

Transboundary, institutional, and legal aspects of the Water Resources Commission in Ghana

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Summary

The Volta River is an international watercourse with six riparian countries. The economies of, especially, Ghana and Burkina Faso rely to a high degree on the water from Volta River and there is a rapid increase in demand for water for the domestic, agricultural, mining and industrial sectors as well as for hydropower. Dependency on the water supply from the Volta might be illustrated by the two hydropower stations at the Akosombo Dam, which are supplying Ghana with 95% of the domestic electricity. The raising water use of all riparians and the plans to develop the national economies might lead to rising conflicts about water uses at the international level. International cooperation and joint institutions of the riparian countries are needed. This cooperation is still in the planning process and not realised so far. The following contribution will outline the hydrological setting, planned and realised projects along the water course as well as potential future conflicts over water. Possible international institutions and legal framework are discussed in order to foster further cooperation which could help avoid water use conflicts in the Volta Basin.

I. Scientific Background: The GLOWA-Volta Project

The proposed paper presents the institutional component of a research project undertaken by the Center for Development Research (ZEF), which is the lead institute of a network of partner institutions in Germany and Ghana. The GLOWA-Volta project aims at developing a scientifically sound decision support system (DSS) for the assessment, sustainable use and development of water resources in the Volta Basin. It is part of GLOWA (Globaler Wandel des Wasserkreislaufs), a program financed by the German Federal Ministry of Education and Research (BMBF).

GLOWA-Volta aims at creating a basis for the development of innovative technologies and cost-effective strategies relating to climate and environmental protection, in particular for management of water resources.

II. Hydrological setting of the Volta Basin

The Volta Basin covers 398.000 km² of the sub-humid to semi-arid West African savanna zone. The Volta Basin is an international catchment shared by six riparian countries. The basin lies for 42% in Ghana, 43% in Burkina Faso, and for the remaining 15 % in Mali, Côte d'Ivoire, Togo, and Benin. The Volta has an average runoff of 35 km³/year. The river can be subdivided in several sections corresponding to the three biggest contributing branches. The Black, White and Red Voltas flow from Burkina Faso into Ghana. Together they represent 56% of the water captured by the Akosombo Dam. Forty-four percent comes from the Oti River (see Figure 1).

The wet season in the south of the catchment runs from May to October, whereas in the north it runs from May/June to September. The inter-annual variability is high for a given location. Also the variability within a rainy season is very large due to the convective nature of most rainfall events. In West Africa, from an agronomic point of view one should characterize rainfall in the region as unreliable.

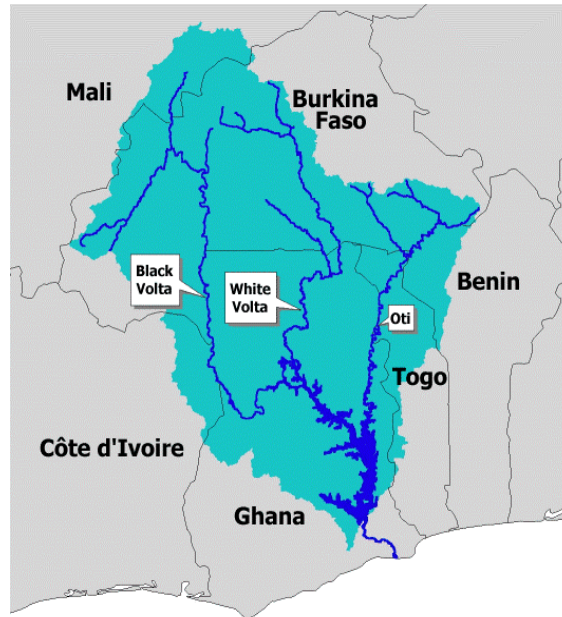


Figure 1: The Volta Basin (<http://www.glowa-volta.de>)

Riverflow is highly sensitive with respect to rainfall: relatively small changes in yearly rainfall cause large changes in riverflow (see Figure 2). Clearly, surface water resources in the basin are very vulnerable to droughts. The runoff/rainfall sensitivity also implies sensitivity with respect to the mechanisms that divide rainfall between evapotranspiration and runoff. Changes in land use and land cover may, therefore, have a potentially large impact on water resources. This sensitivity has therefore important implications not only for agronomic planning, but also for energy supply.

