winkongo dam is that everyone pays his/her irrigation levy before gardening. But some promise to pay immediately after harvest but fail. The WUA therefore insists that payment is made before cropping allowed. So those who want to crop before paying often get disappointed. Participation in collective maintenance activities at the scheme is compulsory. Unlike the case of Sumbrungu and many other places, the irrigation land is controlled by the WUA. Original land owners have no control over land at the schemes. Once allocated, plots remain in the control of the beneficiary irrigators.

Water related problems in Winkongo

- Only one dam for the village and surrounding communities, and water is always not enough for gardening and livestock watering. Most people in the community have nothing to do and the youth often migrate to the cities and return with so many social problems.
- Few boreholes, water not enough for both humans and livestock
- Women and children walk long distances to water points, which even do not yield enough water. Water is therefore very scarce in the community for most of the year, especially in the dry season.
- Because of lack of water animals stray far in search of water and get stolen
- During the rainy season many homes get destroyed but people find it difficult to get water to reconstruct them in the dry season.

- Most parts of the community do not have access to safe and clean water. The people rely on streams which always dry up during the dry season.

Interventions proposed by the community

- Need for additional dams
- Dam be desilted
- More water points be constructed

Community initiatives

- Organize to dig shallow wells to get water for household use and livestock watering
- Members of the communities in the village have in the past contributed money for the construction of boreholes. Contributed 2 million for the district assembly to construct a borehole in the community.
- Constructed mud walls to fence irrigation area
- At a time the dam was seeping, the committee informed the Assemblyman and chief who managed to get a certain contractor to supply them clay materials and gravels the community used to stop the seepage

Baare (Talensi Nabdam District)

Social and economic infrastructure

Baare is also one of the villages in the Talensi-Nabdam District. The schools in the area are a Day Nursery, a Primary school, and a Junior Secondary School. Those children who qualify to attend Senior Secondary School are sent to Bolga and other schools in the region. There is access to electricity and many houses are connected. There are no telephone landlines but one gets reception to the cellular phone networks in the Region. There is a periodic market, which is however not very well patronized. People in the town attend the periodic market days in Bolga. Baare has no health facility. Health cases are sent to the Tongo clinic which is about 5km away.

Water sources and actors in community water supply

Baare has 11 boreholes and 3 wells as the main sources of water for domestic use. However, all the three wells completely dry up during the dry season. There is a community dam for dry season irrigation and livestock watering. The Adventists Development and Relief Assistance (ADRA) provided 3 of the boreholes, CIDA constructed 6, while the remaining 2 were constructed with assistance from the District Assembly and CWSA. IFAD-LACOSREP funded the construction of the community dam.

Community contribution to the establishment of the boreholes provided by CIDA and ADRA were very little. As part of poverty alleviation programs in the Region ADRA had agro groups in the community to which it provided seeds and other farm inputs to be paid in kind. At the end of that program, ADRA asked for the community's felt need which they indicated was water, which it provided. The District Assembly support for the 2 boreholes followed the same demand driven approach outlined earlier, in which communities are made to contribute 2 Million Cedis out of the construction cost. Each compound in the section for which the system was to be built contributed ¢10,000. Those who did not have fiscal cash paid in kind, with bowls of groundnuts and millet equivalent in value to the ¢10000 to be paid. The grains were then sold by the committee to raise the required amount of money.

Like the other villages in the region the boreholes and the community dam are respectively managed by local WATSAN committees and a WUA. The modus operandi of these organizations is similar to those outlined earlier, as the same institutions (i.e., CWSA and MoFA) set them up. In fact the operations and maintenance obligations are similar across all the communities visited. Communities meet to decide on the contributions to be made that would enable them to raise enough resources to meet the maintenance needs of the infrastructure. Each woman in the beneficiary sections pays ¢ 5000, per year as water levies. At the irrigation scheme, landlords play roles in land allocation. Those wanting to farm approach the land owners for plots. But no land rents are charged. They only have to pay water fees. Irrigators pay ¢5000 per season before cropping. Those who have no money are made to pay after harvest. Defaulters are not allowed to farm the next season.

Water related concerns

- Dam is not enough. Few people farm at the dam site The dam is too small for the community
- Wives come home late from fetching water, cook late, so kids eat very late a situation which is unhealthy for the proper development of the kids.
- No water for the livestock. The dam dries up very often.
- Irrigation is very helpful to the people in the community, inadequate rain makes therefore makes lives very difficult, because cannot irrigate when there is no water in the dam.
- When there is water in the dam, many of the young people migrate to the south but return with so many social problems.
- Efforts of the communities to dig wells have not been successful, because the place is rocky.
- Many of our livestock have died because of lack of water.
- Irrigation canals not yet constructed.
- Community lacks sanitation facilities.

Interventions proposed by the community

- Construct more boreholes.
- Expand dam to allow community to expand the irrigation area.
- Introduce alternative Irrigation systems, e.g., sprinkler irrigation.
- Electricity should be extended to the school to enable the children study at night.
- Need health post. Travel long distances to Bolga and Tongo.
- Help us to get water pumping machines to enable us irrigate along the White Volta.
- Women sometimes not given plots. They have no activities in the dry season

Community efforts

- Constructed own turn outs to enable us use the dam. The contractor did not construct canals for irrigation to take place.
- Dig wells to irrigate crops in the dry season

Management Problems the Baare WATSAN faces

- Problems of getting parts for maintenance of the systems
- Schedule for cleaning the water point: trouble comes when some houses fail to come out for cleaning. Often threats to report to matter to the organization that constructed the system to come and close it down move people to come out to do the cleaning at the water points

And for the WUA:

- Canals are not constructed.
- Those at the head end get water first when the system is opened. Attempts to get them to allow the water to flow to the other parts, especially at the tail end often lead to quarrels.

Bongo central (Bongo District)

Social and economic infrastructure

The community has 4 nursery schools, 6 primary schools, 3 JSS and a senior secondary. There is a district hospital with a resident medical doctor. The furthest section of the community is about 3 km away from the hospital. There is a commercial communication center at Bongo from where people go for telephone services. Bongo has both a daily and periodic markets, which like other markets in the region, is held in a 3-day cycle. The people also attend the markets at Bongo Soe and other nearby communities villages.

