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Leadership, local knowledge and water management: Lessons from fringe communities of the Kogyae Strict Nature Reserve, Ghana

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Abstract

Access to water remains a key global issue in spite of significant progress made over the past two decades towards achieving the Millennium Development Goal drinking water target. This study therefore examined how local leadership and community-based institutions contribute to effective and sustainable management of water resources and environmental stewardship in the face of climate change. The study focused on three outlying farming communities of the Kogyae Strict Nature Reserve of the forest-savannah transitional zone of Ghana. The study adopted participatory rural appraisal methodologies involving focus group discussions, interviews and observation at the community level. The study noted that the influence of local chiefs is a strong factor in the management of water resources and environmental stewardship. Lack of effective community leadership, accountability on the part of community water management committees and cooperation between indigene and migrant settlers constitute a major constraint towards achieving effective management of water resources. The study advocated for stronger cooperation among people of different ethnic backgrounds to sustain community water management. There is also the need for support from the local government and law enforcement agencies to enhance community initiatives at conflict resolution arising out of multiple use of water resources.

Keywords: Community; Leadership; Management; Environmental Stewardship

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1. Introduction

Water forms an integral part of the natural environment and it is very vital for all forms of life. Access to water by humankind is therefore essential. At the Earth Summit in Rio de Janeiro in June 1992, the provision of sustainable water supply emerged as one of the key issues. Since then there have been a number of programmes and actions at global, regional and national levels aimed at enhancing improved access to safe drinking water. Target 7C of the Millennium Development Goals (MDGs) for instance, aims at halving by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation. On the 6th of March 2012, the World Health Organization (WHO) and The United Nations Children's Fund (UNICEF) issued a joint statement that the world is on course to achieving this target and that the proportion of people without sustainable access to safe drinking water has already been halved. The statement indicated that "between 1990 and 2010, over two billion people gained access to improved drinking water sources, such as piped supplies and protected wells" and that 89% of the world's population (6.1 billion people) used improved drinking water sources at the end of 2010 (WHO, 2013). The report also highlighted the wide disparities in regional and national figures as well as the disproportionate burden of inadequate water supply on girls and women. For example in Sub-Saharan Africa, only 61% of the population had access to improved water sources compared to 90% for Latin America.

Ghana has made impressive strides towards achieving the MDG Target 7C. Between 1990 and 2008 the proportion of the country's population using improved drinking water increased from 56% to 83.8%. During the same period, access to improved drinking water in the urban areas increased from 86% to 93% whereas that for the rural population rose from 39% to 76.6% (NDPC and UNDP, 2010). The percentage of the population relying on unimproved and surface water sources was 14 (UNICEF and WHO, 2012). However, in spite of the improvements in potable water supply sources in the rural communities in the form of boreholes and hand dug wells, surface water resources including streams, ponds, dugouts and wells remain vital to the survival of the community members.

Two agencies are responsible for the provision of water to households in the country: the Ghana Water Company Limited (GWCL) and the Community Water and Sanitation Agency (CWSA). The focus of GWCL is on urban water supply while the CWSA (which was established by the Act 464) coordinates and facilitates provision of potable water and sanitation facilities in rural communities and small towns (Republic of Ghana, 1998). The National Community Water and Sanitation Programme (NCWSP) emphasizes "community ownership and management (COM), which entails effective community participation in the planning, implementation and management of the water and sanitation facilities in the belief that, as custodians, communities will ensure the sustainability of the systems" (Government of Ghana, 2007, p.43).

Under the Act that established the Water Resources Commission, Act 522, water resources are subject to state ownership (Republic of Ghana, 1996). Local authorities are also involved in the administration of non-registrable waters and traditional informal customary law principles are also recognized (Opoku-Agyeman, 2005). This means that traditional concepts and values which are embodied in local and indigenous knowledge are important. Customarily, surface water sources are common resource and considered as community good or property and their use is guided by the principle of 'non-denial' (Addai, 2012). The

concept of non-denial means that community residents and visitors, as well as, members from other communities which are contiguous to a common water body have the right of use of the resource (Opoku-Agyeman, 2005). Under the customary law, individuals who dig wells are accorded priority of use but do not have ownership rights (Opoku-Agyeman, 2005). As a “common-property resource” water is owned and defended by the community of users (Schlager and Ostrom, 1992). The responsibility for water management and decision making at the local level lies with the community members and the community leadership has oversight responsibility of individual actions with respect to the resource.

