Transboundary Water Governance in the Volta River Basin

- Yongxuan Gao, Civil and Environmental Engineering, Tufts University
- Amy Margolies, International Relations, Tufts University

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Abstract

Lack of coordinated development of water resources, a rapidly increasing population, unsustainable agricultural practices and competing uses of water have placed enormous pressure on the already scarce water resources, leading to environmental degradation in the Volta River Basin. The basin is shared by Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Togo in the semi-arid region of West Africa. Irrigation and hydropower generation are the major water uses of water in the basin. Water resources are limited and are unevenly distributed both spatially and temporally in the basin. Spatially, rainfall increases from north to south with mean annual values ranging from less than 500 mm in the extreme north to more than 1600 mm in the southeastern part of the basin. Temporally, over 70% of the annual total rainfall occurs in July, August and September, with little rainfall in the months from November to March. By examining the water issues, we have identified that water quantity (Q) and governance (G) are the dominant variables in the problem definition for the basin. In order to manage the water resources holistically, a transboundary watershed management organization called the Volta Basin Authority (VBA) was created by the six riparian countries in 2006. However, the VBA has yet to take on a role in attending to the problems of water management, coordinating water projects or resolving water conflicts in the Basin. Merely signing a convention and statues and having an institutional structure are not enough to solve water issues. The VBA needs to take actions. Institutional capacity building and involvement of more stakeholders at different levels in the decision making process make the VBA effective.

Questions Addressed and Wisdom Gained

The key questions addressed in this case study are: 1) What kind of institutional structure is needed to address transboundary water issues? 2) How to promote consultation and cooperation among the riparian countries and also between these countries and all the development partners concerned with the development of water resources in the Volta River Basin? Having an institution alone will not have a significant effect on watershed management unless the VBA takes actions. The success of VBA is essential to prevent potential conflicts over water resources in the basin. Sustainable development of the water resources in the basin will eventually alleviate poverty and help economic development in the region.

1. Issue(s), stakeholders and relevant NSS variables for this case study.

<table>
<thead>
<tr>
<th>Issues</th>
<th>Stakeholders</th>
<th>Variables Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scarcie water resources and competing uses of water</td>
<td>Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Togo</td>
<td>Quantity (Q)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ecosystem (E)</td>
</tr>
<tr>
<td>Lack of coordinated water development, unsustainable economic development</td>
<td>Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Togo</td>
<td>Quantity (Q)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Governance (G)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Economy (C)</td>
</tr>
<tr>
<td>Ineffective water governance</td>
<td>Volta Basin Authority, Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Togo</td>
<td>Governance (G)</td>
</tr>
</tbody>
</table>

2. Description of the Setting

| Location | West Africa, lies within latitudes 5° 30 N and 14° 30 N and longitudes 2° 00 E and 5° 30 W |
| Watershed Area | 400,000 km² |
| Water Population | 18.6 million (Year 2000 estimate) |
| Average Annual Rainfall | 1000 mm (range from 500 mm in the north to 1600 mm in the forested regions in southeastern part of the basin) |
| Average Annual Temperature | Range from about 27° C to 30° C |
| Average GDP per capita | US$550 (2006 estimate) |
| Top uses of water | Irrigation, hydropower generation |

The Volta River Basin (Figure 1) lies in West Africa. It covers an area of 400,000 km², shared by six countries: Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Togo. Eighty percent of this area falls within the territorial boundaries of Ghana and Burkina Faso. The remaining four riparian countries only occupy 20% of the basin area. The basin is drained by numerous streams, most of which are ephemeral. These streams can be grouped into four main river systems: the Black Volta, White Volta, Lower Volta and Oti Rivers. The climate of the basin can be divided into three zones: the humid southern zone with two distinct rainy seasons, a tropical transition zone with two rainy seasons close to each other and a tropical northern zone with one rainy season peaking in August. The annual mean temperatures in the basin vary from about 27° C to 30° C (Barry et al., 2005)
The total population of the basin is 18.6 million (Year 2000 estimate), and it is rapidly growing at a rate of 2.5% per year, putting more pressure on the natural resources in the basin. Overall, high population growth rates in those countries remain a cause for concern in terms of food security, poverty alleviation, risk mitigation, disaster recovery and environmental sustainability (Andah and Gichuki, 2005).

