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Abstract

This paper examines water management policies and institutions in the Ghanaian and Burkinabe portions of the Volta Basin of West Africa. The paper begins with a brief historical overview of political, cultural, and environmental developments in the basin since the late 19th century. Customary approaches to water management in the Volta are described next, followed by colonial and post-colonial water management developments in Ghana and Burkina Faso. The interplay between formal and informal water management institutions in the watershed is then analyzed so as to understand how conditions changed due to national-level developments. Finally, the paper examines transboundary actors and developments in the Volta basin.

Introduction

The Volta River Basin is the 9th largest in Africa, encompassing approximately 417,000 km2 in area and generating more than 32,000 million cubic meters in mean annual runoff (Challenge Program for Water and Food, 2003; FAO, 2001). The basin contains people from more than fifty ethnic groups and parts of six African nation-states (Ghana, Burkina Faso, Mali, Cote d'Ivoire, Benin and Togo), each of which endured different colonial experiences and adopted different post-independence trajectories of development (Buah, 1998; Oxfam, 2000). While interesting research has been conducted on the historical developments of water policy and institutions in the basin (Gordon and Amatekpor, ed., 1999; Andreini et al., 2000; Lund, 2002; Odame-Ababio, 2002; Opuko-Agyemang, 2001b), this research has generally been from the perspective of one of the six riparian nation-states rather than from an integrated basin approach.

International interest is nevertheless growing in basin-wide Integrated Water Resources Management (IWRM) in the Volta (Curtin and Charrier, 2004; Challenge Program for Water and Food, 2004; Niasse, 2004; Odame-Abobio, 2004; Opoku-Agyemang, 2004; Water Resources Commission, 2004). Several reports have therefore comprehensively assessed water resources endowments and use in the basin (Global Environment Facility, 2002b; Challenge Programme for Water and Food, 2003; IUCN, 2004). While these reports are very valuable in their analyses of the hydrologic conditions in the watershed, their assessments of institutional arrangements are somewhat limited. Legal and institutional aspects for natural resources management and its diversity have been rather explored at local level and different regions within the basin (Laube forthcoming, Kuba and Lentz 2006). Our study aims to partially remedy this deficiency through an historical examination of water management structures in the Ghanaian and Burkinabe portions of the Volta Basin in order to draw some general patterns (figure 1).[1]

The paper is divided into six sections. In the first, a broad historical background is provided in order to contextualize water-related developments. The second section examines so called "customary", "indigenous", or "traditional" water management institutions. The third section focuses on the impact of the colonial impositions on water institutions and policy in the two regions. The fourth portion of this paper assesses post-independence approaches to water management and recent water sector reforms. The fifth section examines the interplay between the traditional and national approaches to water management. The paper concludes with a look at transboundary water developments in the basin.

Historical Background

One fundamental reality which should be recognized in any analysis of traditional practices of West African states is that prior to the European colonization of West Africa[2] boundaries were defined due to the diffusion of ethnic groups and indigenous tenure systems in the Volta basin. The existence of the here focused states Ghana and Burkina Faso is the product of the French and British colonization process which began in the 19th century, a process which gave little consideration to the borders of prevailing West African political chiefdoms. While one may therefore speak of customary approaches to water management in the regions of modern Ghana and Burkina, appellations of indigenous "Ghanaian" or "Burkinabe" water management approaches are somewhat inaccurate as these approaches above all epitomize the practices of the ethnic groups which pre-existed the superimposition of the modern nation states (Buah, 1998; Oxfam, 2000).

It should also be recognized that customary water management practices and institutions vary temporally. The traditional water management practices Europeans encountered when they arrived have not simply remained static over subsequent years; neither can it be assumed that these customs were stagnant in the years prior to the European arrival. Rather, customs and traditions are as precedural as anything else. Certain generalizations are made to facilitate analysis in this study, but it should be realized that customary practices have evolved and will likely continue to evolve as Buah (1998) points out for Ghana.

Similar to the transformation processes of indigenous African traditions were French and British colonial policies which showed themselves capable of changing with global and regional realities. The colonial entity of Upper Volta (renamed Burkina Faso in 1984) was dissolved in 1933 and divided among other French colonies before being re-configured in 1947 (Oxfam, 2000). The Gold Coast (renamed Ghana upon independence) was ruled as three different entities, each of which accorded different degrees of control to local authorities, before the British finally consolidated the different territories in the late 1940's when the country was put on the path to independence. Just prior to independence, the country again changed form, incorporating a portion of Togoland (Buah, 1998).

Following the independence of Ghana and Upper Volta in 1957 and 1960, respectively, both states implemented programs of economic development with varying degrees of success. While both countries experienced their share of political instability, Ghana and Upper Volta possessed relatively small populations and unexploited natural resources bases in the early years of independence. Hence the development paths of the two countries were not impeded by demographic pressures or natural resource stress. In the last decade, however, changing demographic and resource realities in Ghana and Burkina have combined with shifts in international development strategies to result in the integration of concepts like sustainability and IWRM into national development policies (Buah, 1998; Oxfam, 2000; Ministère de L'Agriculture et des Ressources Halieutiques, 2003; Ministry of Works and Housing, 1998a; World Commission on Dams, 2000).

Customary Water Management Institutions

The body of literature concerned with customary water management in Ghana and Burkina has grown considerably in recent years (e.g., Odame-Ababio, 2002; Opoku-Agyemang, 2004; Ramatou, 2002; Zone, 2002). Opoku-Agyemang (2001a; 2001b; 2004) has been particularly active, explaining how indigenous institutions in Akan cultures (which occupy much of the southern Volta basin) invariably tie management of natural resources to their religious belief system. According to Akan beliefs, the earth was accorded a spirit of its own, which could be helpful if propitiated or harmful if degraded. Land was inherited from the ancestors. Chiefs and priests, entrusted with ensuring that ancestors and gods received proper respect, exercised control over the land and its resources to promote conditions which were beneficial to the environment and sustainable for communities (Opoku-Agyemang, 2001a; Opoku-Agyemang , 2001b; Ministry of Works and Housing, 1998).