The coefficient of variation in runoff was reduced from 0.07 to 0.04 by the Akosombo dam. Larger withdrawals of water from the Akosombo dam severely reduced the water level of the lake on several occasions. The combination of large withdrawals and high sensitivity to drought has led to serious energy crises in Ghana in recent years.

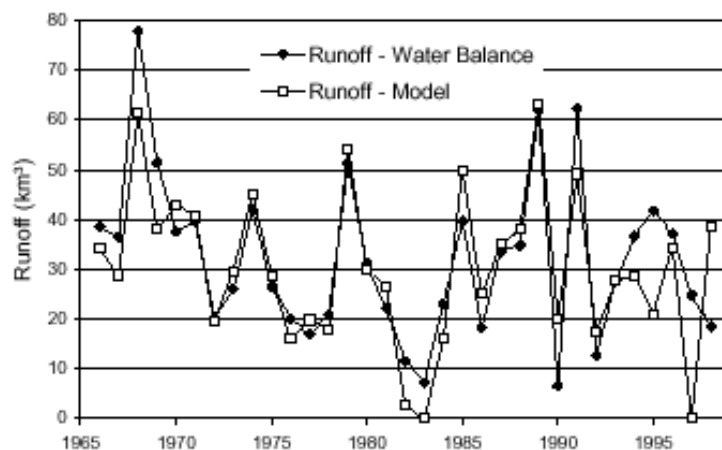


Figure 2: Water Balance of the Volta (Andreini et al 2000)

Water use and land use choices made within these countries and their effects on trans-boundary river flows are already an issue between the two major stakeholders Ghana and Burkina Faso. In view of the size of the Oti's contribution to the lake, changes in Togo's use of the Oti River's water may also divide Togo and Ghana.

II. Realized and planned water projects

At present, water use of the riparian countries along an international water course determines *de facto* their share of water withdrawal. The economic development of the countries and the related increased demand for water for industry, energy and agriculture are a possible source for international conflicts. On the other hand, national needs also be an incentive for a riparian country to take the initiative for international cooperation, as is the case for Ghana.

The largest project in the Volta Basin is the Akosombo dam with Lake Volta, built in 1965. The dam reaches a height of 134 m and is one of the biggest man made artificial lakes on earth, covering 3.5% of Ghana. When the dam was built, one of the main problems was the financial aspect. Although the World Bank Group as well as the United States of America and the British Government assured financial contributions, a considerable sum was lacking to realize the project. Finally, the Ghanaian government signed an agreement with the US-aluminium producing enterprise Henry J. Kaiser, in Ghana known as VALCO. VALCO was granted exemptions from im- and export regulations, special tax regulations as well as low energy tariffs for 50 years to produce energy intensive aluminium (World Rivers Review, 1995). VALCO consumes 45% of Ghanas energy (see Figure 3).

The construction of the dam was criticized heavily due to the resettlement of inhabitants which was well planned, but then took place very hastily. This led to financial and social disadvantages of the resettled people.

Presently, the hydropower station at the dam produces 912 MW, but the production will be increased by 15 % in the next five years. As electricity demand is raising new possibilities of hydropower production are exploited. Already in 1995 17 possible dam sites with further capacities of 1200 MW were identified (World River Review, 1995). However, the construction of only one dam is discussed seriously, a hydropower station at the Black Volta near the Bui george. This station would have three units with a capacity of 150 MW each. The energy will supply the cities Dunkwa and Kumasi in the south of the country and may possibly be exported to Burkina Faso, Mali and Côte D'Ivoire. The construction costs are estimated at about US\$660 million. The construction of the Bui dam is debated internationally and nationally, in the first instance for environmental reasons because the construction site is in a national park and might cause serious ecological damages. The discharge rate of the Black Volta is highly seasonal and a dam could cause floods in the neighbour country Côte D'Ivoire.