These six countries are among the poorest in the world and possess underdeveloped economies (Table 1). The majority of the population lives in rural areas, with agriculture playing the most important role in labor absorption, employing the largest share of the work force in all six countries (Andah and Gichuki, 2005). Average GDP per capita of the six countries is US$550. Thirty-one percent of the population is living below US$1 a day.

### Table 1. Macroeconomic Indicators in the Volta River Basin Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP Per Capita 2006* (US$)</th>
<th>2007/2008 Human Development Index**</th>
<th>Population living below US$1/day*** (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>536</td>
<td>163</td>
<td>31</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>416</td>
<td>176</td>
<td>27</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>952</td>
<td>166</td>
<td>15</td>
</tr>
<tr>
<td>Ghana</td>
<td>532</td>
<td>135</td>
<td>45</td>
</tr>
<tr>
<td>Mali</td>
<td>498</td>
<td>173</td>
<td>36</td>
</tr>
<tr>
<td>Togo</td>
<td>356</td>
<td>152</td>
<td>Not Available</td>
</tr>
<tr>
<td>Average</td>
<td>550</td>
<td>-</td>
<td>31</td>
</tr>
</tbody>
</table>

Source:  

Water resources are limited and unevenly distributed both spatially and temporally in the basin (Figure 2). Spatially, rainfall increases from north to south with mean annual values ranging from less than 500 mm in the extreme north to more than 1600 mm in the forested regions in southeastern Ghana (MWH, 1998). Temporally, over 70% of the annual total rainfall occurs in the three months of July, August and September, with little or no rainfall in the months from November to March in most of the basin (Amisigo, 2005).

Figure 2 also shows the seasonal meteorological variation recorded at Navrongo, Ghana. Potential evapotranspiration in the basin also varies both spatially and temporally with an annual mean varying from 2500 mm in the north of the basin to 1800 mm in the coastal zone. Mean monthly potential evapotranspiration exceeds mean monthly rainfall for most of the year for the entire basin (Amisigo, 2005). In addition, when rain comes, it often comes in the form of thunderstorms. Rainfall intensities often exceed the soil’s infiltration rates causing surface runoff, without replenishing soil moisture and groundwater (Liebe et al., 2005). The onset of the rainy season is especially unpredictable. From an agronomic point of view, rainfall in the region can only be characterized as unreliable (Van de Giesen et al., 2001).

### 3. Problem Definition

As the basin population may increase by as much as 80% over the next 25 years, water resources are going to become even scarcer (Andah and Gichuki, 2005). Water scarcity arises as a result of diminishing precipitation, reduction in river flows, falling water tables, an increase in the amount of evapotranspiration (due to the construction of thousands of large and small reservoirs in the basin), and inefficient use of water resources. Over the past 20 years the basin has seen a reduction in the amount of precipitation and river flows (Gyau-Boakye and Tumbulto, 2000). Furthermore, groundwater in the basin is overexploited with excessive pumping without due regard to the recharge characteristics of aquifers. Lowering of the water tables has also been observed in large parts of the basin, and can lead to saltwater intrusion in the southern parts of the basin near the Gulf of Guinea coast (Andah and Gichuki, 2005).

Since the six countries are very poor, they lack the financial resources to build water infrastructure. As a result, sanitation, water and wastewater treatment and water supply facilities are inadequate in the basin. At the same time, since water is an important development resource, the six countries are trying to exploit the basin’s water resources as much as possible to develop their economies. There are competing uses of water resources among different sectors within a country and between the upstream and downstream countries. Within each country, water has diverse uses: irrigation, fishery, domestic water supply and livestock watering. Internationally, conflict exists between Burkina Faso, who wants to expand its irrigation extracting more water from the river, and Ghana, who wants to generate more hydropower to fuel its economic development (Andah and Gichuki, 2005). The need to develop the region economically to improve the livelihoods of its people conflicts with the need to preserve and protect the ecosystem for future generations. These issues are essential to address in any plan of water management for the basin.