To achieve their goals, chiefs and priests enforced a set of rules which were intended to protect the earth and regulate use of natural resources. Most importantly, a river's waters were considered holy. Desecration in or around them was therefore prohibited as was farming on river banks (as these areas were considered resting abodes for river gods and their children). Further, beliefs concerning tree deities entailed demarcation of certain forest areas as sacred groves (in which no human activities were permitted), thereby minimizing deforestation and soil erosion. In addition, certain areas were usually designated for gathering water and these areas were

generally (and logically) situated upstream from areas of other activities which may harm the water. Finally, certain days of the week entire activities such as washing clothes, water abstraction, or fishing were prohibited—helping to make use of water and exploitation of resources therein more sustainable (Ministry of Works and Housing, 1998b; Ministry of Works and Housing, 1998d; Odame-Ababio, 2002).

Assuming these rules were upheld, surface water was considered a public good and every individual possessed right to its use (Ministry of Works and Housing, 1998d). The overarching customary principle applying to surface water permitted water users to take as much water as they could personally carry so long as there remained enough water for others (Opoku-Agyemang, 2004). While there is some uncertainty surrounding the right to consumptive use of groundwater, it appears that in most communities a person with right to a piece of land was allowed to tap the water beneath that land. Whether groundwater or surface water, the resource was considered community property and therefore free (Ministry of Works and Housing, 1998d, FAO 1996). At this point it has to be mentioned that the management of natural resources like land and water was not that homogenous than often described. Legal pluralism and conflicts over properties were also issues in pre colonial regimes and widely contested between lineages and clans. It can be stated that pre-colonial tenure arrangements formed complex indigenous systems that allowed local communities to continue their traditional practices of subsistence farming and cattle herding (Lentz 2006, 6).

The practices and institutions prevalent in Ghana appear largely similar to those found in the Volta's upper reaches in Burkina Faso. A couple of examples taken from the regions occupied by the Mossi (who comprise over 40% of Burkina Faso's population) indicate that here water is treated as sacred, too, and regulatory functions are played by chiefs and priests to maintain sanitation in villages and promote a certain degree of conservation. Sustainable water management practices were achieved through measures similar to the Volta's downstream portions; "traditional [water] management is founded on practical logic", wrote a French observer to colonial Upper Volta. (Institut des Sciences Humaines Appliquées, 1958; Ramatou, 2002)

Similar to the Ghanaian portions of the basin, water was both a private good and public property. The resource belonged to the entire community, but could be used for personal benefit as long as the collective good was not harmed (Ramatou, 2002). Land tenure appears equally similar to the examples in the Ghanaian regions of the Volta basin, as inheritance stemmed from the ancestors while chiefs (chef de la terre) and earth priests (of maitre du sol) wielded regulatory powers. Drinking and household use of water was (and still is) under the control of earth priest (FAO 1996). One final caveat must be added. In Burkinabe regions of the basin, a higher percentage of the population was (and is) Muslim, which may alter many of the traditional religious beliefs on which customary water management is based. Many examples of religious syncretism nevertheless pervade the region, allowing traditional practices and institutions to persist in an altered form; in an example from the Sourou region, sacrifices to the river gods were discontinued while most other traditions preserved (Institut des Sciences Humaines Appliquées, 1958).

The Colonial Impositions

While it can be assumed that the customary water management practices and institutions evolved relatively independently for centuries, the British and French colonial incursions substantially altered the geographic and institutional landscape of the region. In the decade following the 1885 Conference of Berlin, the British, French, and Germans colonized

virtually all of West Africa. Largely unconcerned with (or unaware of) existing ethnic and hydrologic boundaries, the Volta River Basin was divided among the British colony of the Gold Coast (later renamed Ghana), several regions of French West Africa, and temporarily German Togoland.[3] Colonial powers employed their political (and military) power to impose new territorial boundaries and new concepts such as land and water ownership (Buah, 1998; Oxfam, 2000).

In the Gold Coast colony, colonial legislation relating to water consists primarily of two key documents (Lund, 2006; Opoku-Agyemang, 2001b; Ministry of Works and Housing, 1998b).[4] The first of these, the 1903 River Ordinance, applied to several rivers including the Volta. Although the document was above all concerned with river navigation, it regulated use of water by declaring that the colonial government must approve water use for irrigation, mines, and power generation (Opoku-Agyemang, 2004; Ministry of Works and Housing, 1998b). A second piece of colonial legislation, the 1949 Forests Ordinance, was primarily intended to regulate the protection of forests. However, the ordinance stipulates that the forest authority must approve construction of a dam or weir in any river and such a construction should not obstruct the flow of water in any forest reserve (Opoku-Agyemang, 2001b).[5]

As a British colony, the Gold Coast was subject to a common law legal system. The owner of land contiguous to a source of water was entitled to access and withdraw water from that source so long as his land was in daily contact with the water body (Opoku-Agyemang, 2004). In essence, then, a foreign British colonial system relating to water management was imposed on those which were pre-existing, meaning that (at least) two systems of water management—state-sponsored and community-regulated—were concurrently practiced (Lund, 2006). It appears these systems existed more in parallel than in conflict, as British colonial policies allowed for the persistence of certain levels of tradition. (Lund, 2006; Odame-Ababio, 2002).

As colonial and traditional water management practices are related to land tenure, focus is now given to British colonial policies concerning land, which were marked by inconsistency and ambiguity (Lund, 2006). Agreements in the Gold Coast were made to allow for the persistence of native tribunals yet a 1901 Ordinance gave the Chief (Colonial) Commissioner widespread authority to control allocation of land. Subsequent ordinances in the 1920's and 1930's provide similarly contradictory evidence. It nevertheless seems in practice that desirable land, e.g., land used for mining or railway construction, generally became property of the colonial administration while "natives" maintained control in other areas (Lund, 2006).