Sources of water and actors in community water supply

There are 12 boreholes and 10 wells from which the people obtain water for domestic uses. Most of the boreholes were constructed by CIDA. The other boreholes were constructed by the Bongo District Assembly with community contributions, in line with the demand-driven approach of CWSA outlined earlier. The construction of hand dug wells and the rehabilitation of the Bongo Central dam were funded by IFAD-LACOSREP.

The mode of application for assistance for boreholes from the District is similar to procedure outlined earlier. However, contributions made by households largely depended on the population of the beneficiary community. In one section, for instance, each landlord contributed ₦240,000 whilst in another the contribution was ₦20,000. Similar to what pertains in other communities, the water points in Bongo are managed by local WATSAN committees. Community meeting is held to decide on how to raise resources towards the maintenance of the water systems. Proposals are made for the community to agree upon. Water levies vary from community to community, ranging from ₦2000 to ₦5000 per woman per year.

Women fetching water quarrel a lot among themselves. There were indications that such conflicts sometimes extend to their husbands. Water conflicts are resolved by the community leaders.

The Bongo Central dam is managed by the water users' association, consisting of irrigators, livestock owners and fishermen's associations. These separate groups have their leaders and keep separate bank accounts. The different groups: gardeners, fishermen, and livestock owners are organized to seek mutual interests. However, three groups work together on matters concerning the dam. The gardeners association is made up of 215: 115 women and 100 men.

The dual land control arrangement outline earlier is also observed at Bongo. Land in the entire irrigation area reverts to the original owners in the rainy season. However, during the dry season the WUA takes over. A land allocation committee of the WUA is responsible for plot allocation. Plots are equally distributed and everyone at the irrigation site is entitled to two vegetable beds, but someone can have more if others who cannot farm in a particular season decide to lend their plots to him/her

Water related problems

- Dam is silted
- Animals get stacked in the reservoir when they attempt to get into the water to drink.
- Children in the area develop colored teeth from drinking water
- Dam is too small for the number of people it has to serve
- There is often not enough water for gardening
- Women and children queue at water points for long time
- Women travel long distances to nearby water points

- Water in the dam is unclean and animals are dying for drinking it
- Most of the wells dried up in the dry season
- Pumps do not yield enough water
- Women spend so much time fetching water, come home late and prepare meals late
- Dam is silted and thus shallow and so not enough water is harvested for irrigation in the dry season.
- Could not repair our houses that collapsed during the rainy season because of lack of water.
- Dam serves the whole bongo town and the water not enough for both gardening and livestock watering.
- Hand dug wells do not yield enough water for the community, unclean and unhygienic to drink
- Pump breaks down frequently.
- Coloration of teeth as people drink from water from the area
- Seepage of dam, so run short of water as early as January. The dam seepage started in 1994.
- Most of the wells dry up.
- There are worms in the wells

Interventions proposed by the community

- Desilt dam
- Create inlets (culverts) to direct water into the dam
- Need more boreholes and hand dug wells
- Drilling machines to help drill deep to reach underground water, water table is low and the place is rocky

Community efforts

- Planted trees along the catchment area to prevent siltation
- Planted grasses on bunds
- Constructed mud walls to fence irrigation area
- Dug wells to water, after which the assembly assisted with cement for lining them
- Constructed watering troughs from which livestock can drink water
- Clean around water points.

Dua (Bongo District)

Social and economic infrastructure

The educational facilities in the village are a Day nursery, 2 primary schools, and a Junior Secondary School. Dua has a clinic which is manned by a nurse. The village has no

access to electricity and telephone services. There is no market the inhabitants of Dua attend markets at Bongo and Bongo Soe. The nearest market is about 6km away.

Sources of water and actors in community water supply

The main sources of drinking water at Dua are boreholes (6 in number, 2 of which were not in order at the time of the village visit), and 6 hand dug wells (4 often drying up in drier months of the year). The village obtained support from the Bongo District Assembly for the construction of two the boreholes. Following the demand driven approach of the CWSA of the Assembly the community contributed 5% of the cost of establishing the water system. For the CIDA funded boreholes, community contribution was very little. A community needs assessment was conducted by a research team and water was identified as the most pressing need of the people of Dua. CIDA therefore came in to help. IFAD-LACOSREP phase II funded the construction of one of the hand dug wells. All the boreholes in Dua are managed by local WATSAN committees, some of whose members have been trained and provided with tools to undertake repairs of the systems. Repair works that are beyond the capability of the WATSAN committee members are reported to CWSA. Similarly, the WATSAN committee collects levies from the beneficiary communities to meet maintenance requirements.

The Dua dam was constructed in the early 1960s. IFAD-LACOSREP I rehabilitated the scheme in 1998 to provide water for both dry season gardening and livestock watering. The dam is managed by local WUA whose operations and maintenance responsibilities are similar to those outlined earlier. The Dua dam experiences water shortages very often, but the water situation has been worst in the past few years. Rainfalls in the area have been very low and for that matter not enough water harvested for gardening. The community has not been able to crop for the past 3 years due to the low water level in the dam. The dam was totally dried up at the time of the village visit.

Water related concerns

- Dam was not desilted during rehabilitation
- Very few boreholes and many sections of the village do not have. Pressure on the few water points is high. Women walk long distances to fetch water
- Dam is heavily silted. Reservoir cannot hold enough water for irrigation. Community has been unable to farm at the scheme for the past 3 dry season.
- When there was water in the dam the people could produce vegetables improve nutrition in their homes and sell to get additional income to buy grains and pay for fees of the children.
- Losing their livestock due to lack of water. Many died in dry season because there was no water for them.
- Children queue for long at the water points before going to school. So get to school very late.

- Few communities in the village have boreholes. Access to potable water is very difficult for many sections of the village
- Spillway was not raised to retain more water when the dam wall was raised, during the rehabilitation. As a result all the water spill off when it rains.
- Hand hug wells are shallow, and so dry up.
- Our children have to send animals as far as the Bongo dam to find water for the livestock.
- Before the rehabilitation work was done water was not of much problem however the contractor heaped some in the reservoir which he did not evacuate. This has been the source of the problem. The heaped soil has now spread to virtually fill up the reservoir, drastically reducing the volume.
- Water from some of the boreholes is sometimes rusty^

Interventions proposed by the community

- Need assistance to remove the silt from the dam
- Asked for the expansion of the dam

Doba (Kasena-Nankena District)

Social and economic infrastructure

Schools in Doba include: One Day Nursery, 3 Primary Schools, and a Junior Secondary School. Few houses have electricity. There is a health post with a resident nurse. The people patronize the Navrongo market, which is about 7km away.