Burkina Faso plans to build three dams along the Volta, two of them to supply the capital Ouagadougou with water and one for irrigation and hydropower. Total amount of stored water will not be more than 149 MCM (Million Cub meters) or 3.75% of Lake Volta (Ghana World Wide, 1998). Many smaller dams for household and agricultural purposes have been constructed as well.

III. Water use sectors and future water demand

Especially in Ghana, the major water use is energy supply. Energy demand presently exceeds by far production. 45% of the energy is sold to VALCO, 48 % is consumed in households, out of which rural areas consume only 5%. The demand will rise further when the government plans as worded in „Vision 2020“ (Ministry of Works and Housing, 1998 a) are realised which includes electric supply to every household in Ghana, including those in rural areas (Ofosu-Ahenkorah, 1995). Severe energy crises have hit Ghana in times of droughts. In Ghana, the last crisis occurred in 1998, whereas regional crises were recorded in 2001. During crises, the country only has 12 hours supply per day. This has severe impacts on the national economy. Daily power failures are normal in urban areas like Accra. Certainly also other factors, like institutional failure, contribute to the poor energy supply.

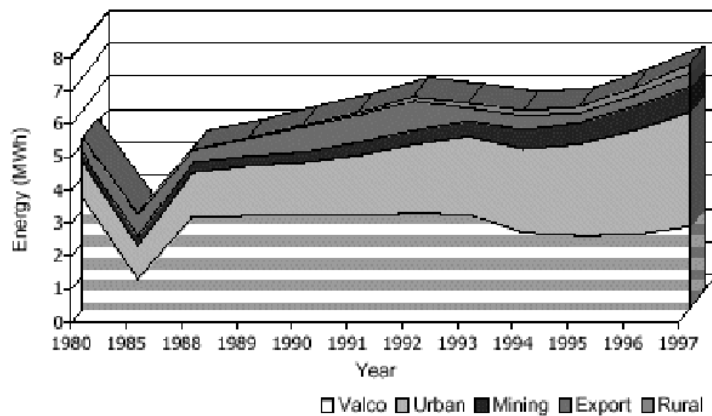


Figure 3: Energy demand in Ghana (Andreini et al 2000)

Ghana regularly has to import more energy from Côte D'Ivoire, in addition to the normal import between 18 and 22 o'clock when consumption is high. The Volta River Authority, responsible for hydropower production and the management of the Aksomobo dam, owes the neighbour country over US\$ 34 mill. for power imports. At the same time, current energy prices for consumers are lower than production prices. Togo and Benin are importing energy from Ghana, except in times of droughts. It is not unrealistic that these importing countries will realize their own hydropower projects in the future.

The household water sector is important for the inhabitants of the countries, but not so much in terms of water quantity. The same holds for agriculture. As irrigated agriculture is not really important in Ghana, this sector currently consumes only moderate amounts of water (617 MCM). This may change with the realisation of Vision 2020 according to which irrigated agriculture would be extended from 10,000 to 100,000 ha. This would imply an increase of water consumption to 4,114 MCM in the year 2020 (Ministry of Works and Housing, 1998a). At the same time, industry's share of GDP is supposed to increase to 37% by 2020 and the projected demand for industrial and urban water would rise from 63 MCM in 2000 to 272 MCM in 2020 (Ministry of Works and Housing, 1998b).

Projected water demand is not available for all riparian countries. The demand for water use in Côte D'Ivoire in 2025 is projected at 9400 MCM, in Burkina Faso in 2010 at 860 MCM and the water use in Benin was estimated in 1997 at 15 MCM (Ministry of Works and Housing, 1998b).