Against the backdrop of increasing modification of the natural environmental conditions including climatic change, water availability in general cannot be taken for granted. Land-based activities (LBA), particularly clearance of vegetation for farming, impact negatively on surface and underground water sources. There is therefore the need to ensure effective management of community water resources for sustainable livelihood.

The aim of this paper is to examine the role of community leadership and knowledge systems in the management of water resources against the background of increased changes in the environmental conditions in the forest-savannah transitional zone of Ghana. The paper is based on the view that effective community leadership, strong collective action and adherence to community values, local experiences and knowledge systems are essential ingredients for sustainable management of water resources and environmental stewardship. The paper is divided into five sections. The introduction presents background information as well as the research questions. The second section presents the conceptual framework while the third and fourth sections provide the methodology and the results and discussion. The paper concludes with policy implications as well as the way forward.

2. Conceptual framework

2.1. Community-based resource management

On the basis of past experiences in the developing countries, many international organizations and non-governmental organizations (NGOs), particularly those belonging to the Millennium Water Alliance (MWA) which are involved in water provision, have called for greater community participation in the management of water resources and water supply systems. According to the International Water and Sanitation Centre (IRC), community management of water supply is fundamental for sustainable development, hence the need to strengthen local institutions (Evans and Appleton, 1993). The National Water Policy (NWP) of Ghana places emphasis on Community Water and Sanitation Programme (CWSP) which considers community participation and involvement as the institutional framework for pursuing water delivery (Government of Ghana, 2007). Key components of this framework are the community level Water and Sanitation Boards (WSDBs) and Water and Sanitation Committees (WATSANs).

Community-based resource management (CBRM) takes varied forms and covers a range of resources. Fundamentally, the concept recognizes the capacity of local community members who take charge of their

own resources in a flexible participation and partnership with supporting institutions. CBRM therefore recognizes the role of user groups and also acknowledges interactions with institutional actors and regulatory frameworks (Meinzen-Dick and Knox, 1999). Several factors account for effective CBRM including local knowledge and capacity as well as incentives such as benefits to be derived from the resource (Murphree 1991). There are also some factors that may not enhance effective CBRM. They include: loss of knowledgeable individuals, weakened collective action, diminished reliance on natural resources, weak community leadership, as well as, poorly harmonized local and government efforts (Meinzen-Dick and Knox, 1999). Cooperation seems strongest where the group of resource users is ethnically and economically homogeneous. Very often it is assumed that there is sufficient local knowledge for managing resources sustainably. But community groups may need central and local government support for ensuring compliance of local regulations and managing conflicts (Meinzen-Dick and Knox, 1999).

2.2. Leadership in local resource management

Various international for a on water have called attention to community management of services and the need to strengthen local institutions in implementing and sustaining water and sanitation programmes. Such interventions are seen as fundamental in developing national programmes for sustainable development (Evans and Appleton, 1993). Leadership in local resource management is key to sustained and effective management of community water supply.

Leadership refers to the ability to influence and inspire confidence in people usually in a social setting with the aim of accomplishing a desired goal (Kim and Maubourgne, 1992). Hence leadership is not practiced in vacuum. The presence of a leader presupposes a followership. Dubrin (2007) suggests that people at different levels and positions in an organization or society show leadership qualities. Thus leadership quality is not reflected only in people in high level positions (Dubrin, 2007). Rather it cuts across different segments of society and exhibited in both formal and informal situations.

2.2.1. Conceptualization of leadership

Many scholars view leadership as either a partnership or long term relationship between the leader and group members. Block (1993) conceptualizes leadership as a partnership in which control is shifted from the leader to the group members in a move away from authoritarianism and towards shared decision making. Based on Block's conceptualization, effective leadership for water resources management projects would involve diffusion of authority (decentralization) from the top (government) to the community level and would also involve leadership that supports community involvement, participation and empowerment in water resource management projects.

Looking at leadership as a partnership is linked to an optimistic view of group members (community members or followers), referred to as stewardship theory. This theory depicts group members (or followers) as being collectivists, supportive of a project and trustworthy. Thus, where the leadership believes that group members or community members within the context of community based initiatives at water resources

management, are more likely to take stewardship of their own resources, it leads to diffusion of responsibilities and a more effective and decentralized system of water governance.