Sources of water and actors in community water supply

The sources of water the majority of the inhabitants of Doba are boreholes and deep wells. Ironically, the Ghana Water Company has a water treatment plant located in this village from which it pumps water for Navrongo and its surrounding communities, but only a few houses in Doba (about 7 compounds) along the pipe line are connected. There are 14 boreholes and 6 hand dug wells in this village, but 4 of the wells always dry up in the drier months of the year. Water table is said to be high in this community so people can easily dig shallow wells around their compounds to provide themselves water for household uses. The majority of the boreholes were constructed by CIDA. Some communities in the village also contributed money for the District Assembly to assist them with a borehole. People who refused to contribute to the establishment of the boreholes are prevented from fetching water from the water points. One other community has contributed money but the bore hole is yet to be drilled. The boreholes at Doba are managed by local WATSAN committees, which have similar responsibilities as outline earlier.

The community dam is also managed by a local WUA. A land allocation committee does the land allocation at the scheme. The Agricultural Extension staff of MoFA assisted in the demarcation of the land. Once allocation, irrigators control their plots and use them for rainy season crop production as well.

Water related concerns

- Inadequate boreholes in relation to the population of the village. People resort to hand dug wells, though the water is not hygienic.
- Children suffer from water borne diseases because they drink unsafe water.
- Dam is silted. The reservoir cannot store enough water for gardening and livestock use
- Women spend much time at the water points
- GWC takes water from Doba but only a few houses have access to pipe borne water
- There is only one dam, it is woefully inadequate to meet irrigation water needs of the people
- Livestock stray far in search of water, many either got lost or are stolen.

Paga Nania (Kasena-Nankena District)

Social and economic infrastructure

Paga Nania is a community very close to the Ghana-Burkina Faso border. Paga has two Day Nurseries for kids below school age, 6 primary schools and 2 Junior Secondary Schools. The community has a clinic which is manned by a medical assistant. There are no telephone services. Like other towns and villages in the UER the Paga market day falls is marked in a 3-day cycle.

Sources of water and actors in community water supply

The main sources of water for domestic use in Paga are boreholes, hand dug wells and standing pipes. Only houses along the main road in the town are connected to the GWC pipe lines. There are 10 boreholes and 9 hand-dug wells in the community. One of the hand-dug wells is however privately owned. 4 of water points were constructed through communities' contributions and support from the District Assembly following the demand-driven procedures of the CWSA. The boreholes are managed by community-based WATSAN committees. Water levies charge differ from section to section and range from ₵1500-₵5000 per woman per month. The communities have health facilitators and they are responsible for the sanitation around the water points.

Actors in the community drinking water: District Assembly, CIDA, GWSC.

The community has one dam for dry season irrigation and livestock watering. People who cannot get land at the irrigation site dig wells in the dry river banks to irrigate crops in the dry season. The Paga Nania dam was constructed in the late 1950s, was rehabilitated by the IFAD-LACOSREP in 1997. The scheme is managed by a local WUA, which LACOSREP helped to establish. The dam water has multiple uses: dry season gardening, livestock watering, home construction, household uses (e.g., washing).

Water related concerns

- Boreholes are very old, yield very little water
- Dam is silted, water is always not enough for irrigation
- Human population at the irrigation site is large and drinking water is always a problem
- Women queue for very long time to fetch water
- Fencing is a major problem at the irrigation area. Animals destroy crops.

Interventions proposed by the community

- Dam should be enlarged
- Desilt dam
- Need for permanent fencing
- Water point around the scheme
- More boreholes

Coping strategies

- Rationing water, open for one side of the scheme to irrigate at a time in turns.
- Control water drawing/fetching at the wells and boreholes to enable the water points to recharge

Sinyansa (Builsa District)

Social and economic infrastructure

The number of schools at Sinyansah includes 2 Nursery Schools, 2 Primary Schools and a Junior Secondary. The closest Senior Secondary is about 7km away. The nearest health facility is at Yisobsa, about 5km away. The people from Sinyansa also attend market at Yisobsa.

Sources of water and actors in community water supply

There are 3 boreholes and 12 hand-dug wells in the village. IFAD-LACOSREP funded the construction of one the hand dug wells. The rest were constructed by the community. Unfortunately, only one of the 12 hand-dug wells yields water throughout the year. All

the boreholes in this village were constructed by CIDA. Rural Aid constructed the LACOSREP funded hand dug well. Most of the boreholes were constructed around 1985. Chiefs of the community was said to have played very important role in the establishment of the water systems in the community. They carried the community's request to the central government and followed up. Like the rural water systems in the UER, the Sinyansa boreholes are managed by local WATSAN committees. Each woman is levied ¢ 5000 for repairs anytime a borehole breaks down.

The Sinyansa dam, which is the main source of water for livestock in the area is also fitted with irrigation facilities for dry season gardening. The community dam was first constructed in the 1950s but was rehabilitated by IFAD LACOSREP in the late 1990s. The dam was rehabilitated by a labor intensive method, which required labor contribution for the community. Like other LACOSREP dams, the community dam is managed by a local water users association.

Water related concerns

- Sinyansa is a large community and so the three boreholes not enough. Women spend a lot of time fetching water.
- Dam is silted
- Dam is silted and so can harvest is small of water
- The dam has only one canal that cannot serve the entire community.
- Much time is spent every season to construct mall walls to construct to a fence around the irrigation area to chase way
- Most of the youth migrate to the south for lack of economic activity, especially in the dry season.
- Boreholes in the village are few and many households are far from them. The far away compounds are compelled to drink from wells. Some drink form shallow wells.
- Hand dug wells not deep enough and water not very safe for drinking
- Hand dug wells not protected from pollution. Wells are often contaminated by human faeces
- Lack of health facility.