Burkina Faso, Côte D'Ivoire and Mali are three of six countries in the West African Region that have more than 10% of their irrigable area under actual irrigation (World Water Council, 2000). According to the World Water Council (2000), extension of irrigated agriculture is an important factor for economic development. Such development will certainly have consequences for water use in the Volta Basin.

IV. Possible conflicts on water use

Water consumption will certainly rise in the future with increasing economic development and higher living standards. First we look at water use in the energy sector. Already, international cooperation takes place for alternative energy supplies such as for the West African Gas Pipeline (WAGP) that exports gas from Nigeria to Benin, Togo und Ghana (Newsrunner, 2001). If further alternative energy sources are found and cooperation in this field is enhanced, conflicts on water use might be reduced considerably in future.

Major conflict potential exists between Burkina Faso and Ghana. As Ghana relies heavily on the flow of Volta tributaries coming from Burkina Faso, its major interest is to keep the water flowing. Burkina Faso on the other hand expands its irrigated agriculture.

Latent conflicts between the two countries surfaced in 1998, when the drought and energy crisis hit Ghana. Burkina Faso's water consumption was suspected of being a main reason for the reduced water level at Akosombo. Ghana then offered to supply Burkina Faso with energy in order to prevent the country to build the dams at the Volta tributary which are expected to reduce water flow considerably. Burkina Faso refused these plans and insisted on being nationally autonomous in energy supply; the notion of national sovereignty still seems to be important. Flooding in Northern Ghana caused by sudden releases from dams in Burkina Faso are the second major concern for Ghanaian water management.

Several actions have to be taken in order to prevent conflicts, the first and foremost would be the development of alternative energy sources. Even if the energy problem would be solved without the development of further hydropower projects in the Volta Basin, the watercourse still has to satisfy the needs of other water use sectors. Development of the river basin is essential for economic and social progress of the respective countries, but can not be achieved without corresponding cooperation at international level.

V. International legal and institutional cooperation in the Volta Basin

A high percentage of total flows into the riparian countries originates from outside their borders. This is true for each riparian except Burkina Faso. 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.

V.1. International arrangements and initiatives in the Volta Basin.

So far, only one agreement on Onchocerciasis (1973), initiated by the World Health Organisation, has been signed between the riparian countries of the Volta River. No international institutions have been established to deal with transboundary management issues.

As the main conflicts are most likely to occur between Ghana and Burkina Faso, communication between those two countries was identified as one major goal for the initiative by international donors, called the Volta Basin Water Resources Management Initiative. It concentrated on capacity building at national and international levels of the riparian countries. Already in 1996 communication began between the two countries when Burkina Faso asked for the "no objection"¹ of Ghana in order to realize the dams at Ziga and Bagre for hydropower and irrigation. This "no objection" of Ghana was given provided conditions were fulfilled by Burkina Faso (Ministry of Works and Housing, 1998b). For these conditions to be implemented, a mechanism or institution should be put in place to facilitate communication and to monitor the agreements. This has not been realized so far. One major outcome of the initiative was the establishment of the Water Resources Commission in Ghana which will be described in the following section.

V.2 The Water Resources Commission: Structure, planned and realized tasks

As national and international institutional capacity building and initiatives are intertwined (for example in the field of data exchange), the Water Resources Commission (WRC) in Ghana will deal with national as well as with international management issues.

The WRC was established in 1996 with the Water Resources Act and started working in 1998. The WRC serves as an umbrella institution for the national water policy in order to coordinate different institutions and their different interests and management approaches.

¹ The no objection rule is a principle of international law (see point VI.3) and it is also an operational rule of the World Bank Group to get the acceptance of every downstream riparian before financing a dam in an international watercourse.