Where the right community leadership exists, it helps to maintain the interest and commitment of the community members (Evans and Appleton, 1993). However, where there is no such leadership or when recognized leaders are frequently absent, interest may wane. This underscores the importance of local leadership and belabours the point that sufficient attention be paid to identifying and involving key individuals and institutions in water supply projects.

A second view of leadership conceptualizes leadership as a relationship (Dubrin, 2007). This view sees leadership as a relationship between the leader and the people being led. In order to accomplish a desired goal, it is important for the leader to have good relationship with the group members (Kouzes and Posner, 2002). Thus, where strong and effective leadership exists, there is less disputes and conflicts. As would be shown in this paper, the partnership and relationship views of leadership both come to the fore in managing water resources in the study area. The nature and balance of these forces affects the success or otherwise of water resources management either negatively or positively.

In sharp contrast to the view that effective leadership is related to performance, there are other views challenging the importance of leadership (Dubrin, 2007). Some argue that leadership has negligible impact on organizational accomplishments and that whatever gets accomplished depends on the situation and not leadership (Dubrin, 2007). Such view however has little support and the dominant view has been that leadership influences performance and affects projects and programmes outcome.

2.2.2. Leadership versus management

The literature makes a distinction between leadership and management. Leadership is a major part of management, but management also involves planning, organizing and controlling. Leadership on the other hand is said to deal with change, inspiration, motivation and influence (Dubrin, 2007). Thus leadership is an important ingredient of effective management.

2.2.3. An integrated framework of leadership in water resources management

Based on our review of concepts of leadership, our conceptualization of leadership is that of both a relationship and a partnership. Thus in our view, leadership involves good social relationship with followers that do not antagonize group members, results in reduced disputes and conflicts as well as one that diffuses responsibility through decentralizing power and empowerment of local communities to take initiatives in managing their water resources while providing feedback to higher authorities and vice-versa. Our view therefore is consistent with Robbins' (1997) conceptual framework for understanding leadership. Robbins' (1997) framework focuses on the major sets of variables that influence leadership effectiveness (Figure 1). The assumption underlying the framework could be summarized thus:

$$L = f(l, gm, s) \quad (1)$$

The formula means that the leadership process is a function of the leader, group members (followers) and other situational variables (Hersey et al., 1997). In other words leadership does not exist in vacuum but takes into account factors related to the leader, the person or person being led and a variety of forces in the environment (Dubrin, 2007).

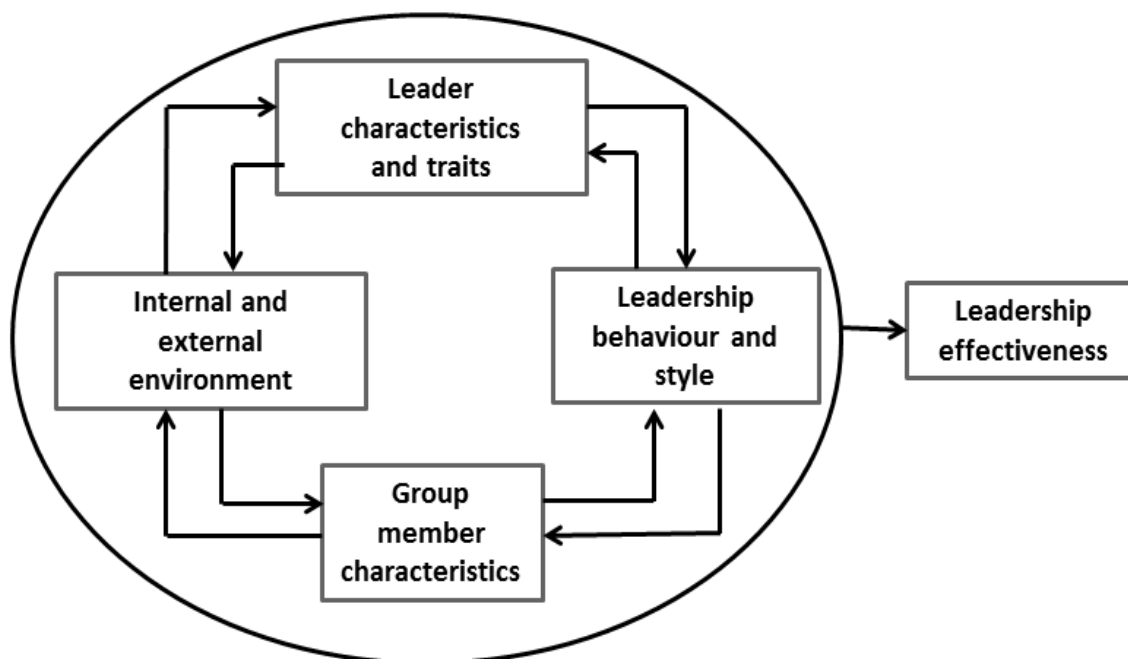


Figure 1. A framework for understanding Leadership (Source: Robbins, 1997)

