INVESTIGATING INSTITUTIONAL ARRANGEMENTS FOR INTEGRATED WATER RESOURCE MANAGEMENT IN DEVELOPING COUNTRIES: THE CASE OF WHITE VOLTA BASIN, GHANA

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Investigating Institutional Arrangements for Integrated Water Resource Management in Developing Countries: The Case of White Volta Basin, Ghana

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"If the misery of our poor be caused not by the laws of nature, but by our institutions, great is our sin" - Charles Darwin
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Executive Summary

Problem Definition

Water has become a critical resource for most developing countries. These countries are increasingly exposed to a range of water related challenges. These include the problems of fresh water scarcity, seasonal flooding, pollution of the resource base and challenges with respect to their navigational uses, all of which affect the ecosystem services offered by these water bodies. The exposure to these problems is due to different domestic and international factors, and the effects of these different factors are diverse within different country conditions.

Many scholars have described the water challenge as a crisis of governance. Thus, part of the problem is attributed to shortcomings in the institutions for water management. Although societies have developed rules for managing water since ancient times, the evolving approaches have been both path dependent and sectoral and have been unable to keep up with the rapid developments in society, especially in this century. In order to deal with these governance challenges, the international scientific and policy communities have been suggesting new models of water management. One dominant model is the concept of Integrated Water Resources Management (IWRM). Can the complex tasks associated with IWRM be effectively implemented by developing countries like Ghana that are moving away from sectoral approaches and adopting the IWRM concept? This thesis aims to improve the understanding of institutional arrangements in the management of water resources in an integrated manner in the White Volta basin of Ghana.

Research Questions

The overarching research questions are: (1) How has the IWRM philosophy been interpreted and implemented by developing and developed countries in general? (2) How do the institutional arrangements and the interactions among the institutions in Ghana influence IWRM interpretation and implementation? The three sub-questions are:

(i) To what extent can the problems in the use and protection of water resources be attributed to institutions in Ghana?
(ii) How do the different socio-economic factors in the White Volta basin influence the practice of IWRM?; and
(iii) How can the IWRM model be improved based on a general literature survey and the lessons learnt from water institutions in the White Volta Basin of Ghana?

Methodology

The study is based on extensive literature analysis, content analysis of policy documents, and an analytical layered case study that examined the national level through the White Volta Basin level to local level. Ten communities were selected from different sections of the basin for the study of local institutions. Actors at the different levels include water user associations, traditional authorities, water and sanitation boards/WATSANS, households, youth groups, women’s groups, the district assemblies (DAs), an irrigation company (ICOUR), and industries. The key data collection method included interviews, focus group discussions, observations, and document reviews. Those interviewed include government organisations (sector-specific and regulatory),
international organisations and non-governmental organisations involved in water resources management, industry, water research bodies, and universities.

**Literature Survey**

Chapter 2 presents a literature survey on IWRM. The review shows, first, that the evolution of the IWRM concept is a reaction to the perceived failure of the fragmented, sectoral approaches of the past. The idea of recognising the multi-sectoral nature of water resources and the need for its management in a holistic manner initiated a series of international debates at various forums, conferences and symposia which culminated in the adoption of the IWRM concept by epistemic and policy communities. The concept is still evolving and is also linked with other evolving concepts such as sustainable development and ecosystem services.

Second, IWRM recognises water as a social and economic good and gives room for exploring ways of achieving equitable access to water resources and obtaining maximum economic and social welfare out of it. It aims at the coordinated development and sustainable use of water resources. Third, at the conceptual level the views about what IWRM actually means vary widely. The most widely quoted definition of the concept is: ‘IWRM is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems’ (GWP, 2000: 22). But there is no consensus about its interpretation in the literature. Some of its proponents see it as a systems concept. Others see the concept as being fashionable rather than a radical new approach. Still others regard it as adaptive management. However, no matter how it is defined by its proponents, there is a general theme of coordination, sustainability, holistic approach and maximum utility implied.