The riparian countries have very weak capacity to deal with environmental issues, such as loss of biodiversity, reduction of fisheries resources, groundwater resources depletion, flooding and river pollution. These problems are water related and transboundary in nature. In the six countries, many institutions are charged with responsibilities for managing water, food, and soil resources. This results in overlapping of responsibilities and difficulties in coordination. Coordination of activities among institutions is weak, and in some cases exists only on an ad hoc basis for crisis situations. For the management of water and soil resources to be effective, it should be integrated at the local and national level, with emphasis on inter-sectoral coordination (Andah and Gichuki, 2005).
Further more, there has been little coordinated transboundary effort in the basin until recently, with the establishment of the Volta Basin Authority in 2006. Previously, each country acted independently in harnessing the river. Many of the causes and effects of the water issues are transboundary in nature. If no cooperation is achieved, potential for conflicts among riparian countries might increase with rising water withdrawals. Conflict prevention and resolution can be found in some countries in Africa at the local and national level, but nearly no functional provisions exist at the international level.

The history of transboundary actions in the basin can be dated back to the pre-colonial period when France and Great Britain signed two territory agreements in 1906. The first one was called “Exchange of Notes between France and Great Britain relative to the Boundary between the Gold Coast and French Soudan,” and the second, “Agreement between France and Great Britain relative to the frontier between French and British possessions from the Gulf of Guinea to the Niger (Southern Nigeria and Dahomey)”. These two agreements both involved the Volta River Basin, with their primary goals as cross-border native access. In many cases, the establishment of colonial boundaries separated people from the water resources they had traditionally used.

Figures in this category generally allowed for a continuation of pre-colonial cross-border movement by “natives” to access water resources (The African Transboundary Water Law, 2008). But agreements related to water like these two in the pre-colonial time were precipitated by non-water factors such as territorial division and recognition of traditional water use customs (Lautze et al., 2005). After independence in 1950s and 1960s, African countries were trying to develop their economies, and water was a key developmental resource. Since then, the six riparian countries have built numerous dams on the river without consulting each other.

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Ghana has been the most active in developing the hydro potential of the basin. In 1966, Ghana built the Akosombo Dam, which is a 912-megawatt hydropower plant and the most significant hydraulic structure on the Volta River. When the dam was built, there was an agreement between Ghana and an American aluminum company called VALCO. At that time, as Ghana's domestic electricity demand was not high, it was agreed that VALCO would purchase 80% of the power generated by the dam at a cheap rate and the remaining 20% was used by the Ghanaian people. However, as time went by, Ghana's electricity demand has increased and the Akosombo Dam is not sufficient to meet the whole country's demand anymore.

Therefore, Ghana built another hydropower plant in 1982 and a thermal power plant in 1997. In August 2008, Ghana has started the construction of a 400-megawatt hydropower dam at Bui on the Black Volta River. The Bui Dam is expected to be completed in 2012 (The Statesman, 2008). Akosombo Dam is still of strategic importance to the economy of Ghana today–it generates 80% of the power of the country. Currently, 40% of the electricity generated by the Akosombo Dam is supplied to VALCO, and VALCO has agreed “to shut down its plant if the water level should drop to 240 feet” (Daily Graphic, 2008).

In August 2007, there was a 50-year flood in Ghana. The flood was aggravated by the opening of the floodgates of the Bagre Dam in Burkina Faso. Ghana accused Burkina Faso for causing the problem by holding back too much water upstream. During this period, many research institutes and development agencies, such as GLOWA-Volta, Green Cross International, UNEP and the World Bank, observed the emerging conflicts in the basin. These institutes and agencies funded several projects and initiatives on sustainability and governance in the basin in an attempt to ameliorate the situation (Lautze et al., 2005). They also organized conferences to engage stakeholders across the basin to develop commonly accepted principles on transboundary water governance. These projects were a very important driving force for the launching of the Volta Basin Technical Committee in November 2004 and a series of follow-up meetings among the six riparian countries. As a result of all these efforts, the six riparian signed an agreement to establish the Volta Basin Authority (VBA) in July 2006.

The VAB is composed of National Water Directorate representatives of the six countries and has its headquarters in Ouagadougou, Burkina Faso. Research institute and development agencies are the external driving forces of cooperation among the six countries. Rising in water demand and emerging of more environmental issues are the internal driving forces. Figure 3 shows the historical time line of transboundary governance, the stakeholders involved and the important events or issues that occurred and drove this history of development. This figure also includes a curve of annual consumptive water demand (domestic and industrial water demand, irrigation, and livestock water demand) along the time line. As population is growing and the economy developing, water demand is increasing, it is projected that in 2010, the consumptive water demand will be 4,068 million m3.