The model presented in Figure 1 extends this situational perspective (Robbins, 1997). To understand leadership, one has to examine the key variables in the model. Leadership effectiveness on the right side of the framework refers to attaining desirable outcomes such as productivity, quality, satisfaction and success in a given situation. Thus whether or not leadership is effective depends on the four sets of variables.

Leader characteristics and traits refer to inner qualities such as self-confidence and problem-solving abilities that help a leader function effectively in many situations (Dubrin, 2007). The activity that the leader engages in constitutes leadership behavior and style and attributes shown by the followers that would define how effective the leadership is, constitute group member characteristic in the model (Robbins, 1997). According to Dubrin (2007), intelligent and well-motivated group members for example, help the leader to do an outstanding job.

The internal and external environment also influences leadership effectiveness. Thus a leader in a culturally or ethnically diverse environment, for example, will need to have multicultural or “multiethnic” skills to be effective. This situation was observed in the present study. In some communities with large

migrant populations, the ethnic constitution of the community affected the effectiveness of leadership and the effectiveness of leadership was also constrained by the ethnic makeup. This therefore suggests a shift in management paradigm of water resources of communities with ethnically diverse background.

The connecting arrows shown in the model suggest a reciprocal influence among the variables. Thus for example, the leadership characteristics and traits could influence the leadership behavior and style and vice-versa.

3. Methodology

3.1. Study area

The Kogyae Strict Nature Reserve (KSNR) is located in the northeastern part of the Ashanti Region of Ghana (Figure 2). It is classified as a category 1a protected area by the International Union for Conservation of Nature (IUCN) which is defined as:

“A strictly protected area set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring” Dudley (2008).

The reserve lies in the forest-savannah acetone, within the Guinean Forest of West Africa biodiversity hotspot (European Union, 2010). The reserve covers an area of 33,618 ha and shared by the Kumawu and Kwamang traditional areas in the Sekyere West District of the Ashanti Region. In historic times, the area was set aside as a cultural heritage site in recognition of its role as a meeting ground for the two traditional areas, who joined forces there to repel invading enemies. In 1952, the colonial Gold Coast government acquired the site as the Kujani Bush Forest Reserve. In 1962, the Ghana Government earmarked it as a forest reserve and it was gazetted in 1971 as a Strict Nature Reserve under the Wildlife Reserves Regulations of 1971 (L.I. 710). The reserve is to preserve the natural vegetation and animal life and to check the southward extension of the savannah (Hagan, 1998). To date, each of the two traditional areas still lays claim to the site because they were not fully compensated contrary to the State Lands Act of 1962, Act 125, which stipulates that adequate compensation be paid on all state acquired lands (Hagan, 1998).

The area is underlain by the Voltaian geological system made up of sandstone, shale mudstones and conglomerate of the Afram Plains physiographic region (Dickson and Benneh, 1995; Yidana et al. 2008). The region is generally low-lying with average height of about 120m above mean sea level. Few areas within the reserve have relatively higher elevation, attaining heights of between 215m and 230m above mean sea level. These areas serve as watershed for a network of streams that drain into the main rivers, the Afram and Sene. The climate of the area exhibits characteristics of the forest-savannah transition zone. Annual rainfall values average about 1,360mm with annual temperature averaging about 28oC (Wildlife Department, 1994). Figure 3 shows the annual rainfall and temperature distribution. The vegetation is the transitional forest, riparian

ensures a fair geographical coverage of the communities on the perimeter of the reserve. Data for the study were obtained from both primary and secondary sources. The primary data were obtained using participatory rural appraisal (PRA) techniques involving focus group discussions, formal and informal interviews and participant observation at the community level. There were also direct interviews with officials of DAs and World Vision International (WVI). Information gathered centred on general environmental conditions, water resources, land-based activities which exert multiple pressures on water resources, community leadership and knowledge, and water management systems. Other information obtained included the ethnic profile of the communities. Key informants in the communities including the assemblymen were engaged in informal interviews. Follow-up visits were also made to the communities for clarification on some issues. Participation in the group discussion was voluntary. In all, a total of 80 participants were involved in the discussions in the three communities (Table 1).