Fourth, the strength of IWRM approaches over the sectoral approach is in the emphasis placed on the interdependence of the many different uses of water resources and the need to take the different aspects into account. The inclusion of elements of good water governance in its operationalisation adds to its strength and makes it more appealing to policy makers. Fifth, despite the attractiveness of IWRM to policy makers, critics argue that: (a) identifying the essential elements for IWRM is not easy; (b) the operational aspect of IWRM, integration, is complex; (c) managing water and other resources in an integrated and holistic manner may result in dealing with elaborate institutions which may not be easy to manage; and (d) the interface between water and law, as well as the many complex social aspects involved in water management, may pose a major governance challenge. For these reasons, it is important to ascertain the relevance of the concept by examining how the concept is being currently implemented in developing countries, and in particular in Ghana.

Chapter 3 assesses how the IWRM concept has been interpreted and applied in different developed and developing countries. The literature shows that (i) countries have applied the concept to different water development problems and have also interpreted IWRM differently. (ii) IWRM interventions have concentrated on modifying the legal and regulatory systems, but have not successfully engaged the people and social movements nor resulted in changing social institutions (e.g. South Africa and Tanzania). (iii) The few IWRM success stories are in countries where the structure of the economy and the governance processes are fairly well developed (e.g. New Zealand and Canada). (iv) In the absence of proper incentive structures, participants’ actions tend to work against the change process. (v) Each country’s experience has shown that both internal and external factors contribute in unique ways to institutional change.
Chapter 4 analyzes how institutions change or evolve. It shows, first, that institutions are a set of regularised practices. They may range from formal regulations backed by laws or organisational procedures to informal rules, norms and practices that have a conventional character. Without institutions and institutional arrangements there can be no organised water governance. Second, institutions do not function in a vacuum; they are closely linked both horizontally and vertically. Water governance involves introducing and developing changes to existing institutional arrangements to manage water in a sustainable manner. Third, a combination of the various theories on institutional change (evolutionary, market based, and bargaining theories) offer a viable way of explaining what changes might have occurred within the basin and of exploring how the existing institutions interact with the new institutions created as a result of the introduction of IWRM at national or basin level. These are applied in explaining the use of market-oriented approaches (for example, through cost-recovery, less state interference) in water supply and the use of democratic means (through decentralisation, user participation) to enhance efficiency.

Chapter 5 explains the institutional framework in Ghana for water management. The developments of water management regimes are traced from pre-colonial times to the present attempt at IWRM. Until 1996, there was no single ministry or department responsible for water management when by an Act of Parliament (Act 522 Water Resource Commission Act, 1996) the Water Resources Commission (WRC) was established. The Act entrusted the regulation and management of the utilization of water resources and coordination of any policy in relation to them to the Commission. The new institutions operate alongside the existing ones. The only exception is the tindanas (owners of the land resource in the study area) who are not recognised at the regional or district administration levels. Community crafted institutions that are perceived to be fulfilling the felt needs of the community, are respected and legitimised. Potable water supply was the sole responsibility of the Ghana Water and Sewerage Corporation (GWSC), which became the Ghana Water Company Limited (GWCL) in 1999. In line with the government’s decentralization policy, the Community Water and Sanitation Agency (CWSA) was carved out of the then GWSC with the mandate to facilitate the provision of safe drinking water and related sanitation services to rural communities and small towns in Ghana. Water management was placed under one ministry (Ministry of Water Resources Works and Housing) in 2001. A national water policy came into operation in 2007.

The need to coordinate Ghana’s water resources in a more holistic way was precipitated by findings from a Water Resources Management Study in 1998. The paradigm shifts from sectoral approaches to an integrated one in Ghana resulted in the acceptance of IWRM to mean: (a) managing surface and underground water with attention being given to the environment from a multidisciplinary and participatory perspective; (b) a process change involving the devolution of power and competencies to the local level to organise and implement executive functions; and (c) managing water based on hydrological boundaries. The implementation processes show that Ghana’s experience with IWRM is still evolving, and that the interpretation of the concept and application of the principles in practice are being introduced in various sector-related policies, plans and programmes.