The International Waters Committee (IWC), which is part of the WRC, has mainly three tasks which were identified in the Strategy Document of the WRC (WRC, 1999). It will identify international waters and draft bilateral agreements, it will establish mechanisms for informal discussions on a technical level with the riparian countries, and examine the possibility to initiate a multi-national regional agreement for the development of the Volta Basin. The strategy paper mentions explicitly other river basin organizations which were established for the Senegal, Gambia and Mekong rivers. In the Action Plan of the strategy paper it is further specified that a Volta River Basin Organization should be established in 2003 while in the previous years various bilateral agreements should be closed with Burkina Faso, Côte d'Ivoire and Togo (WRC, 1999). So far, none of these agreements have been drafted or signed. But according to the WRC, informal information exchange on technical projects and possible development of the Volta River takes places frequently. The first step towards cooperation, namely the mutual trust building between the main stakeholders, was thus taken.

V.3 Possible institutional arrangement and legal framework for international cooperation

There are several agreements regarding several aspects of the management of International Water courses in Africa,² but not all of them are working in practice and some may be revised due to institutional difficulties, see for example the Zambezi river (Shela, 2000). The Senegal River Basin Organisation performs well and can be regarded as an exception (Salem, 1999). For the other basin organisations there is often no clarity of their roles vis-à-vis the member states. In the WRC (1999) strategy paper, three river basin organizations are named as possible models. The Gambia River Basin Organisation, established in 1978, is not very active so far. The convention deals exclusively with the establishment of the organization and not with aspects of water use. The Mekong River Agreement on the other hand has been quite successful so far in developing the basin and managing the projects. This agreement deals also with legal aspects of water use, but the major part details the structure and functioning of the institution. As was the case in other successful cooperation agreements, as for example the Indus Treaty, the heavy involvement of donors and projects was one major factor for the relative success of the institutional arrangements (van Edig, 2000). The riparian states had to work together in order to realize the water related projects and to develop the respective river basins. As for water use and management, the Mekong River Basin contains the major principles of international law.

So does another possible legal framework, the Protocol on the Shared Watercourse Systems in the Southern African Development Community (SADC, 1995), which came into force in 1998 and was revised in 2000. The SADC Protocol is seen as "*the pillar for setting up an enabling environment for equitable allocation and management of water resources*" (Shela, 2000,). The protocol will serve as legal framework for international treaties on international watercourses in the region, comparable to the Convention on the Law of the Non-Navigational uses of International Watercourses,³ which was adapted 1997 by the General Assembly of the United Nations.

²For example the Convention relating to the creation of the Gambia River Basin Development Organisation (1978), Agreement for the establishment of the Organization for the Management and Development of the Kagera River Basin (1977), Convention creating the Niger Basin Authority (1980), Agreement for the full utilization of the Nile waters (bilateral, 1959) Convention creating the Organization for the Development of the Senegal River (OMVS; 1972) Agreement on the Action Plan for Environmentally sound Management of the Common Zambezi river System (1987) Protocol on the shared Watercourse Systems in the Southern African Development Community (SADC) (1995), see internet: <http://internationalwaterlaw.org/Africa.html>.

³United Nations/General Assembly: Convention on the Law of the Non-Navigational uses of International Watercourses, Resolution adopted by the General Assembly, UN. DOC A/Res/51/229, 8 July 1997.

The SADC protocol includes all relevant provisions from international customary water law as the principle of cooperation (which is defined as a “community of interests, art. 2,2), of equitable utilization (art. 2,2, and 2,7), exchange of information (art. 2,5), prior notification (art. 2,9), prevention of significant harm (art. 3.10, revised version), environmental protection (art. 2, 11-12), as well as peaceful dispute settlement (art. 7). The duty of cooperation is made explicit in art. 3 according to which River Basin Management Institutions shall be established. An outstanding regulation of the protocol is the institutionalisation of monitoring Units (art. 3,1) as well as the dispute settlement mechanism according to which disputes shall be resolved by a SADC Tribunal for adjudication. So far this tribunal was not called to solve water conflicts. *De facto* disputes were solved either by the River Basin Organisation or the International Court of Justice such as between Namibia and Botswana in 1998 (Salem, 1999). This situation might change when the countries have more trust over time in their regional dispute settlement mechanisms. Although each river basin has its own specific characteristics which have to be incorporated in a treaty, general principles from the SADC Agreement can be included, and it could be considered as a framework for the Volta Basin.