In areas in which traditional land and water management practices persisted, such practices often underwent a process of modification due to outside influences. Though priests and chiefs continued to regulate water management institutions in these areas, introduction of outside concepts such as Christianity began to produce changes by the end of the colonial period. A British colonial administrator paying a visit to "native" areas of the Gold Coast in 1948 made a couple of interesting observations: 1) the "traditional" non-farming day was now Sunday, which coincides with the Christian day or worship, 2) chiefs and priests were increasingly viewed as owners rather than mere custodians of the land (Lund, 2006).

As for the Upper Volta, the colonial impact here was somewhat minimal largely due to the inconsistency of French policies. Indeed, despite the French conquest of West Africa by the end of the 19th century, Upper Volta was not established as a distinct territory until 1919. The colony was then dissolved in 1933, only to be reconfigured in 1947 (Oxfam, 2000). A recently released government document reveals that even in the first decade of independence, Upper Volta was characterized by a "politique non-formulée"; i.e., an unformulated or unwritten policy in relation to water (Ministère de L'Environment et de L'Eau, 2001). While Upper Volta—as a

French colony— was subjected to civil law and the water implications derived therefrom, it appears that the national government made little headway in imposing any national water policy during the colonial period judging by documents concerning water management in Upper Volta (Institut des Sciences Humaines Appliquées, 1958, Ramatou, 2002).

Finally, before proceeding into post-colonial water management developments, it should be recognized that the Volta Basin became transboundary by virtue of the border drawn by the British, French, and Germans. To establish this boundary and regulate the use of the waters flowing from one side of the border to the other, the British and French signed the "Exchange of Notes between France and Great Britain relative to the Boundary between the Gold Coast and French Soudan" in 1906, which effectively stated that traditional "native" practices relating to water withdrawal and use should be allowed to continue despite the imposition of a new border (TFDD, 2004).

Volta Basin Water Management in Post-Colonial Ghana and Burkina Faso

Following independence of Ghana and Burkina, the two countries (as well as the Volta's other riparians) generally pursued their own water-related agendas with little concern for impacts outside their states. Between 1957 and 1996, there were only two international agreements concerning the Volta's waters, and neither of them effectively integrated the water management and development plans of riparian countries. In 1962, an agreement was signed by Togo and Benin to purchase electricity (generated at Akosombo dam) from Ghana (Assouma, 2004). In 1973, an international agreement was signed by all six riparians to control the spread of Onchocerciasis in the basin (United Nations, 1984). Absent was any international agreement containing a coordinated approach to water management among the different riparian states.[6]

Not only was there a lack of integrated water management among any of the six basin-states, however, there was often a lack of coordination among various institutions within riparian states (Ministry of Works and Housing, 1998a). Within Ghana, water-related institutions often implemented plans which ignored the aims of other institutions as well as applicable laws. The 1903 River Ordinance and 1949 Forest Ordinance were still in effect, yet three major government institutions acted as if these rules did not exist in order to achieve their goals (Mensah, 1999; Ministry of Works and Housing, 1998a).

The first of these water management institutions established in independent Ghana was the Volta River Authority (VRA). Created in 1961, the authority was responsible for the generation of electrical power and development and maintenance of the reservoir. To carry out its goals, the VRA was entrusted with regulating the abstraction of water in the Volta basin for purposes other than domestic use (Mensah, 1999; Ministry of Works and Housing, 1998b; Ministry of Works and Housing, 1998d).

The next major water management institution created in Ghana was the Ghana Water and Sewerage Corporation (GWSC), launched in 1965. The organization was charged with provision, distribution, and conservation of the nation's water resources for public, domestic, and industrial purposes. The institution was given priority over other water authorities, yet the VRA maintained exclusive rights over the Volta lake and rivers (Mensah, 1999; Ministry of Works and Housing, 1998d).

The creation of the Irrigation Development Authority (IDA) marked the inception of the last major water-related institution in Ghana until the 1990's. Established in 1977, it was

responsible for the development of irrigation for farming, livestock improvement, and fish culture. Although the IDA undertook water diversion projects to fulfill its objectives which may have impacted the efforts of other water management bodies, it appears that there was a little cooperation among the IDA, VRA, and GWSC (Mensah, 1999; Ministry of Works and Housing, 1998b; Ministry of Works and Housing, 1998d).

While there was a theoretical hierarchy among these three water management institutions in Ghana, there was virtually no practical integration. Each institution sought to fulfill its own objectives irrespective of whether pursuit of these objectives affected the efforts of other organizations (Mensah, 1999, van Edig et al., 2003). Although there was presumably an acceptance that the quantity of water in the Volta basin was finite, it seems that the resource's relative abundance afforded policy-makers and development technocrats the luxury of pursuing strategies which implicitly assumed that developments in one sector had no impact on the efforts of another sector (Ministry of Works and Housing, 1998b; Ministry of Works and Housing, 1998c; Ministry of Works and Housing, 1998d).

Burkina Faso's water management displayed a similar lack of coordination, though Burkinabe institutions were forced to adapt to the conditions of water stress that the country endured. In the 1970's, severe droughts struck the Sahel and manifested Burkina's vulnerability to years of low precipitation. Following these droughts, Burkina Faso's water policies have above all been oriented toward ensuring a basic supply for all and minimization of the vulnerability to spells of low precipitation (Ministère de L'Environment et de L'Eau, 2001).

The first institution directly related to water to be formed in Upper Volta was the Colonial Society of Energy, which was created in 1954 to handle the development and allocation of energy and electricity. Its name was changed to African Electricity Society in 1968, then subsequently to the National Water Society and the National Water Office. Evolving in parallel was the Center for Hydraulic and Rural Supply (DHER), created in 1965, which concerned itself primarily with extending water supplies for domestic use (Ministère de L'Environment et de L'Eau, 2001). The National Office of Dams and Irrigation (ONBI) was then created in 1976, with the aim of harnessing the irrigation potential of the country. Several water research institutions were formed as well (Ministère de L'Environment et de L'Eau, 2001).