Intervention suggested by community

- Sink more wells
- Fit wells with pumps
- Sections can make contributions of the village to the District Assembly for boreholes
- Collectively contribute money to procure pumps to be fitted on wells
- Support for permanent fencing materials
- Sink more boreholes
- Desilt dam

Coping strategy

- Contributed money for the District Assembly to construct boreholes
- Community has dug wells, through collective action
- Through collective action, irrigators build mud walls to fence the irrigation area each season
- Dam was rehabilitated by labor intensive technique in which the community contributed labor

Yesobsa/Wiaga (Bulsa District)

Social and economic infrastructure

Yisobsa/Wiaga has one Nursery school, two primary schools, and 2 Junior Secondary Schools. The nearest Senior Secondary schools are Sandema, about 8km away. The village is connected to the national electricity grid, but few houses have electricity. There is a clinic, which is manned by a nurse. Yisobsa has a periodic market which occurs in a 3-day cycle, and patronized by people from many communities in the district. The inhabitants of Yisobsa also attend the Fumbisi and Sendema markets, both of which are primary markets in the region.

Sources of water and actors in community water supply

The main sources of drinking water in Yisobsa are boreholes and hand-dug wells. The meeting could count 7 boreholes, six of which were said to be in good condition. There were 10 hand-dug wells in the village, but only four have water throughout the year. Five of the wells are privately owned, although the entire community has access to them.

The meeting could not remember all the organizations that have supported the construction of water systems in the village. GWSC was however thought to have been the main actor. Two of the boreholes were however constructed with assistance from the District Assembly in 2002. The initial plan was to establish a small town water system at Yisobsa to which all the communities contributed. Each adult male and female paid ₪ 6000 and ₪5000, respectively. But test drills showed that the water table in the area is very low and the wells could not yield enough water to supply the entire village. The system was therefore converted into boreholes for the people to use.

The boreholes are managed by community level WATSAN committees. The activities of the committee include

- Inspection of the water points to identify problem, and report them to the community for the experts to be called upon to undertake the necessary repair works.
- Keep sanitation of the water points

Both men and women pay monthly water levies of ₺2000. The committees mobilize additional resource (cash) from the people to purchase spare parts when the need arises. Defaulters are not prevented from fetching the water. Few people however fail to pay the levies. The community however puts a lot of pressure to compel them to pay. Similarly, those who do not turn up for maintenance activities are pressurized to do it part of the communal work. The defaulters are reported to the community leaders when all attempts fail.

IFAD-LACOSREP rehabilitated the community dam in the late 1990s for dry season gardening and livestock watering. The dam is managed by a local WUA. The plots in the irrigation area were laid out with the assistance of the AEAs. Plots are reallocated every year for dry season gardening and every member who comes early is given. The lands however revert to the original owners during the rainy season. Apart from maintenance activities carried out the scheme, the WUA also meet at the beginning of the dry season to decide on the levy for the season. Usually payment is done before cropping, but those who cannot pay are made to settle their obligation after harvest.

Water related problems

- Dam is heavily silted
- The inlet outlet structure has broken and it is filled with mud.
- One of the three canals is broken down and cannot be used
- Termites in the dam wall, need chemicals to control them
- A borehole at one of the sections of the community has broken down. Women have to walk long distances to fetch water
- Boreholes in the village are very few women spend a lot of time looking for water
- One of the canals was not completed. It is difficult to get water to reach those at the tail end of the irrigation scheme
- Women struggle to get water for household use
- Livestock break through temporal fences to destroy crops

Interventions suggested by community

- Dam should be desilted
- Construct a well close to the irrigation area to provide gardeners safe water to drink
- More water points should be constructed.
- Rehabilitate the remaining canals
- Help us to acquire permanent fencing materials

Coping strategies

- Regulate water at the irrigation site. Water is allocated to different sections of the scheme following a time schedule the WUA has agreed on.
- Mobilize funds to support maintenance work

Saka (Bawku West District)

Social and economic infrastructure

There is no school located in Saka, the nearest primary school is about 9km away. The Zebilla market is the main market where people buy most of the essential items they require. Saka is one of the major onion producing communities in the UER. Onion trade is therefore brisk in the village, although there is no local daily or periodic market. The people have however created an onion market along the main Zebilla – Bawku road where onions produced in the dry season are sold.

Water sources and actors in community water supply

Hand-dug wells are the major sources of drinking water. The meeting counted 96 wells in the community, but only 6 were said to have water all year round. The majority dry up during the drier months of the year: There were only 3 boreholes in the Saka, two of which are said to be in good condition but the other very old and slow in yielding water.

The two newer boreholes were constructed with assistance from the District Assembly, while GWSC provided the older borehole. The people contributed 2.2 Million for each of the boreholes with the District Assembly and CWSA bearing the remaining cost of constructing the water systems. The Assemblyperson of the area was the liaison between the community and the District Assembly. Each household head contributed ₵30,000 irrespective of the number of women in the household.

A number of organizations were credited for the construction of the wells. In many cases, the community dug the wells themselves, collected stones and sand for the agencies to come and line the wells with concrete slabs and stones (Ref. figure 1, panels A and B). The organizations involved in the construction of wells in Saka are Action Aid, Rural Aid, IFAD-LACOSREP, ADRA, and the Program of Action to Mitigate the Social Cost of Adjustment (PAMSCAD).⁵ The water sector support was said to have come from needs assessment some of the organizations conducted in the community.

The boreholes are managed by local WATSA committees. People from the beneficiary communities were selected and trained to undertake routine maintenance of the boreholes. Monthly contributions are made towards the maintenance of the boreholes.

⁵ PAMSCAD was a World Bank supported program aimed at mitigating the socio-economic effect of structural adjustment program the government of Ghana embarked upon in the early 1980s.

Each woman pays ₪1000 per month as water levy. The community mobilizes itself keep the sanitation of the water points.

The Saka dam was first constructed in the early 1960s, but rehabilitated by IFAD-LACOSREP in the 1997 to support dry season gardening and livestock watering, as part of the poverty alleviation strategies of the project. The community dam is managed by a local WUA, which mobilizes its members to collectively maintain the dam and the irrigation infrastructure.

In addition to the irrigation scheme, there is a natural stream (the Goo River) along which people produce significant amount of onions in the dry season. There were claims the community had contributed money to the Small Scale Irrigation unit of the GIDA for a the area to be developed for irrigation, but nothing has happened.