Chapter 6 assesses the institutions and organisations at the river basin level for water resources management. It reveals that the bodies involved are government agencies, non-governmental organisations, research bodies, an irrigation company, water user associations, traditional authorities, and international organisations. The assessment shows that (a) some of the river basin institutions and organisations exist in form but not in reality; and that (b) there is a gap between the mandate and the tasks and the actual execution by these organisations.
(c) There are very strong vertical links with organisations at the local to the basin level and to the national level. This is because the links with the national level are regulated by hierarchical power relationships. These relationships have a political and legal basis since the organisations involved are in the public sector. No formal horizontal linkages exist at the basin level among these organisations/agencies. At the local level, they rely on cooperative types of coordination mechanisms. The horizontal linkages are weak because each line department concerns itself with its own activities and nothing more. This has not performed well in harmonizing decisions that are taken independently by different stakeholders. The changes in some of the basin institutions have resulted from the decentralisation and devolution of decision-making to the lower administrative levels (endogenous factors). This shift has put more responsibility at the local levels. However, some of the changes are based on ‘induced institutional innovation’ that results from exogenous factors such as the marketing of the IWRM philosophy by the western world and are not always locally understood, supported or implemented.

Chapter 7 identifies the institutions and organisations involved in the provision of potable water and their implications for water resource management. The Ghana Water Company Limited (GWCL) is responsible for urban water supply. The Community Water and Sanitation Agency (CWSA) works, in conjunction with the assemblies, for the provision of rural water supply and there are a number of NGOs also involved in the rural water supply. The GWCL treats water as an economic good in urban water provision. In the process the concept of private-public partnership comes into play, with cost recovery as the key philosophy behind the operations. This has been met with public resistance with civil societies arguing that this philosophy leads to exclusion of the urban poor from the use of the resource.

The operation of CWSA is based on the concept of community ownership of and responsibility for potable water management. The concept seems to generate good group actions for the management of the resource but there is a problem of institutional fit/interplay here. The CWSA is under the Ministry of Water Resources Works and Housing, which is decentralised only to the regional level. At the district and community levels, the CWSA functions under the Ministry of Local Government, and Rural Development. This leads to operational difficulties. Under the existing arrangements the district assembly (DA) is mandated to implement and monitor community water delivery programmes while the CWSA serves as the coordinating body. But the supervising DAs do not have the technical capabilities to perform the implementation and monitoring functions.

Chapter 8 looks at water management for livelihoods in the basin. The economic activities at the basin are basically crop production, fishing and animal rearing. The crop production is either rain fed or irrigated. Furthermore, there is one agro-industry concern, and there are women’s groups involved in pottery, small scale miners, and local traditional breweries. The agencies involved in managing these activities are the Ministry of Food and Agriculture, the Irrigation Development Authority, the Environmental Protection Agency, the Minerals Commission, the Ministry of Fisheries, the Irrigation Company of the Upper East Region and the water user associations (WUAs). The WUAs way of managing water for their common good demonstrates the existence of collective interest and how it brings about group action. The WUAs have their own practices, norms and rules that have evolved over the years to help manage water resources for their livelihoods.

Chapter 9 examines the interactions among water institutions and agencies for transboundary water management. It examines the extent to which these arrangements facilitate sustainable management of water resources in the basin and explores how the different
levels interlock in these arrangements. The results show that transboundary coordination of management of the Volta River Basin has evolved rapidly. The sub-committee of WRC in charge of international negotiations on water has had good consultations and bilateral agreements that have the potential for efficient use of the resources for the benefit of the riparian countries. The Project for Improving Water Governance in the Volta Basin (PAGEV) constitutes an innovative tool for the integrated management of water resources of the Volta Basin but the scope (in terms of area) of the pilot interventions is too limited. Up scaling the project to cover a broader scope may reveal the challenges that are inherent in the IWRM principles and methods in managing international waters. The changes in water institutions are as a result of an intentional design approach to institutional development. Notwithstanding, there are changes due to 'induced institutional innovation’ which is as a result of exogenous factors such as the IWRM philosophy from the international community.

Conclusions

Chapter 10 recalls the major purpose of the thesis and aims to provide an overview of the key overall messages. Four paradigms in water management have been marketed worldwide. These are the shift from government to governance, from centralization to decentralization, from water as a gift of God to water as an economic good and from sectoral to integrated water resource management. From the existing literature it is concluded that there is ineffectiveness in the sectoral organisation of water management in solving the water crises in the face of the multifunctional nature of water. This general picture applies well to the Ghanian water sector, where fragmentation of water management functions coupled with the absence of a common coordination mechanism resulted in the pollution of water bodies and drying up of water bodies due to uncontrolled clearing of vegetation along riverbanks, thus hampering the supply of potable water to both urban and rural communities. To address the problem the government introduced institutional reforms in the 1990s which eventually resulted in moving away from the centralised management system of the GWSC. This was followed by the decentralisation process and the subsequent adoption of the IWRM concept for the management of Ghanaian water resources.