In the 1970's and 1980's, Burkinabe water management institutions continued to proliferate. In response to the droughts of the 1970's, the government formed the Rural Development Fund (FDR) to strengthen the state's capacity to intervene to combat the impacts of droughts and the Water Point Committees (CPE) to facilitate the extension of potable water supplies to rural communities. Attempts were made to consolidate the various institutions in the 1980's, but real institutional integration would not come until the 1990's (Ministère de L'Environment et de L'Eau, 2001).

Influenced by release of the Dublin Principles in the early 1990's, Burkina Faso set out to restructure its water sector with the aid of the World Bank and IMF. In 1995, the government of Burkina Faso created the Water and Environment Ministry (MEE), which then created the General Directorate of Hydraulics (DGH). As a result, water-related activities and interventions in the country achieved much greater organization and coordination (Ministère de L'Environment et de L'Eau, 2001).

Three main institutions implemented the mandate of the DGH. The first of these organizations, the Directorate for Provision of Potable Water (DAEP), was entrusted with extending potable water supplies to urban and rural areas as well as for industrial uses. The second organization employed to carry out the DGH's mandate, the Directorate of Agriculture Hydraulics (DHA), directs and organizes work relevant to water use for agriculture, pastoralism, and energy (Ministère de L'Environment et de L'Eau, 2001; Ministère de L'Agriculture de

L'Hydraulique et des Ressources Halieutiques, 2004). Also created to facilitate the DGH's mission was the Directorate for the Inventory of Hydraulic Resources (DIRH), which documents all water-related activities and interventions in Burkina Faso and conducts studies to identify areas in need of future water-related interventions (Ministère de L'Environment et de L'Eau, 2001).

In 2002, Burkina Faso's water institutions underwent another restructuring following the Johannesburg World Summit on Sustainable Development. The goal of this restructuring was implementation of a programme of Integrated Water Resources Management, known by the French acronym PAGIRE (Ministère de L'Agriculture de L'Hydraulique et des Ressources Halieutiques, 2003). Beneath the Ministry of Water and Environment four permanent departments were suborduinated, three of which were essentially reincarnations of those created in 1995 (Figure 2). The General Directorate of Agricultural Hydraulics (DGHA), the General Directorate for Provision of Potable Water (DGEAP), and the General Directorate of the Inventory of Hydraulic Resources (DGIRH) were all similar to predecessors under the previous institutional arrangement. The General Directorate for Fishing Resources (DGRH),[7] however, was new. The organization seeks to establish a strategy for sustainable exploitation of the country's fish resources and assures the competent management of the fishing industry in the country. It is also entrusted with preserving and protecting aquatic ecosystems (Ministère de L'Agriculture de L'Hydraulique et des Ressources Halieutiques, 2004).

Somewhat similar to the changes in Burkina, Ghana underwent an IWRM-oriented restructuring of its water institutions in the course of the 1990's. Aided by outside actors such as the World Bank and DANIDA the Ghanaian government increasingly adopted the view that its water resources were finite and their use must be coordinated to maximize utility and ensure adequate quality. The drinking water systems in urban and semi-urban areas, constructed partly during late colonial times has been deteriorated and state driven institutions faced serious problems to ensure the supply of potable water Ghanaian government together with the Worldbank and various bilateral donors launched therefore the Water Sector Rehabilitation Project (WRSP) in 1990. In the course of the project 140 million US$ were invested addressing all sorts of inefficiencies in the sector (Laube und van de Giesen 2005). Three new water management institutions were created and a pre-existing one was divided into two in order to create an institutional arrangement adapted to the goals of the Ghanaian water secto, as shown in figure 3 (Mensah, 1999; Ministry of Works and Housing, 1998a; Ministry of Works and Housing, 1998d).

The Environmental Protection Agency (EPA), launched in 1994, was the first of the new institutions to be created. The EPA sought to co-ordinate activities of bodies that generate waste and thereby improve the quality of the environment. Also among its activities was implementation of the National Environmental Plan (NEP), which aims broadly to improve the surroundings, living conditions, and quality of life for Ghanaians (Mensah, 1999).

Following the creation of the EPA, the World Bank collaborated with the Ghanaian Ministry of Works and Housing to initiate a Water Resources Management Study in 1995 (van Edig et al., 2003). The result of this study was a drastic restructuring of the Ghanaian water sector. All laws applying to Ghanaian waters (such as the 1903 Rivers Ordinance) were repealed and riparian rights were no longer recognized. The country's waters now belonged to the president and a permit must be obtained for their use. Further, there was a formal acceptance of the principle that water is an economic good and there should be a cost associated with its use (Opoku-Agyemang, 2004; Ministry of Works and Housing, 1998a; Ministry of Works and Housing, 1998b). Under the auspices of the World Bank water resources allocation decisions were placed within a demand orientation (Fuest and Haffner 2005).

In order to coordinate activities among previously established water institutions such as the VRA, IDA, and GWSC, the Water Resources Commission (WRC) was established in 1996. Not surprisingly, this organization adopted many IWRM-oriented principles and accepted that Ghana's water resources development should be coordinated and managed in a sustainable and equitable manner (Ministry of Works and Housing, 1998a; Van Edig et al., 2003). The WRC thus took responsibility for overall regulation and management of the country's water. (Mensah, 1999).

The third major Ghanaian water-related institution to be created in the 1990's was the Public Utilities Regulatory Commission (PURC). The organization was established in 1997 to regulate the supply, transmission, and distribution of water and power. PURC therefore sets guidelines for rates which could be charged to consumers, and monitors the standards and performance of utility companies (Mensah, 1999; Ministry of Works and Housing, 1998b).