In August 2007, there was a 50-year flood in Ghana. The flood was aggravated by the opening of the floodgates of the Bagre Dam in Burkina Faso. Ghana was not notified at the time of the opening, therefore, it was not prepared for the sudden increase of water, and much damage was done. With only two years and a half in existence, the Volta Basin Authority’s influence in the basin and its effectiveness have yet to be seen. The VBA is certainly facing many challenges such as dealing with flood warning issues (e.g. Bagre Dam) and meeting rapidly growing water demand with limited water resources in the future.

4. Variable Identification

By examining the issues described above, we have identified that water quantity (Q), economy (C) and governance (G) are the dominant variables in the problem definition for the basin. Inevitably, the natural and societal systems interact with each other, and therefore, the six variables are connected and interdependent. Figure 4 shows such connections and interdependence among the three variables for the Volta River Basin.
As mentioned previously, the basin's water resources (Q) is naturally scarce and unevenly distributed. In order to capture the excessive runoff in the rainy season for a later use in the dry season, and to meet the demand of a rapidly growing population, numerous dams of various sizes have been built in the basin. However, the construction of the dams was funded by different agencies, at different times, with little coordinative effort among the agencies to facilitate a regional optimization of investments.

Economy (C) plays a key role in the basin dynamics, influencing the state of the environment, and increasing need for a sustainable solution for water management. The Volta River Basin is an impoverished region with a rapidly growing population and a need for economic growth. The riparian countries face the pressure of poverty reduction, the need to provide electricity to the urban areas and irrigation to the rural areas, as well as to protect the natural environment, especially the aquatic ecosystem. Each country has its own economic priorities, which are often in conflict with one another. For example, as Burkina Faso is less developed, it relies more heavily on irrigation for farming, while Ghana, in addition to irrigation, relies on the generation of hydropower for export. This has increased the demand for water resources in the basin, which is a concern for Ghana, which is the most water-rich but the least populated country in the basin. The increase in the demand has also increased the competition among the riparian countries for water resources, which has led to a lack of coordination and cooperation among the member states.

Vertically, there is a lack of integration between the VBA nations and the stakeholders at the lower levels. That is, there is a lack of involvement of the grassroots stakeholders. Integration should begin on the village level, eventually scaling to the national country level and finally, to the international. Traditional or religious leaders have control over various aspects of allocation and use of natural resources in rural Africa, affecting the right of the villagers to fish and farm. Traditional leaders, namely the chief and highly respected senior members of the village, will be consulted when water disputes occur among villagers. The resolution decided by those traditional leaders is expected to be final. Since the chief is the entrusted with the land, site selection of any irrigation scheme in the village must be agreed on by the chief.

Clearly, the role of traditional leadership is very important in water management, and traditional practices, which have evolved with the biophysical and cultural settings in the society, are generally sustainable. Unfortunately, village water resources are being expropriated and controlled in a top-down approach by agency such as the WRC. This process has occurred without consultation with local leaders or the provision of compensatory packages for the value of the resources lost. "Instead of providing incentives for traditional institutions to cooperate, the WRC’s policy of neglecting traditional practices of water rights allocation, which is backed by the current rule of law, provides disincentives for cooperation by diminishing the chiefs’ responsibilities and ability to collect funds.” (Van Edig et al., 2002). This style of aggressive institutional behavior is not conducive to collaboration. Water governance in the Volta River Basin must take traditional values into account. Evidently, there is variation in custom and culture across the six riparian signatory countries, so the incorporation of traditional systems must be done in a manner that is comprehensive but also feasible.

Integration on the international scale will only be possible if cooperation is achieved among the grassroots village level and the national level, and involvement of the local NGOs. Therefore, it is evident that for international basin management to be effective, the mechanism must also embrace a bottom-up approach to include the participation of grassroots actors.

2) Unclear processes

The extent to which VBA’s water management is successful will be defined by the characteristics of decision-making processes. There are many considerations to be taken into account in order to spur action in the VBA. First of all, the process itself must be defined. It is unclear what kind of process the VBA utilizes to negotiate policies and action plans. The VBA is composed of National Water Directorate representatives of the six countries only. This small coalition of actors will prove limiting on the long-term, as an exclusive process may not attend to the needs of all stakeholders involved. By excluding other actors such as civil society representatives, the VBA may create problems for the process, as spoilers may emerge and prevent sustainable agreements. Although it may be unreasonable or impractical to include a multitude of actors with a stake in the process, the inclusion of other key decision-makers in the region would expand the possibilities for lasting agreements.