Water related concerns

- The drying up of the natural stream appeared to be a major concern
- Young people migrating out for lack of water to do gardening in the dry season
- Water in the wells is not wholesome for drinking during the early rains. The wells get polluted
- Livestock do not get water to drink, lost many animals
- Women walk long distances to for potable water. Community was not consulted in the selection of the site for the water
- Streams and water bodies dried up, unable to do gardening. Live is therefore very difficult in the community
- Dam is silted
- Boreholes do not yield enough water
- Many children are yet to taste borehole water. This is because 2/3 of the population has no access to boreholes

Interventions suggested by community

- Develop stream into a dam
- Construct more boreholes
- Need dam to be desilted
- Extend canals
- Community can contribute in-kind towards any assistance

Coping strategy

Community has formed groups and contributed money for SSID to build a dam for the community, but nothing has been head about it. The community has contributed ₪4.0 Million the construction of the dam

Community contributed labor during the rehabilitation of the dam

Dig wells in the valleys and dry river beds for irrigation

Kabore (Bawku West District)

Water sources and actors in community water supply

The main sources of drinking water at Kabore are boreholes and wells. Community members at the meeting counted 5 boreholes and 3 well. Four of the boreholes are for the community and the other is specifically meant for the local primary school. Only one of the wells was said to be yielding water at the time of the interview. The wells were constructed by the community members while a Church organization funded the construction of the boreholes.

As part of an FAO funded special food security program of the Ministry of Food and Agriculture the people of Kabore have been assisted to use the White Volta for irrigation. Farmers in the community have been organized into 2 groups. Each group was assisted with loans to purchase 3 water pumps to draw water from the White Volta for irrigation. The group members work on individual farms but there is also a group farm in which members collectively cultivate onions, the proceeds of which is used to service the loan for the pumps.

Members of the groups contribute to money to fuel the water pumps for their operations. During the immediate past season each member paid ₦75000 for fuel. In a labor arrangement the farmers help each other to transplant their seedlings, irrigate the crops and weed their plots. On how to ensure that each member turns up for work in the group farm, it was hinted that group members made sure only credible people are accepted into the groups. Besides, pressure is put on absentees to turn up. It was suggested that habitual absentees will be withdrawn. One of the groups claimed that it had to sack a member who was not using the loan for the purpose for which it was granted was sacked from the group.

Tonde (Bawku West District)

Social and economic infrastructure

Tonde has 2 Nursery schools, the nearest primary school is about 4 km away. Similarly the nearest health facility is at Tanga, a distance of about 5 km.

Water sources and actors in community water supply

The main sources of drinking water at Tonde are wells and boreholes. The community has 25 wells, about half (12) of which dry up during the drier months of the year. Tonde has 5 boreholes, but one was not in working condition at the time of our visit. Action Aid

and Rural Aid, both NGOs, assisted the community to construct the hand dug wells. However, two of the boreholes were constructed with the assistance of the CWSA and the Bawku West District Assembly while the Ghana Water and Sewerage Cooperation provided the remaining boreholes.

The community head about the demand driven approach to the provision of boreholes through the assembly person of the area, who was briefed in a District Assembly meeting. The community purchased a form and contributed the ₵2 Million requirement for the District Assembly and CWSA to bear the rest of the construction cost. In one of the sections (a relatively more populated area) men paid ₵40,000 while each woman paid ₵20,000. In the other section, however, men contributed ₵100,000 each, for each woman to also contribute half of that amount (₵50,000).

The boreholes at Tonde are communally management with the local WATSAN committees overseeing the operations and management responsibilities. The responsibilities of the WATSAN committees are similar to those described earlier. Two of the members of each WATSAN have been trained to maintain the systems while the remaining members take charge of the environment of surrounding the water points.

The construction of the Tonde dam was however funded by the Red Cross, to provide water for livestock in the area and opportunity of Red Cross mothers association in the community to earn some income through dry season gardening. With the assistance of MoFA, a local WUA was formed to take up the management responsibilities of the irrigation system.

The plot allocation at the scheme was initially done with the help to the Agricultural Extension Agents of the Ministry of Food and Agriculture. The land was initially allocated to groups, so that plot sizes differed depending on the group sizes. The Red Cross mothers were the only people farming there, but when interest was generated many people came in later. Land distribution was done through balloting. The plots were partitioned and tagged with numbers for balloting. Once allocated, land is held permanently. The irrigators use the land for both wet season cropping and dry season gardening. Like in other WUA in the region, the group members pay levies to meet future maintenance needs and undertake periodic cleaning and maintenance of the system. Other collective activities include labor exchange arrangements to help one another. People will not come out to help anyone refuses to help another.

Water related concerns

- Very few boreholes serving the entire village, people queue for long hours to fetch water
- Tadpoles drop from the nozzle of the borehole pump into containers
- Water from the wells not safe for drinking; there are worms in them
- Dam water is not safe for drinking

- Experience health problems (itching skin) after bathing in the dam water

Interventions proposed by the community

- Need chemicals to kill germs in the water
- Identify wells with worms and disinfect
- Provide more water points to reduce pressure on the few existing ones

Kpalwega (Bawku Municipal Assembly)

Social and economic infrastructure

The educational infrastructure at Kpalwega includes a Day nursery, four primary schools, and 3 junior secondary schools. The Bawku secondary School is about 1km away from Kpalwega. Unlike nearby communities like Manga and Nyorigu, no compound in Kpalwega has access to electricity. There is a health facility at Kpalugu, less than a kilometer from Kpalwega, but the people like to visit the Bawku Hospital which is about 4km away. The main market in the area is the Bawku market, one of the most patronized markets in the Upper East Region.

Sources of water and actors in community water supply

There were 3 boreholes at Kpalwega and 2 private wells. The 3 boreholes are however concentrated at one section of the village a considerable distance to many of the inhabitants of the village. The people claimed that many of them do not fetch these water points because the nearest distance is about 2km. Many of the people in the village however depend on shallow wells they dig close to the community dam and around their houses. The meeting could not remember the agencies that helped to construct the few boreholes in the community. But it was later suggested that CIDA could be one of them.

The community dam

The community dam was rehabilitated as part of the activities carried out under IFAD-LACOSREP phase I. The dam is managed by a local WUA with responsibilities similar to those outlined earlier. However, the WUA has no control over irrigation land. Interested farmers seek land from the land owners. Land rent is about ₵200,000 per acre. Sometimes in-kind payments (with inputs e.g., between 25kg -50kg fertilizer, or produce). As expected, it is difficult for women whose husbands are not landowners to get irrigable plots because often they lack the resources to pay for the land and crop. Plots sizes therefore differ. Water levies as well differ, ranging from ₵5000 to ₵20,000 depending on ones plot size.