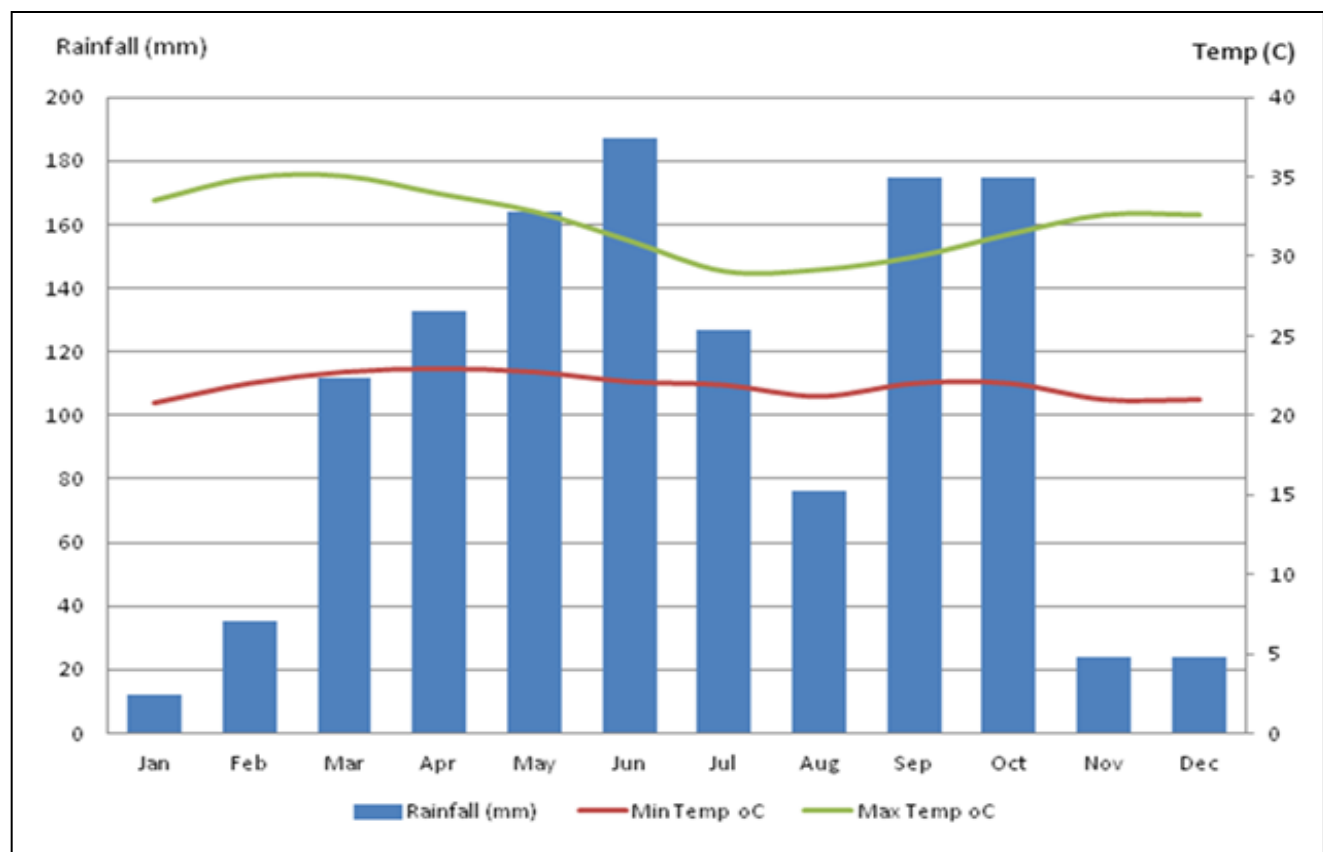


Figure 3. Average rainfall and temperature data based on the WorldClim 50 year monthly climate data (Source: European Union, 2010)

Table 1. Number of Participants at Focus Group Discussions

Community	No. of Males	No. of Females	Total
Berem	18	10	28
Dome	12	19	31
Oku Nkwanta	11	10	21
Total	41	39	80

4.1.1. Qualitative data analysis

The study is largely qualitative in nature. This method was chosen because qualitative techniques allow researchers have better insight into how resource users understand and frame the resources they depend on as well as their perceptions and values (Berg, 2004). Thematic technique was employed in analyzing the qualitative data. This was done by breaking down the responses into various themes for orderliness and systematic presentation. In addition, facts and opinions commonly expressed by majority of the respondents were taken as factual statements. Guided by the responses, detailed description of knowledge of the causes of multiple pressures on water resources was done to give a comprehensive account of the facts and opinions expressed. Where necessary, direct quotes from some of the respondents were presented.