Another example is that one of VBA’s mandates is to authorize the development of infrastructure and projects planned by the States Parties and which could have substantial impact on the water resources of the basin. However, it is unclear how it should be done. This is a very important role that VBA can play in solve water conflict in the basin, but there has not been a standard procedure created to allow VBA carry out this role.
3) Convention and statutes have not been transformed to actions

The signed convention and statues have not been enforced. There is no mechanism to transform what is written on the paper in the transitional processes to real issues of water management in the basin.

One of the most immediate issues in the basin that continually has emerged as cause of tension is the flooding caused by the Bagre Dam in Burkina Faso. As previously mentioned, the opening of the floodgates of the Bagre Dam was exclusively decided by officials in Burkina Faso, who then warned officials in Ghana. Unfortunately, this process was not well planned, and the warning regarding dam activity was typically communicated at the last minute. The opening of the floodgates in Burkina Faso has a severe effect on agriculture in Ghana and may damage many homes in Ghana. Although this situation has not resulted in conflict or destroyed relationships, it maintains a tension between the two countries.

The VBA is situated perfectly to deal with this situation, but the process must involve preparation and planning. The institution will only be useful if the actors act in advance. As when crises hit, procedures must already be in place. The Bagre Dam is a good opportunity to test out the VBA’s structure and institutional capacity for leadership. The problem is not overly complex, and can be addressed through meeting with officials from Burkina Faso and Ghana and establishing mutually acceptable procedural steps for the opening of the Bagre floodgates. Finding solutions for simpler problems such as the Bagre Dam situation will help establish a precedent for the resolution of more complex situation in the future, such as the growing disagreements surrounding the declining water levels in the Akosombo Dam area.

There lacks a mechanism for the member states to define problems and prioritize projects. The problems in the basin should be defined and the corresponding mitigation measured must be prioritized in a joint fact finding mission carried out by all of the six riparian countries and other major stakeholders in the basin (e.g. representatives of traditional authority and environmental groups).

In order to enforce the convention and the statues, a long-term development strategy, which is nonexistent at the moment, should be created as a guiding document for the VBA and its member states to develop their water projects. At the same time, a development plan based on this strategy, should be developed in a regular basis, e.g. every five years, and make available to the public. Of course, the inputs to the development plan should come from the member states and, studies and assessments of the basin are needed to make such a plan. Data sharing between the VBA and each of its member states and among the members states are essential in good planning and building cooperation and trust among the countries. However, such a data sharing system does not exist due to 1) most of the riparian lack the funding and capacity to collect sufficient hydrologic and meteorological data; 2) bureaucracy and red tapes constrain the sharing of resources among different government agencies in a county.

5. Summary and Key Questions Addressed

The Volta River Basin, located the semi-arid area, is an impoverished region with limited water resources. The six riparian countries, eager to reduce poverty, have acted independently and uncoordinatively in harnessing the river in the past. Coupled with competing uses of the water among different sectors in the basin, the lack of coordinative effort in managing the basin's water resources have placed further stress on the already scarce resources, leading degradation of the environment. By examining the water issues, we have identified that water quantity (Q), economy (C) and governance (G) are the dominant variables in the problem definition for the basin.

In order to manage the water resources holistically, a transboundary watershed management organization called the Volta Basin Authority (VBA) was created by the six riparian countries in 2006. However, the VBA has not been functional and effective in its role as a water manager of the basin. In this article, we explore the reasons that contribute to this situation and suggest measures that can strengthen the VBA.

The key questions addressed in this case study are: 1) What kind of institutional structure is needed to address transboundary water issues? 2) How to promote cooperation and integration among the riparian countries and also between these countries and the major stakeholders concerned with the development of water resources in the Volta River Basin?

The creation of the VBA is a very important milestone in the development of transboundary governance in the Volta River Basin. But having an institution alone will not have a significant effect on watershed management unless the VBA takes actions. The success of VBA is essential to prevent potential conflicts over water resources in the basin. Sustainable development of the water resources in the basin will eventually alleviate poverty and help economic development in the region.

References