The IWRM philosophy and methods seem to present highly challenging and complex implementation tasks. However, there are opportunities emerging from the implementation process. Historical experiences and policy legacy of the fragmented approach regime still dictates present actions to a very large extent. There is interaction of the existing institutional elements and that of the new concept, giving rise to new cooperation among the basin organisations involved in water management. These outcomes are neither dictated wholly by rational choice nor the path dependency of historical institutionalism. They are as a result of a kind of selection among the various logics that the IWRM ideas present to the actors.

There may be no universal instruments for IWRM implementation. Different implementation factors operate differently at different locations and a generic template of “best practices” may not work for others. The interconnectivity view of management also may not work for developing countries. The cultural context of the country is a critical issue in determining the extent to which IWRM could be beneficial. Without an understanding of existing informal collaboration, customs and networks, a formal IWRM framework may face great challenges and institutional mis-matches are a serious drawback to IWRM implementation. The greater the link of IWRM initiatives with the political and legal/institutional framework the better chances of success. Policies geared towards the promotion of ownership of programmes stand a better chance of acceptance and success.
Based on the literature survey, the content analysis of policy documents and interviews with stakeholders, this thesis concludes that developing countries like Ghana often adopt paradigm shifts because of exogenous pressures (e.g., aid agencies and international trends) but that (a) lack of domestic ownership of and leadership in implementing the concept, (b) limited resources, and (c) institutional mismatches, often results in implementation of the ideas on paper rather than practice with an ever widening gap between mandates and resources. This may ultimately have counter-productive impacts! Furthermore, the July 2010 United Nations General Assembly adoption of the Human Right to Water and Sanitation which has been supported by Ghana along with 121 other countries raises new questions. Will Ghana now discard the cost-recovery principle in favour of the human rights principle, is it going to blend the two principles, or is it going to ignore its commitment to progressively implement the human rights principle at national level? If it decides to implement the human rights principle it may have no resources left for IWRM.

Recommendations

The following recommendations aim at assisting the Water Resources Commission (WRC), White Volta Basin Board (WVBB), District Assemblies and the communities to address, in a practical way, pertinent problems on the ground and to fashion out further arrangements that will meet the needs of the time for sustainable management for the benefit of all.

Ghana could manage its water resources better if essential elements for IWRM are well identified within each basin. Attention is then given to the key components and relationships in order to reduce the complexity and uncertainty problems associated with the operationalisation of the concept. Given the fluid nature of the IWRM concept and the limited resources of Ghana on the other hand, it is such a focused integrated interpretation that is likely to lead to the most appropriate utilisation of the limited resources. It can result in spending less time in planning because there will be a smaller set of more relevant and prioritised recommendations to concentrate on and work with. It is recommended that the sub-committees of the basin board be reorganised along livelihood objectives or goals instead of the present subcommittees of the Basin Boards which are organised around topical issues like environment, land use, Research, Education and Public Awareness, etc. There can be, for example, a sub-committee on managing water for agriculture. This is more likely to bring about the proper coordination of agricultural sector agencies of the Ministry of Food and Agriculture (MOFA). The number of the subcommittees should depend on the key elements identified. These will help reduce the problem of “horizontal fragmentation” and facilitate effective coordination and cooperation. These could then be effectively integrated and coordinated by the basin board for better water management in Ghana.