In addition to the creation of the new institutions described above, the Ghana Water and Sewerage Corporation (GWSC) was divided into two. The GWSC, later renamed into the Ghana Water Company Limited (GWCL) stayed in place to manage urban areas and the Community Water and Sanitation Agency (CSWA) was launched in 1998 to extend domestic water supplies in rural areas (Mensah, 1999; Ministry of Works and Housing, 1998b). In response to the slow progress of the previous rural water extension strategy, the CWSA adopted the rather clear objective of supplying all Ghanaians with 20 liters of water per day from a water source within 500 meters and no more than 300 people dependent on a particular source. To facilitate this process of water supply provision international donor support was called in in order to finance the infrastructural needs of the small towns and rural areas. Due international policies the communities introduced a participatory approach and were expected to form a Water Sanitation and Development Board as well as Water and Sanitation (WATSAN) Committee with operational functions. These elected institutions are supposed to partner with governmental District Water and Sanitation Teams (DWST). In some small towns also private service suppliers took over water supply to the communities. While this new decentralized program of action with international financial support seems to be more effective than its predecessor in extending water supplies, some have argued that extension of sanitation has been neglected (Mensah, 1998; Mensah, 1999; Ministry of Works and Housing, 1998b, Laube and van de Giesen 2005). It is also arguable if environmental and financial sustainability for water supply and sanitation services has been achieved.

A final addition to the Ghanaian water management sector came in July of 2004. The Ghanaian Water Directorate was launched to provide an overall policy or strategy for the Ghanaian water sector. It is expected that this directorate will constitute one of the three pillars of the to-be-created Ministry of Water, Public Works, and Housing. Further, this directorate will henceforth be entrusted with representation of Ghana's water interests on the international stage (Borghese, 2004; DANIDA, 2004).

In Practice: Traditional and National Approaches to Water Management

While the previous two sections of this study focus primarily on the Volta's formal water management institutions in the colonial and post-colonial periods, this section focuses on institutional realities in the basin. That is, this section assesses the extent to which national water policies in the two countries have succeeded in altering pre-existing indigenous practices. It also analyzes the potential and desirability for fusion or syncretism between the two types of institutions.

To review, traditional water management institutions pervaded Ghanaian and Burkinabe regions of the Volta basin through the pre-colonial period. While the colonial period gave rise to new colonial-state-sponsored or national policies for water management, these policies only began to take hold in urban areas toward the latter part of the colonial period. Following the independence of Ghana and Upper Volta, the pre-colonial regimes sought to extend national policies to all areas of the country—urban and rural. This has resulted in extension of national water policies to some rural areas, persistence of indigenous water management approaches in other areas, and a combination of informal and formal practices in still other rural areas (Mensah, 1998; Mensah, 1999, Laube forthcoming).

The first large-scale impact of national water policies on the rural inhabitants of these countries resulted from the construction of the Akosombo dam in 1962. While the dam's construction facilitated numerous irrigation projects, it also caused flooding which forced the relocation of 759 villages and approximately 80,000 people in the southern portion of the Volta basin. The social and institutional structures of these villages were generally modified upon relocation, and their water institutions were usually altered by state-sponsored schemes (Barry et al., 2004). In the Upper East Region of Ghana large scale irrigation projects have also created tensions between and among local people and state institutions because the projects missed to include local people into the new resource regimes (Laube forthcoming). In Burkina Faso, numerous dam projects in the Volta basin have extended water supplies to towns and villages which were previously managed according to traditional principles. Such dam projects have most often been used to supply water for irrigation. But potable water for domestic use has often been extended as well (Ministère de L'Eau et L'Environment, 2001).

Extension of state-sponsored potable water supplies, when achieved, works to diminish the control of the traditional authorities over the resource (Mensah, 1998; Mensah, 1999). State-sponsored extension schemes introduce new sources of water, sources to which traditional rules no longer apply. It generally appears that the Volta's rural inhabitants prefer these state-sponsored sources of water (as water from these sources is generally more potable), yet these inhabitants simultaneously retain many of their traditional beliefs about water use (Mensah, 1998; Mensah, 1999). Valuable research may therefore be conducted to find the most effective institutional complements to the physical extension of state-sponsored water supplies, i.e., those institutions which can successfully graft accepted local approaches onto modern state services.

Until the recent IWRM-oriented restructuring of the Ghanaian and Burkinabe water sectors, there was little local-level participation in management of state-sponsored water extension schemes (Mensah, 1999: Ministère de L'Eau et L'Environment, 2001). Water from a public stand-pipe was cheap, but the infrastructure was old and the service was unreliable. Further, the willingness to pay for the new services was low because the new concept of charging people for their use of water created tension. Traditionally there was no such charge (Mensah, 1999). Despite the payments associated with use of water from state-sponsored sources, however, there is a perception among villagers that the use of uncontrolled water sources (open wells, surface water) produce health-related problems (Mensah, 1998). Villagers therefore seek to obtain water from "modern" state-sponsored sources if these sources are available (Mensah, 1999).

By the middle to late 1990's, however, it was clear that state-sponsored water sources were not available to many rural Ghanaians. Indeed, approximately 85 percent of Volta basin inhabitants continued to practice traditional methods of water management. While there were inadequacies in indigenous approaches and institutions, the fact remains that these institutions could serve as conduits for extension of rural water supplies. The WRC recognized this and in the late 1990's took a much more participatory approach to water extension. With the inception

of the CWSP in 1999, WATSANs and District Assemblies began to play a much larger role in the extension of water supplies as traditional authorities were co-opted by the state system (van Edig et al., 2003; Mensah, 1998; Mensah, 1999).