5. Results and discussion

This section discusses the findings of the study along the following themes:

- Community water resources and water use
- Current land-based activities and water resources
- Existing water management systems

5.1. Community water resources and water use

The major sources of water for the three communities are streams, dugouts and boreholes (Table 2). The streams are first order streams of the Afram and Sene arms of the Volta Lake (Figure 3).

They are swift flowing during the rainy season but the volume of water in the stream channels reduces considerably during the greater part of the dry season between January and April. There are three boreholes at Dome and three at Oku-Nkwanta, which were provided by the World Vision International. Only 4, out of the ten, boreholes at Berem were functional during the period of research. The dugout at Oku Nkwanta was constructed by the Catholic Mission whereas that of Berem was constructed by the community.

Table 2. Water resources in the study communities

Community	Water Resources		
	Streams	Dug out/Pond	Boreholes
Oku-Nkwanta	Oku	1	3
Dome	Asubonsu		3
Berem	Adusanti Bene Abetinsua	1	10

The main uses of water are for domestic and agricultural purposes. Although all the three communities are farming communities there are no irrigation systems. However at Oku-Nkwanta and Berem the flood waters of the immediate banks of stream channels are utilized for rice cultivation.

In all the three communities the discussants mentioned that there is evidence of reduced water supply in the boreholes during the dry season since they have to apply extra effort to pump water. They queue to fetch water during the peak hours of the dry season.

5.2. Land-based activities

Knowledge of the land-water interactions, properly planned and evaluated, could provide some of the much needed basis for the effective management of water resources. Historically, habitat and land use change have had the biggest impact on biodiversity across biomes. For terrestrial ecosystems, the most important direct driver of change has been land cover change. Deforestation, forest degradation and agriculture are currently more extensive in Ghana. To this effect one of the objectives of the study was to examine land based activities and how these affect the relationships between the aquatic and terrestrial ecosystem compartments.

5.2.1. Agriculture

As already mentioned crop farming is the dominant land-based activity in all the three communities. The major crops grown are yams, maize, cassava and cowpeas. At Berem, plantain is cultivated in the forested zones of the community land. Rice is also grown in swampy areas and in stream channels of Oku Nkwanta and Berem leading to disappearance of riverine forest. Women specialized in cultivation of vegetables, mostly on subsistence basis, alongside the production of basic food crops.

In all the three communities the discussants mentioned the increasing use of agrochemicals among farmers and acknowledged the benefits. According to them agro-chemicals enhance higher crop yield and reduces labour cost as well as time spent in weeding. But they also mentioned the negative effects of agro-chemicals on the soil. They indicated that continuous application of weedicides results in:

- soil compaction;
- proliferation of the “*kyenkyema*” grass;
- pollution of streams which has affected fish stocks in the area; and,
- scarcity of snails and mushroom

Other small-scale subsidiary activities that cut across all communities include the raising of small ruminants including goats, sheep and pigs, as well as, poultry (mainly chicken). Cattle rearing was also mentioned by the community members at Oku Nkwanta but this involves Fulani settlers.

5.2.2. Charcoal burning

Charcoal burning was identified as an important land-based activity especially at Oku-Nkwanta and Berem. It was estimated that 30% of the farming population engage in this activity. Charcoal burning is undertaken both on commercial basis and for household use. At Berem, discussant mentioned that traditional charcoal production gang, who are predominantly Sissalas, are migratory in their operations and have moved into frontier zones. However, other community members have adopted charcoal burning as a secondary and off-farm activity. At Dome charcoal burning is undertaken on a limited scale and only for household use. They explained that the community leadership discourages the activity through sensitization on its adverse effects on the land. They emphasized that community members are encouraged to report to the chief individuals felling trees for commercial charcoal production.

At Berem, and Oku Nkwanta, the community members explained that continuous harvesting of trees for charcoal production has contributed to the changed flow regime of the streams which are annual. They summarized the effects of the harvesting of trees for charcoal production as:

- changing the micro weather conditions in the area;
- exposing the soil to direct sunlight and thus reducing its fertility; and,
- destruction of the top soil which they explained as: “*burning of charcoal on the farmland cooks the soils and kills all nutrients and living organisms in the soil*”.