VI. Outlook

It is likely that not only Ghana, but also the other riparian countries in the Volta Basin will face increasing water demand. The efficient and sustainable use of water resources and transboundary cooperation are therefore essential, not least in the interest of a prevention of conflicts and a sustainable development of the entire region. The Bagre and the Ziga dam projects on the White Volta in Burkina Faso might be quoted as examples. They have already raised concerns in Ghana about the risks of the flow being reduced and the Bagre reservoir spilling its waters which has already led to floods in Ghana. On the other hand they have led to cooperation between the countries as in the suggested Memorandum of Understanding and integrated management plans of the White Volta (Ministry of Works and Housing, 1998).

An acceptable institutional framework for cooperation in the Volta Basin still has to be found. In this context, an International Volta Basin Commission may be a possibility that could have the following main responsibilities:

- simplify and coordinate communication and exchange of data and information
- coordinate water use and monitor its sustainability
- reach agreements on monitoring and controlling pollution
- coordinate technical projects in the Volta Basin
- enhance economic development in the Volta Basin

The substance of transboundary cooperation could be based on the examples which are identified in the Ghanaian Strategy Paper (WRC, 1999) and which follow the main principles of international water law.

A second approach could be to reach agreements on every tributary of the Volta Basin separately. This approach is presently taken by the Ghanaian WRC. (WRC, 1999). However, the effort to reach a comprehensive agreement for the entire basin must be undertaken at the same time, considering that it will take longer to involve all the riparian countries. The Volta Basin must be considered as one hydrological unit.

A further issue to be taken into consideration are the national water institutions. Their performance varies considerably in the different riparian countries. Ghana’s WRC is in a favourable position as donors are heavily involved in the water sector reform. This had a positive effect on water management and the implementation of reforms. In other countries, like Burkina Faso, the water institutions are working in a somehow uncoordinated manner, at least at the different administrative levels. (Ministry of Works and Housing, 1998b). In Mali, the colonial decree of 1928 concerning water resources is still in force. These varying stages of management and institution building are an obstacle for international cooperation. Efficient national institutions are imperative lest international obligations remain empty formalities.

The importance of this fact for international cooperation cannot be overemphasized. The national institutions must have counterparts in the other riparian countries, for example in the field of pollution prevention, so that international agreements and agreed water policy measures can be applied and institutional cooperation be implemented. Donors should not neglect this aspect and invest also in institutional reforms in the other riparian countries.

When it comes to institution building at the national level, it might be advisable to choose a step by step approach. National institutions or departments in the riparian countries could be identified for cooperation. They could then exchange information not only on management of international watercourses but also on institutional experience and thus capacity building could be sped up. Once such cooperation functions, more and more institutions could follow the example so that finally the conditions for setting up an efficient transboundary institution are met. As personal contacts and information exchange are intensifying, trust between the countries is enhanced. This could help the parties which are involved to overcome narrow national thinking and to recognize that international cooperation can offer benefits which make it worthwhile to limit rights that are generally considered to be part of national sovereignty for the advantages of cooperation.

Cooperation in other fields than water use is almost equally important in the Volta Basin where the production of hydropower dominates water use. If alternative energy sources are exploited, the pressure on the hydro power production in the Volta Basin will decrease and so will possible conflicts. Water could then be used increasingly in other sectors such as irrigated agriculture. Further cooperation in this field might in the long run help to secure sustainable water use in the Volta Basin which is the precondition for healthy social life and economic development.

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