The WRC currently walks a fine line between co-opting traditional authorities and de-legitimizing them (van Edig et al, 2003). This institution is simultaneously counting on their cooperation and weakening their power. In the WRC's "Institutions and Participation" (1998b), the water management body outlines its stance toward customary practices. Four points are worthy of reproduction in their entirety:

- "The removal of superstitious dogmas of tradition on water conservation practices
- Education of masses on proven methods of proper water management systems
- Adoption of customs proven to be efficient means for water conservation and management
- Institutionalization of beneficent customs on water management in formal regulatory systems by means of bye-laws, legislative measures, instrument, and statutes"

The WRC seems to be stating that the rural populations should practice "proper" water management. When customary practices violate those which are proper, customs should be eradicated. When customary practices conform with proper practices, they should be institutionalized (Ministry of Works and Housing, 1998a; Ministry of Works and Housing, 1998b). In fact the WRC is facing severe problems of implementing water sector reforms in the peripheral areas because of lack of legitimacy and means to monitor local water resources management. In order to follow IWRM approaches Pilot Project in the Densu and the White Volta Basin have been introduced (Rodgers et al 2006).

In Burkina, rural water management realities appear quite similar to Ghana. Zone (2002) characterizes customary institutions as existing in parallel with written laws. He notes that, as the majority of the population is illiterate, one may deduce that the majority of rural Burkinabe follow traditional rather than modern practices which imply some level of literacy. Officially, for example, the state owns all water in Burkina. In practice, however, water use is regulated by traditional authorities who govern the resource according to the values described earlier; i.e., water is a spiritual resource which is owned by the community (Zone, 2002).

Transboundary Developments in the Volta Basin

Despite the construction of major hydraulic works with considerable international implications beginning in the 1960's, it appears that transboundary issues began to constitute a major concern in the Volta basin only in the mid-1990's. It was at this point that the World Bank took a more active role in the water affairs of Ghana and Burkina Faso and invoked its transboundary waters policy whereby a country "proposing to execute any project which will regulate, abstract or otherwise change river flows must notify co-riparian states of its intentions so that each state may consider whether it wishes to lodge an objection" (Ministry of Works and Housing, 1998; World Bank, 1995).

When Burkina sought World Bank support to construct a dam at Ziga in 1996, the Bank's policy led to the Volta's first post-colonial agreement concerning water as a consumable resource (Ministry of Works and Housing, 1998c). To satisfy the Bank, a Ghanaian delegation visited Burkina and signed a "no-objection" document agreeing to the dam's construction. This event produced discussion about more coordination and collaboration between Ghana and Burkina in the management of the Volta's waters, and a Volta Basin Water Management Initiative was launched with the help of international donors to serve as a medium for communication and dialogue on transboundary water issues. It appears the collaborative efforts did not persist, however, as the initiative was short-lived (Ministry of Works and Housing, 1998; van Edig et al., 2003; van Edig et al., 2001).

Interest in transboundary management of the Volta nevertheless re-intensified when reduced water levels at the Akosombo dam led to an energy crisis in Ghana in 1998. Although the energy shortage was due largely to a drought similar to those which had created energy shortages previously,[9] downstream Ghana now accused upstream Burkina of withdrawal increases and obstruction of Volta river flow (van Edig et al., 2001; Barry et al., 2004). While subsequent research (e.g., Andreini et al., 2000) clearly shows that Burkinabe water withdrawal had little to do with reduced flow in Ghana, the need for some degree of cooperation and information exchange became evident. International organizations responded en masse to this presumed need in the years which followed.

The GLOWA Volta project was one of the first to contribute to transboundary water cooperation, aiming to develop a scientifically sound Decision Support System (DSS) for the assessment, sustainable use, and development of the Volta basin's water resources (van Edig et al., 2003; van Edig et al., 2001; Andreini et al., 2002). In 2002, Green Cross International identified the Volta basin as potentially conflictive, so the organization engaged civil society representatives across the basin to develop commonly accepted principles and cooperative governance policies for management of the shared water resources (Curtin and Charrier, 2004). In 2001 and 2002, the Global Environmental Facility (GEF) funded projects which identified major environmental problems in the basin and presented ways to address these areas of environmental concern (Global Environmental Facility, 2002a; Global Environmental Facility, 2002b). Several others, such as UNEP, the EU, and the IUCN, have also emerged to promote sustainable and equitable governance of the Volta basin (UCC, 2004; International Office for Water, 2004; IUCN, 2004).

Concurrent with the recent increase in international actors, two international agreements have been signed with the aim of creating a path for construction of a transboundary water management institution. In April of 2004, the governments of Ghana and Burkina signed the "Ghana-Burkina Joint Declaration" which acknowledged common water and environmental issues and stated a desire to collaborate on management of shared water resources through a Volta Basin Technical Committee involving all riparian countries (Direction Générale de l'Inventaire des Ressources Hydrauliques, 2004). This work was followed by a conference in Ouagadougou July 29 and 30, 2004, attended by representatives from Benin, Burkina Faso, Cote d"Ivoire, Ghana, Mail, and Togo. All six countries accepted a series of agreements which acknowledged the need for a transboundary management institution and accepting a timeline for its creation. The process was to begin with the launch of a Volta Basin Technical Committee (VBTC) in November of 2004, which would hold its first meeting in December of the same year (Direction Générale de l'Inventaire des Ressources Hydrauliques, 2004). In December 2005 Ministers responsible for the water sector of all riparian countries joint the 3rd meeting of the Volta Basin Technical Committee in Ouagadougou, where it was decided to create a Basin Commission with overlapping responsibilities, presumably in summer

2006. This initiative will be a good chance to include all relevant interest groups into an integrated management of joint water resources.

The ongoing efforts to build a Volta Basin Commission in order to share scientific knowledge and identify management options among the riparian countries need to acknowledge and to incorporate indigenous knowledge, communication structures and networks as well. Local understanding of environmental processes and indigenous strategies to cope with the capricious nature of water and other environmental resources, have to be incorporated into international initiatives as well. Thus, transboundary/ transdistrict water resources allocation decisions can be contested at the local level, where traditional structures of authority and power often determine the distribution of water (Opoku-Agyemang 2005) and where most decisions are made on the basis of customary practices as well as indigenous knowledge and belief systems. Any attempts to establish transboundary water management structures therefore need to encompass local knowledge systems in order to develop an Integrated Water Resources Management system (IWRM) and to avoid water-related conflicts. Since conflicts arise largely at local level (Carius et al 2004) we need to understand how local knowledge is used to address future water management needs, particularly in the case of transboundary waters.