5.2.3. Trading

Petty trading is undertaken mainly by women in all the communities. Some women at Dome engage in the processing of *dawadawa*, since the trees are conserved as part of the community environmental regulatory measures. This activity is traditionally associated with women from the northern sector of the country. Thus the engagement of the indigenous women of Dome in *dawadawa* processing provides an example of changing occupational patterns among ethnic groups and individual community members. This can be viewed as economic diversification at the household level.

5.3. Water management systems

Stakeholder participation is critical in decision-making (Simonovic and Akter, 2006), and is especially important in the efficient management of water resources at the local level (Hetland, 2008). In addition,

involving all relevant stakeholder early in the management process helps prevent marginalization of vulnerable groups and potential conflict (Lawson and Bentil, 2014; Prager and Nagel, 2008). This section examines roles by leadership and institutions in water management and how water use conflicts are managed.

5.3.1. Leadership and water management

The issue of lack of effective leadership as well as poor participation in local water resource management came up during the discussions in the study communities. Key players in water governance at the local level include the traditional authorities. In many places customary law is still effective and people believe in the deities and taboos. For example, farming along riverbanks, which were considered the resting abode of the river gods (and their children) were forbidden. In small rural communities, management of water resources are guided by traditional knowledge within the context of customary laws, in this case, the Akan Customary Law. Under the law water resources including rivers, streams, lakes and ponds are not privately owned. They are community property and vested in community leadership (Opoku-Agyemang, 2005). The use of the resource should therefore not interfere with the public interest. For this reason, the entire community is responsible for protecting their water resources with the chiefs, clan heads and religious leaders having the oversight responsibility.

It emerged during the discussions that effective community leadership and consensus building among community members are essential for efficient management of water resources. At Oku Nkwanta and Berem discussants attributed the uncontrolled felling of trees for charcoal burning, clearing of riverine forest and extension of farming plots into river channels to weak community leadership and loss of traditional values. Local taboos that used to protect land-use practices have been abandoned apparently due to leadership problems in Oku Nkwanta and Berem. At Oku Nkwanta, the respondents emphasized that there are no effective management strategies for the river basins in the community. They explained that:

“We had rules against tree cutting but they do not exist anymore. The first chief did not allow mats at the river site. The village headman is weak and does not care about the environment. It is also difficult for us to build consensus to protect the river basin with a weak village head due to the different ethnic backgrounds of the settler communities”

Both Oku Nkwanta and Berem are under the traditional authority of Kwaman which is a major town. Oku Nkwanta is at the bottom of the traditional hierarchical structure and derives authority from Kwaman through Berem. The village headman is a representative of the sub-chief (*Odikro*) of Berem. Unlike Dome, the two communities are heterogeneous which means they have a mix of Asantes (Kwamans) indigenes and people from different ethnic backgrounds mainly from the northern part of the country (Table 3). As a result, there is the difficulty of achieving consensus among community members in view of factional mistrust and simmering tensions. The situation has been compounded by lack of substantive leadership in the two communities because of several years of dispute over occupancy of the Berem chieftaincy stool. The

communities are loose in terms of organizational structure and therefore unable to build consensus to promote common agenda.

Table 3. Population and ethnic composition of study communities

Community	Population*	Dominant ethnic groups
Oku Nkwanta	271	Gruma, Dagarti, Konkomba Asante Krachi
Dome	383	Asante
Berem	2,542	Asante, Sisala, Mamprusi, Frafra, Gruma, Dagarti, Krachi,

*Source: Ghana Statistical Service (2005)

Out of the 10 boreholes at Berem, only 4 are functional because of non-payment for water use by community members to enable the WATSAN repair the pumps. Some community members complained bitterly about stray pigs which water themselves in the in the dugout. According to them the DA and the police have been slow in helping them to find a lasting solution to the problem. Similarly, the dugout at Oku Nkwanta has been polluted due to uncontrolled use and lack of discipline on the part of community members in protecting it. The residents apply alum to the water to reduce its turbidity.