There is the need to undertake a general review of the local government structure and put in place appropriate legislation that may enhance better coordination by the RCC at that level so as to make it more functional. Considering the vibrant nature of traditional and local institutions, a policy in the direction of legalising community crafted institutions and applying those institutions for water resources management is likely to enhance implementation. The assemblies, for example, can adopt the methods that communities have used to effectively mobilise for sustainable community collective initiatives and apply them in water resources management where applicable. Other recommendations include enhancing linkages, strengthening the technical support system in potable water delivery and properly defining and structuring the roles of NGOs and the donor community in water resources management at the local levels. All these are to be done in the light of the selected goals in the basin to bring about focused efforts.
For developing countries like Ghana the lessons from the Ghanian situation may be relevant because there are common conditions in their economies. These are: too many issues to be considered giving rise to elaborate organisations and institutional interactions that developing countries do not have the capacities to manage; large informal sectors and therefore their economies may not respond positively to the economic incentives for water reallocations; the bottom-up approaches involve too much participation that may eventually lead to lost focus. It is therefore recommended that “limited water resource management” which focuses more on prioritization, rather than holism; indigenising exogenous ideas; and working within existing cultural practices with a history of success and slowly moving towards second order learning that may challenge past path dependencies should attract the attention of developing nations like Ghana. These will give room for reconciling the values, interests and needs that exist within the basin.
Samenvatting in het Nederlands

Voor de meeste ontwikkelingslanden is water een centrale hulpbron geworden. Ze zijn in toenemende mate blootgesteld aan uitdagingen die aan water gerelateerd zijn, zoals problemen rondom zoetwaterschaarste, (seizoens-) overstromingen, vervuiling van hulpbronnen en uitdagingen met betrekking tot scheepvaart, die allemaal van invloed zijn op de ecosysteemdiensten die door de watersystemen worden vervuld. Blootstelling aan deze problemen is te wijten aan verschillende nationale en internationale factoren, en de effecten van deze factoren lopen uiteen in verschillende landen.


Onderzoeksvragen

De overkoepelende onderzoeksvragen zijn: (1) Hoe wordt de IWRM filosofie over het algemeen geïnterpreteerd en uitgevoerd door ontwikkelingslanden en ontwikkelde landen? (2) Hoe beïnvloeden de institutionele regelingen en de interacties tussen de instellingen in Ghana deze interpretaties en implementaties van IWRM? De drie deelvragen zijn: (I) In hoeverre kunnen de problemen met betrekking tot het gebruik en de bescherming van de watervoorraden worden toegeschreven aan de instellingen in Ghana? (II) Hoe beïnvloeden de verschillende sociaal-economische factoren in het Witte Volta stroomgebied de praktijk van IWRM? ; En (III) Hoe kan het IWRM model worden verbeterd, op basis van een algemene literatuurstudie en de lessen vanuit het water instellingen in het Witte Volta Bekken van Ghana?

Methodologie

De studie is gebaseerd op een uitgebreide literatuur-analyse, inhoudelijke analyse van beleidsdocumenten en een analytisch gelagde case study dat het nationale niveau bestudeert via het niveau van het Witte Volta stroomgebied tot aan het lokale niveau. Voor de studie van lokale instellingen werden tien gemeenten geselecteerd uit verschillende delen van het stroomgebied. Actoren op de verschillende niveaus omvatten de verenigingen van watergebruikers, traditionele gezagsdragers, water en sanitaire voorzieningen / WATSANS, huishoudens, jeugdgroepen, vrouwengroepen, District Assemblees (DAS), een irrigatiesysteembedrijf (ICOUR), en industrieën. De belangrijkste methode van dataverzameling betreft interviews, focusgroeppdiscussies, observaties en toetsing van documenten. De geïnterviewden behoren tot gouvernementele organisaties (sector-specifiek en regulier), internationale organisaties en niet-gouvernementele organisaties die betrokken zijn bij het waterbeheer, de industrie,
Literatuuronderzoek
Hoofdstuk 2 geeft een literatuuroverzicht over IWRM. Uit de evaluatie blijkt ten eerste dat de ontwikkeling van het IWRM concept een reactie is op het vermeende falen van de gefragmenteerde, sectorale benaderingen in het verleden. Het idee van de erkenning van de multi-sectoriële aard van watervoorraden en de noodzaak voor het beheer op een holistische manier leidde tot een reeks van internationale debatten op verschillende forums, conferenties en symposia die uitmondden in de omarming van het IWRM concept door de epistemologische gemeenschap en beleidsmakers. Het concept is nog steeds in ontwikkeling en is ook verbonden met andere evoluerende concepten zoals duurzame ontwikkeling en ecosysteemdiensten.