While the riparian countries in the Volta basin are still in the initial phases of establishing a transboundary Commission with formal legal mandate and regulatory authority, it was observed that local solutions for transboundary problems related to land and water management needs can work out quite well in practice. For example, in the Nakanbé Basin of Burkina Faso, farmers organized regular meetings in order to share experiences and to find solutions for problems related to flood and transhumance, which are causing rising tensions between farmers and cattle herders around the border of Ghana and Burkina Faso (GEF 2002, Faure 1996). These practices are necessary to ensure peaceful coexistence between different communities practicing subsistence economy, which are still the predominant economies in the Volta Basin. Therefore studies on successful transboundary collaboration and knowledge sharing in peripheral areas of Ghana and Burkina Faso have to be conducted. Given the numerous initiatives underway to establish international agreements, it will be of paramount importance to understand how local interests and practices are represented at transboundary level, and on the other hand, how principles of international (non-navigational) water law might lead to changes at the local level. By focusing on both international and local venues of action, it might be possible to bridge the knowledge gap (Evers 2005) between international agreements, national policies and indigenous protocols.

Conclusions

This study has shown that the Volta basin's water management institutions and policies have undergone much change over the last 150 years. For much of this period, a potentially important vehicle for transferring theoretical changes into practical realities, however, has been overlooked: traditional institutional arrangements. While the British allowed for some persistence of tradition in the Gold Coast, rarely did they use tradition to catalyze changes in water management practices. Following the independence of Ghana and Burkina, there was scarce mention of tradition in any official documents until the IWRM-oriented restructuring of the countries' water sectors in the 1990's. The increasing research focused on ways to incorporate traditional water management approaches into current practices therefore appears a step in the right direction, though it is somewhat ironic that this research is often initiated by outside actors.

Indeed, the lack of consideration for indigenous approaches in itself may be worthy of examination. Why was an amalgam of traditional practices and modern policies not considered earlier? To what extent were traditional West African customs thought inferior to those imposed by Europeans? To what extent do West Africans themselves, who have lived within both institutions, honestly prefer "modern" national policies?

Whatever the case, there are major impediments to application of traditional beliefs to current conditions. Most namely, the Volta's inhabitants currently face conditions of substantially greater water stress than ever before. The basin is significantly more populated and economically developed than previously. Simply allowing one to take as much water as he or she can carry may no longer apply to the basin's evolving conditions. Further, it now appears clear that water taken directly from the river is unfit for consumption.

Nevertheless, one might say that the indigenous institutional arrangements which pre-existed colonial impositions were the last which were adapted to conditions in Africa. Subsequent institutions and policies have been promulgated or heavily influenced by external actors. Although some progress has been made with recent alterations to national water policies, one wonders whether the transboundary level may supply more effective avenues for incorporation of indigenous water management approaches.

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Notes

1. This study concentrates primarily on the portions of the basin falling in these Ghana and Burkina Faso as these two countries contain 84 percent of the basin's land area.
2. Although a kingdom of Ghana did exist in the Middle Ages, it possesses little to no relation to the modern state of Ghana.
3. Following Germany's defeat in World War I, German Togoland was divided between the British and the French. The Western portion of the country was annexed by Ghana in 1957, the Eastern portion of Togoland became the independent country of Togo.
4. Note also the Forestry Ordinance of 1953 and the Soil Conservation Ordinance of 1953. These pieces of legislation are considered less directly related to water management. (Odame-Ababio, 2004)
5. Note that, while the segment of the population to which these ordinances were intended to apply is not explicitly stated, it can be assumed that they would primarily apply to the colony's population of white settlers.
6. It should nevertheless be noted that an integrated basin approach may not have been needed at this point in the Volta basin's development.
7. Note that "General Directorate for Fishing Resources" is a loose translation of the French "Direction Generale des Ressources Halieutiques".
8. Note that the authority of the Ministry of Water, Public Works, and Housing will supersede that of the Ghana Water Directorate when the former is created.
9. Note that rising demand in Ghana likely played a role as well.