At Dome there is high environmental stewardship on the part of the chief and elders of the community as well as individual members. As already mentioned charcoal burning for example is discouraged and undertaken on a limited scale. Those found engaging in commercial charcoal burning are sanctioned by the chief and elders. This observation is in stark contrast to what prevails at Oku Nkwanta and Berem. The evidence is that the Dome community is largely made up of individuals of the same ethnic background and these accounts for strong cooperation and ease of consensus building among members. The chief of the community blamed the district forestry office of the Forestry Commission for the extensive tree felling and charcoal burning in the region.

5.3.2. Institutional roles and water management committees

The government institution designated by law to be responsible for development in the study area is the District Assembly (DA). The DA plans, implements, operates and maintains water and sanitation facilities within the study area. In addition, several other institutions with varied mandates such as Community Water and Sanitation Agency (CWSA) and Ghana Irrigation Development Agency (GIDA) exist. In all the communities however, the World Vision International (WVI) is seen as the most supportive in providing boreholes. In line with the National Water Policy (NWP) which encourages community-based water management, WATSANs have been set up in the communities. The local committees have strong women representation based on the stakeholder policy of putting women at the centre of water management. This is

because women are more involved with the day to day activities of fetching water for cooking, drinking and bathing their children, among others. The WATSANs undertake the following activities:

- keep the borehole area neat at all times;
- take decisions regarding the opening and closing hours of the pipes;
- charge token fees per bucket of water; and,
- safeguard the boreholes at all times from inappropriate use and/or vandalism

Under the management framework, a pump maintenance committee has also been established and trained to regularly maintain and repair pumps. Proceeds from sale of water are expected to be used to maintain the boreholes and repair the pipes in the event of damage. The Manager of WVI in the region cited one community, Samari Nkwanta, which has managed to use WATSAN's proceeds to put up a classroom block for the school children. Thus, the benefits derived from the boreholes have extended beyond the water needs of the local people and the WVI sees this as a model of how local capacities could be boosted by effective organization.

The community members emphasized that construction of the boreholes has also contributed to reduction in cases of guinea worm infestation. However, a major challenge threatening the sustainability of the water governance framework is when community members refuse to pay the token fee for water. Non-payment for water has partly affected the Berem WATSAN to repair the broken down pumps. Through informal interviews, it was revealed that WATSAN members at Oku Nkwanta have been cited for lack of proper accountability and transparency with respect to proceeds from payment for water. This has become a delicate issue in the community. Thus, without proper mechanism to ensure accountability, there is the tendency for people to take advantage of the leadership crisis to empower themselves illegally. Fallout of this is that community members are reluctant to participate in communal labour.

Another challenge facing effective community-based water management system is when a member of the community with knowledge of pump maintenance moves out of the community. This underscores the need for proper succession planning and local capacity building.

5.3.3. Management of water use conflict

An instance of conflict arising out of multiple water use was encountered at Berem. This resulted out of attempts by the indigenes to prevent pigs owned by migrant households from watering themselves in the community dugout. In such efforts some of the pigs were killed and this sparked conflict between the indigenes and the migrants. The police intervened to resolve the crisis. Considering the scarce water resources in the community the Unit Committee, which represents the community at the DA, has drafted by-laws which seek to address the issue of stray animals in the community. The bill is yet to be passed by the DA. This initiative at managing potential conflict arising out of multiple water use can be effective with local government support involving the District Environment and Sanitation Office and the law enforcement agencies. There is also the need for strong and effective community leadership, consensus building among community members as well as sensitization and education of community members.

6. Concluding remarks and policy implications

Improved access to water supply is essential for sustainable community livelihood. This has become even more pertinent in view of increased modification in environmental conditions and climate change which affect water supply. In line with current development strategy of international and non-governmental organizations engaged in water projects, the Ghana Government emphasizes greater community participation in the management of water resources and water supply systems under the national water policy. As a result, WSDBs and WATSANs have been formed in many communities to empower the local population to manage their own water resources. Several lessons could be learnt from the ways the community-based organizations have operated under different local settings.

This study has revealed that the influence of chiefs is a strong factor in the management of water resources and environmental stewardship. Strong and effective community leadership engenders good social environment for effective performance of the water management committees. Good leadership can foster cooperation among the water committee members, between the water committee and the community members as well as among entire community members. Proper accountability of proceeds from sale of water to community members and transparency in the operations of the committees are also essential ingredients for sustainable management of community water resources. Lack of transparency and embezzlement of funds can be the bane of community water projects. Local community institutions should be empowered with the support of the DAs and the law enforcement agencies to resolve conflicts arising out of multiple water use and maintaining good environmental stewardship.

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