It was revealed that before the rehabilitation of the system, landowners agreed to voluntarily give up their lands in the dry season for the entire community to benefit from the scheme. But many refused to allow the WUA to allocate the land to all members.

Initially, some landlords were complying but the others whose refused to comply with the land redistribution policy threatened them and they stopped cooperating. The WUA in 2001 sought outside intervention (from MoFA) to enable them play greater role in land allocation, but there was not compromise from the landlords.

Water related concerns

- Do not have reliable access portable water. In the dry season the drink from shallow wells which get flooded and polluted in the rainy season. Thus, exposing them to water borne diseases.
- Women walk longer distances, especially in the dry season, to fetch water.
- The shallow wells get silted and sealed up in the rainy season
- Dam water not enough for irrigation
- Dam is silted

Interventions proposed by the community

- Desilting the dam will help the community get enough water dry season gardening and for the livestock
- Boreholes to reduce the drudgery women go through to get water for their households
- Line hand-dug wells to reduce pollution
- Health facility in the community could helpful. Conveying patients to Bawku hospital is a difficult thing
- Sanitary facilities to reduce the pollution of water bodies

Coping strategies

- Community has collectively dug wells, but did not reach water in two other attempts
- At the instance of the Assemblyman, the community contributed money for the District Assembly to help construct boreholes but have head nothing it for more than 3 years after the contributions were made.

Binduri (Bawku West Municipality)

Social and economic infrastructure

In terms of schools in the area, Binduri has a Primary school and a Junior Secondary School. There is no nursery school for very little children. Impatient parents are said to be sending their very kids to sit in school why they make time to attend to household (including economic) activities. There is clinic in the community and also a periodic market, which is organized in a 3-day cycle, like many other markets in the region.

Water sources and actors in community water supply

The main sources of domestic water in Dinduri are boreholes and hand dug wells. The meeting counted 7 boreholes and 19 hand-dug wells, including private ones. In addition to the boreholes Binduri also has a small town water system, which indeed, makes it one of the few communities in the UER to have that system. The Binduri small town water system has however been out of operation for some time due to managerial problems. It was recalled that after water system was handed over, the community could not agree on the fees to charge as levies to generate revenue for maintenance. Eventually, when the plant broke down the community was unable to repair it, and for 3 years the people resorted to drinking from boreholes. Disagreements over water levies continued when the plant was back in operation, many failed to pay the levies, and the system has been down again.

Local WATSAN committees are responsible for the management of the boreholes in the communities.

Organizations associated with the Binduri water systems are GWSC, CIDA, District Assembly, Rural Aid, and IFAD-LACOSREP. The community contributions to the establishment of the water systems were in-kind (communal labor). GWSC established the small town water system but handed it over to the community.

The Binduri dam was rehabilitated by the IFAD-LACOSREP in 1997. Like many other small-scale irrigation schemes in the region, the dam is managed by a local WUA. Land owners have no role in land distribution at the Binduri scheme. They agreed to handover the land for the benefit of the entire community. The landowners however use the land during the wet season for the land to revert to the WUA in the dry season, following the dual land control arrangement highlighted earlier.

Like other WUAs, the users' association is supposed to organize collective action of all members for the maintenance of the schemes. However the tendency for some members to free-ride on the collective efforts of others has been a concern for the executive members of the Binduri WUA.

Constraints of the WUA

- Default in levy payment seems to be high
- Nonparticipation in the construction of mud walls to fence the irrigation area, as people do not turn out nor pay fines imposed.
- Water poaching
- People collect land and selling to others outside the beneficiary communities people not to participate in the collectively constructing mud walls

Water related concerns

- Dam is silted

- Do not get enough water for irrigation and for the livestock
- Water points are few and highly dispersed. Women walk long distances to the fetch water
- Water points do not yield much water, women scramble for water and quarrel a lot at the water points
- The small town water system the town relied on is broken down
- The plant is too big, complicated and costly to repair. It would have been less difficult to manage if it were a borehole
- The dams site management committee does not get enough revenue because of lack of water
- All the wells in the community dry up by March. Face severe water problems
- Youth emigrating because lack of water to do dry season gardening bring a lot of hardship on the people.
- The small town water system does not extend to other sections. It is only within the center of the town
- The dam is too small for the number of people (9 communities) depending on it for survival
- Water not enough for the livestock
- Cannot get enough fish form the dam because of lack of water
- Crops are harvested prematurely because water gets finish before the crops mature
- Wells are polluted but lack of water compel people drink form them
- The small town water system draws water from 2 boreholes, but one of them is blocked.

Community initiatives

- Contributed resources towards the maintenance of the irrigation system
- Communally dug wells and were assisted by Rural Aid to line the wells

Woriyanga (Garu Timpone District)

Woriyanga is one of the communities in the newly created Garu-Timpone District. The Educational infrastructure in the community includes two primary schools and a junior secondary school. The community has no access to telephone land, but the reception to cellular phone networks in the regions is quite clear. The health center at Woriyanga is manned by a resident nurse.

Water sources and actors in community water supply

The main sources of drinking water at Woriyanga are boreholes and hand-dug wells. There were 10 hand-dug wells, although privately owned they were accessible to all

members of the community. Four boreholes were counted, but one was out of order at the time of the community meeting. All the four boreholes were constructed with assistance from the District Assembly. For each borehole, the community contributed 5% for the Assembly and CWSA to bear the remaining cost of construction. The 5% community contribution amounted to €2 Million. The boreholes are managed by WATSAN committees selected by the community, majority of which are women. The women contribute resources for the maintenance of the boreholes. Experts from outside the community are invited to take care of maintenance efforts that are beyond the capabilities of the committee members.

IFAD-LACOSREP rehabilitated the Woriyanga dam for dry season gardening and livestock watering, but it got breached in 2003. The dam was under the management of local WUA. The WUA was made of 623 members (213 men and 410 women). Only about 14 people are able to do gardening at the scheme area. Many who manage to crop use water from shallow wells to irrigate their vegetables in the dry season.