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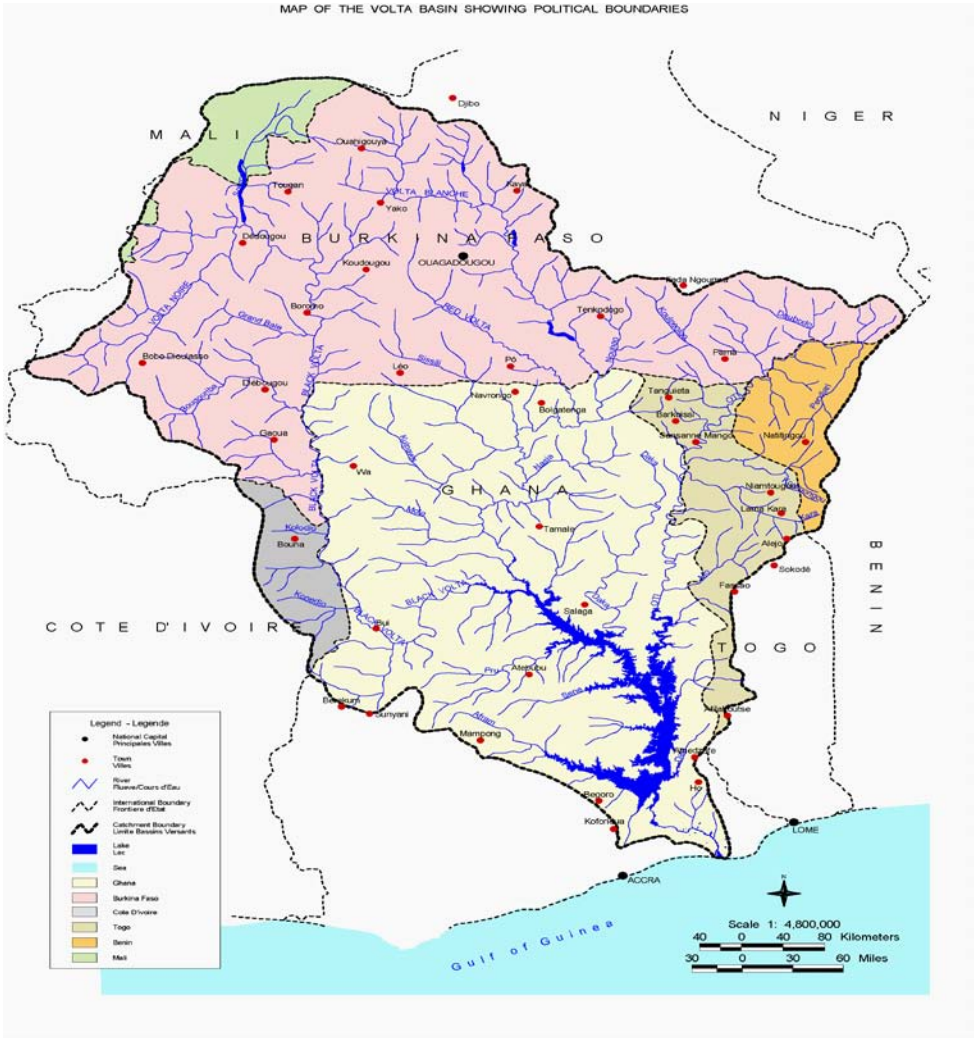


Figure 1: Map of the Volta Showing Political Boundaries
Source: Challenge Program for Water and Food, 2003.

Figure 2: Major Water Institutions in Burkina Faso

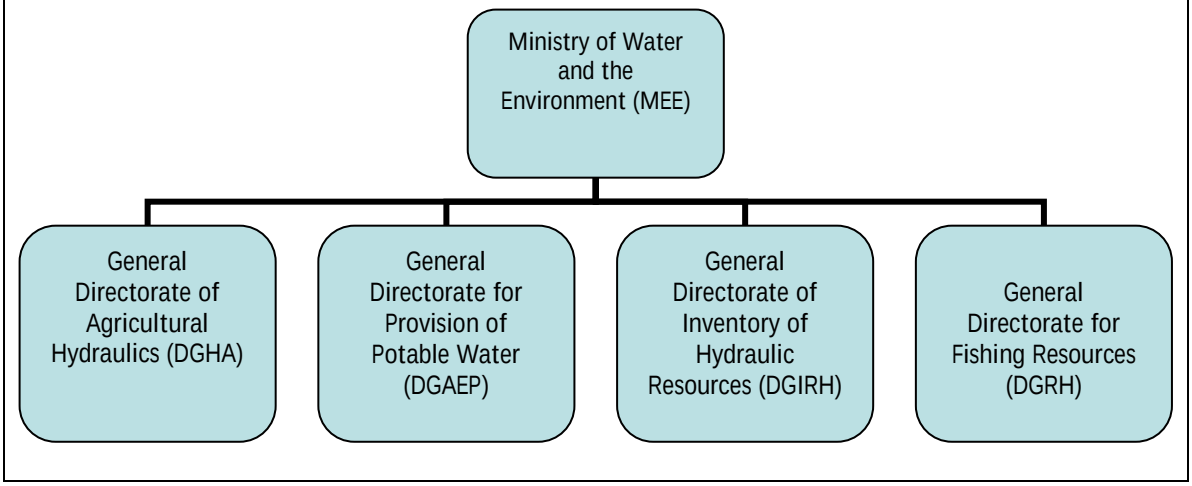
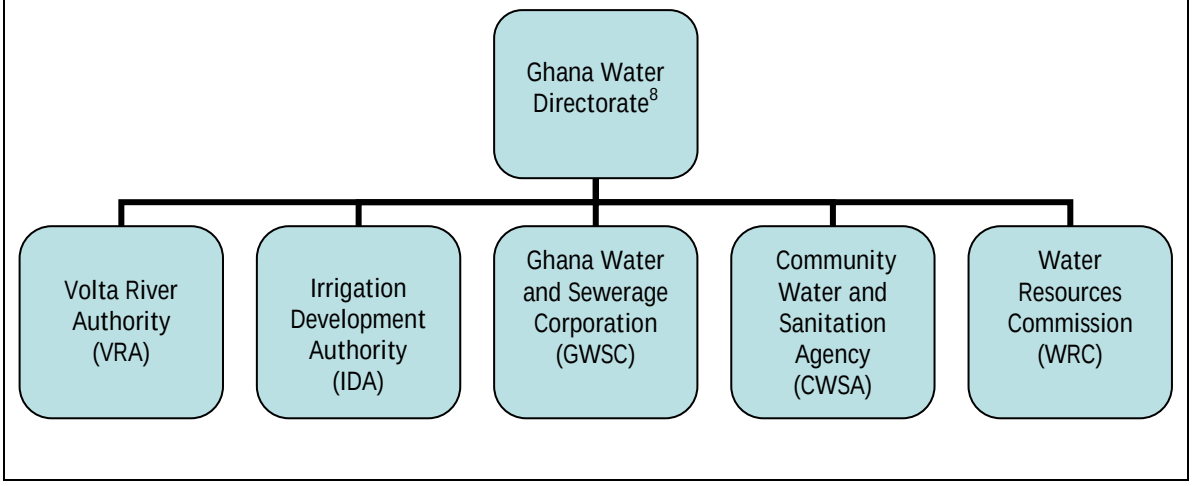


Figure 3: Major Water Institutions in Ghana



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