Water related concerns

- Due to lack of water for dry season gardening, the youth are migrate to the south in such of work and return with so many social problems
- Problems in getting water for the livestock. Animals stray far in search of water and many get stolen
- Difficulty in getting water to construct new homes or rehabilitate dilapidated houses
- Dam is broken down and members of all the 6 communities that were benefiting from the dam can no longer do dry season gardening, which has been the main source of livelihood for the people in this area
- Animals get drown in the shallow wells people dig to water their dry season crops
- The boreholes are few. There is always overcrowding and conflicts at the water points
- Women walk long distances in search of water
- Livestock move towards Ghana's boundary with neighboring Republic Togo. If it have happens that animals stray across into Togo, then they get lost forever.
- Incidence of Bilharzia is high in the area
- People are dying out of starvation because there no longer dry season gardening to supplement household food needs

Interventions proposed by the community

- Build more boreholes
- Help to reconstruct or repair the breached dam wall
- Help to generate alternative income sources

Community initiatives

- Digging shallow wells for water for both domestic and agricultural use.

- Have contributed money for the District Assembly's support for the construction of boreholes
- The WUA raised dykes to support the dam wall but that could not save it from collapse
- The WUA has been contributing money for the dam wall to be repaired. They have so far received no support from any quarters. the community t

Bugri (Garu Timpane Districts)

Bugri is also situated in the newly created Garu-Timpane District. The village has 2 nursery schools, one primary and a junior secondary school. The health facility in the community is manned by a nurse. Bugri has a periodic market that is also held in a 3-day cycle, as it is the case of many markets in the region.

Water sources and actors in the community water supply

The main source of drinking water in this community is borehole. There were about boreholes in the village, with CIDA and CWSA being the main agencies that funded the construction of the boreholes in the village. The CWSA assistance followed the demand-driven approach, which first begin with community application and payment of 5% of the cost of construction of the borehole through the District Assembly. The District Assembly also contributes 5% for the CWSA to source funds for the remaining construction cost, as outlined earlier. Local WATSAN committees the CWSA helped to establish manage the water points. Monthly levies are charged to mobilize resources to meet maintenance requirements. Women in some sections of the village contribute a bowl of rice each, after harvest, to be sold and the amount saved to meet future maintenance needs. There was a hand-dug well, which had dried up at the time of the survey.

The Bugri dam is the source of water for dry season gardening and livestock watering for the surrounding villages. Many people however use water from shallow wells dug outside the irrigation area, in valleys and dry river beds, to irrigate their crops in the dry season. The dam was first constructed in the late 1950s and was rehabilitated in 1997 IFAD-LACOREP to support dry season gardening and provide water for the livestock in the area. The dam is managed by the water users' association, which like the others described earlier, is responsible for the operation and maintenance of the system.

Water related concerns

- Dam is silted, it does not impound enough water for dry season gardening
- Boreholes are not enough, there is a lot pressure on the few water points
- Water in the dam dry up quickly and livestock have to be sent far away in search of water
- People drinking dam water for lack of portable water

- The dam has only one main canal
- Women spend a lot of time looking for and fetching water

Interventions proposed by the community

- Boreholes are not enough, additional water points be established
- Desilt dam
- Need additional canal

The community has constructed its own turnouts to extend the irrigation area.

Kodorogo (Kasena-Nankena District)

Kodorogo is one of the non-dam communities included in the village meetings. The village has one primary school, after that level children go to Goo (5km) or Gambrongo (6km) to attend junior secondary schools. There is a health post, but it operates twice a month.

Water sources and actors in community water supply

Wells and boreholes are the main sources of drinking water at Kodorogo. There were 5 hand-dug wells and 5 boreholes in the village at the time of the survey. Four of the 5 wells are however privately owned, although accessible to community members. The wells yield water only in the wet season, but completely dry up in the drier months of the year. Some sections of the village also depend on running streams for water, but these also dry up in the dry season.

The community collectively sunk the other. One of the boreholes in Kodorogo was constructed by CIDA, while the remaining four were provided by the District Assembly with community contributions following the demand-driven approach of the CWSA. Information about the demand driven approach to community water supply got to the village through community meetings with Agricultural Extension Agents and other development groups (including NGOs). It took the community about a year to make required 5% contributions.

Kodorogo has no dam. The nearest community with a dam is Gambrongo. Livestock from Kodorogo are therefore sent there to water.

Water related problems

- Community has no dam. There is difficulty in getting water for the livestock in the dry season

- No dam to do dry season gardening to earn living, especially in the dry season when people are idle
- Can raise small ruminants, because there is no water for them. The animals stay away for long, get stolen
- Young people migrating to the cities because of lack of dam for dry season gardening
- Boreholes are too few. Six large communities sharing only 5 boreholes
- Children cannot remain in class when there is no water to drink
- Low rains, rivers dry up too early
- Women walk longer distances to fetch water
- Animals die for lack of drinking water. Someone said to have lost 12 cows in the past season
- School children escape to the Vea irrigation area to seek employment as farm hands during the dry season, because there is no dam here
- People drink from streams because of lack of portable water
- Women complained that sometimes husbands steal the water they struggle to fetch for the household to water their livestock
- Women and children get up very early in the morning to fetch water. The water points recharge slowly and also many people are far from the water points.

Interventions proposed by the community

- Need dam for dry season farming and livestock watering
- Need more boreholes for portable water for household uses and for the livestock
- Need assistance to blast rocks encountered underground when sinking wells

Coping strategies

- Community meets regularly to discuss water problems
- Contribute money for the district Assembly's support to sink boreholes
- One section contributed moneys in 2002 for the assembly's support to sink a borehole, but nothing has come out of it after money were paid to the District Assembly
- Community has organized to sink wells. Sunk 5 wells last year to seek assistance from Rural Aid to line them with concrete slabs, but hit rock at the bottom, and so did not yield water. Sometimes they dig as deep as 30m without reaching water. Gender roles in well sinking: Men digging while women pull out the earth materials dug.
- Women also organize food and water for people digging.

Dua Apuwongo (Bongo District)

Dua Apuwungu is also a non-dam community. The only educational facility in the village is Primary school. The nearest Junior Secondary School is at Dua (4km away). The people of Apuwungo frequent the markets in Bongo (10km) and Bolgatanga (15km) where they buy and sell.

Water sources and actors in community water supply

Mainly, the people depend on boreholes for household water needs. However, stream and ponds also serve important sources of water for many of the inhabitants. There were 6 boreholes in the community, but 2 were out of order at the time of the community meeting.

The District Assembly, TRAX, and the Standard Chartered Bank, Ghana Ltd, helped the in the provision of the boreholes. In fact TRAX tried to construct 3 but only 2 yielded water. The remaining borehole was said to have been constructed during the colonial era. The TRAX support came followed its land and water conservation program in the village. The NGO trained the villages on ways to control erosion with various types of bunds, as well as preparation and application of manure. It was during the community's needs assessment that drinking water was identified as a critical need, when TRAX took up the challenge to assist community.

On the Standard Chartered Bank's intervention, the community recounted that a prominent native of the area who was well placed in government managed to get the World Water Day was launched in the Village. After the launch the dignitaries were led to the streams from which the people drink water, which had virtually dried up. The Standard Chartered Bank heeded to their plea and offered the community a borehole. The support from the District Assembly however followed the demand-driven approach of CWSA. The community contributed 5% of the establishment cost for the District Assembly and CWSA to bear the rest.

The boreholes are managed by WATSAN committees selected by the beneficiary communities, who are also trained to undertake routine maintenance of the systems.

Water related concerns

- Boreholes are not enough, some areas of the village have no access to portable water
- No water for the livestock during the dry season. Indeed, in the dry season animals and humans compete for water
- No watering troughs constructed to allow animals to drink from the boreholes
- Some of the boreholes recharge very slowly, so women and children spend a lot time waiting and fetching water

- Unlike in the dam communities, the people of Apuwongo have nothing to do in the dry season. Availability of a dam could enable them the crop vegetables to earn income to feed their families, and also for the livestock to drinking water.
- Young people migrate to the citizens because of lack of economic activities, only to return with so many social problems
- Children attend school late, especially in the dry season, because they have to spend several hours fetching water
- Livestock die for lack of water to drink. The community has lost most of its livestock
- Guinea fowls are also dying. Because people converge at the water points, the birds are afraid to get close to drink water.
- Existing boreholes are far from the compounds and the women suffer walking long distances. Many people therefore depend on rain water as well as water that collect in depressions around their houses. shallow wells
- Young women from other villages are refusing to marry men from Apuwongu. They say they do not want to use the rest of their lives searching for water

Interventions proposed by community

- Help to provide boreholes for all the communities in the village to control water borne diseases in the area
- Availability of a dam will provide water for the livestock and also enable the people to do dry season gardening to earn some income
- More boreholes will reduce the drudgery on women

Coping strategies

- Young people travel far with bicycles to fetch water
- Dig wells but cannot get water
- Women fetch water for the livestock pans

Kaasi (Kasena Nankena District)

The village of Kaasi is the remaining non-dam communities included in the survey. The only educational infrastructure in the village is a 3-classroom block primary school, with classes sharing a room. The closest market is at Kadinga, about 6km away.

Water sources and actors in community water supply

Wells and boreholes are the main source of water in this community. There were 6 wells, but only 2 were said to be having water throughout the year. The community members working groups sunk the wells. IFAD-LACOSREP funded Rural Aid to fix pumps to two of the wells. The meeting counted three boreholes in the community, which were

constructed with the support of the District Assembly. Indeed, the District Assembly provided two of the boreholes without community support. The other followed the demand driven approach of the CWSA. The community contributed ₦100,000 a month (with monthly contributions of ₦1000 per a man and ₦500 per a woman. It took the village about a year to mobilize the 5% contribution. Before the district assembly's intervention, the people of Kaasi were drinking from the rivers and streams, which dried up so often. The boreholes are managed by WATSAN committees.

Kaasi has no dam for irrigation. The community members do dry season gardening in the community's lowlands and dry river banks, using water from shallow wells. The gardeners have organized themselves into groups whose leaders are selected in general meetings. It was hinted, always the elderly with good temperament are chosen to lead the groups. In groups of 4 individuals help each other to sink wells with which they irrigate their gardens in the dry season. Women were also said to be farming vegetables in the valley, on their separate plots, but often it is their husbands and children who help them to dig wells for irrigation.

Water related concerns

- Boreholes are far apart, women walk longer distances to the water points
- Community has no dam for dry season gardening.
- It difficult getting water for the livestock in the dry season
- There is no health facility in the village

Interventions suggested by the community

- Need a dam for irrigation in the dry season
- More boreholes to reduce pressure on the existing ones. Children go to school late because they have to spend more time fetching water
- Additional classrooms local primary school
- Need health facilities in the village

General conclusions

The fundamental constraint to the ability of the people to help themselves is abject poverty. This makes it difficult for the people to mobilize enough resources to provide for themselves their basic needs including water. Poverty is extreme especially during the lean season, when it is difficult for many households to meet their food requirements. The people rely on their livestock for income but the animals are dying for the lack of water. Although the region is well covered with water resources, yet water is the major constraint for development activities in the area. Indeed, opportunities exist for water systems to be established in most of the communities, as the large rivers as well as small streams running through the area make most part of the region suitable for irrigation development (FAO, 1978).

While seeking assistance from the District Assembly for the construction of water points, some communities continue to depend on shallow wells and other unwholesome sources of water to meet their water needs. And as a coping strategy to get water for dry season gardening, the people in some of the communities have come together to dig wells in lowlands and dry river beds to be used to irrigate vegetables they grow in the dry season. In a labor sharing arrangements the people work in groups of about four to help one another to dig wells in their gardens. To conserve water in the dam communities many of the WUAs have adopted time rotation arrangements for water distribution. Water rationing is also practiced by some WATSAN committees to allow the bore holes to recharge.

There is no doubt some collective activities are taking place in the communities aimed at improving the desperate situations the people are facing, there is however the impression that communal work and monetary contributions are burdened with free-riders. The actual extent however differs across communities. The methods chosen for the community needs assessment however limited the ability of the research team to pry more into this sensitive issue. Assess, control and management arrangements for the community irrigation lands varied and very unclear. Besides, different institutional arrangements that pertain at the valley irrigation systems, pump irrigation along the White Volta River, and the damsite irrigation systems might produce interesting insights if critically analyzed.

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