Ten tweede, IWRM erkent water als een sociaal, economisch goed en het geeft ruimte voor het verkennen van makkelijke toegang tot water en het verkrijgen van maximaal economisch en sociaal welzijn. Het is gericht op gecoördineerde ontwikkeling en duurzaam gebruik van waterbronnen. Ten derde, op het conceptuele niveau over de betekenis van IWRM lopen de meningen sterk uiteen. De meest genoemde definitie van het begrip is: ‘IWRM is een proces dat de gecoördineerde ontwikkeling en beheer van water, grond en aanverwante middelen bevordert, met het doel het daaruit voortvloeiende economische en sociale welzijn op een billijke manier te maximaliseren zonder afbreuk te doen aan de duurzaamheid van de vitale ecosystemen ’(GWP, 2000: 22). Maar er is geen consensus over de interpretatie ervan in de literatuur. Sommigen van de aanhangers zien het als een systeem concept. Anderen zien het als een radicaal nieuwe benadering. Weer anderen beschouwen het als adaptief management. Echter, ongeacht hoe het wordt gedefinieerd door de voorstanders, is er een algemeen thema met betrekking tot coördinatie, duurzaamheid, de holistische benadering en het impliciete maximale nut.

Ten vierde, een voordeel van de IWRM benaderingen ten opzichte van de sectorale benadering is de nadruk die wordt gelegd op de onderlinge samenhang van de vele verschillende toepassingen van de watervoorraden en de noodzaak om met die verschillende aspecten rekening te houden. Een ander sterk punt is het opnemen van elementen van goed waterbeheer in de operationalisering en dat maakt het aantrekkelijk voor beleidsmakers. Ten vijfde, ondanks de aantrekkelijkheid van IWRM voor beleidsmakers, beweren de critici dat: (a) de identificatie van de essentiële elementen van integraal waterbeheer niet eenvoudig is, (b) het operationele aspect van waterbeheer, integratie, is complex, (c) het beheer van water en andere hulpbronnen op een geïntegreerde en holistische manier kan resulteren in het omgaan met ingewikkelde instellingen die niet eenvoudig te beheren zijn, en (d) het raakvlak tussen water en recht, evenals de vele complexe sociale aspecten van het waterbeheer, kan zorgen voor belangrijke bestuurlijke uitdagingen. Om deze redenen is het belangrijk om de relevantie van het concept vast te stellen door te onderzoeken hoe het concept momenteel wordt toegepast in ontwikkelingslanden, en met name in Ghana.

Hoofdstuk 3 beoordeelt hoe het IWRM concept is geinterpreteerd en toegepast in verschillende ontwikkelde landen en ontwikkelingslanden. Uit de literatuur blijkt dat (i) landen het concept hebben toegepast bij verschillende aan water gerelateerde ontwikkelingsproblemen en dat ze IWRM verschillend hebben geïnterpreteerd. (ii) IWRM interventies zijn gericht op wijziging van de wettelijke en regelgevende systemen, maar hebben gefaald om mensen, en sociale bewegingen er actief bij te betrekken, en het heeft niet geresulteerd in verandering van maatschappelijke instellingen (bijvoorbeeld in Zuid-Afrika en Tanzania). (iii) De weinige IWRM succesverhalen zijn te vinden in landen waar de structuur van de economie en de bestuurlijke processen redelijk goed zijn ontwikkeld (bijvoorbeeld in Nieuw-Zeeland en Canada). (iv) Door het ontbreken van
adequaat aanmoedigingsbeleid, werken acties van deelnemers het veranderingsproces veelal tegen. (V) Ervaringen in elk land tonen aan dat zowel interne als externe factoren op unieke wijzen bijdragen aan institutionele verandering.

Hoofdstuk 4 analyseert hoe instellingen veranderen of evolueren. Het toont in de eerste plaats aan dat de instellingen een verzameling van gereguleerde praktijken zijn. Zij kunnen variëren van formele regelgeving die wordt ondersteund door wetten of organisatorische procedures rondom informele regels, normen en praktijken met een conventionele signatuur. Zonder instellingen en institutionele regelingen is er geen georganiseerd waterbeheer mogelijk. Ten tweede, deze instellingen functioneren niet in een vacuüm, ze zijn nauw met elkaar verbonden, zowel horizontaal als verticaal. Waterbeheer vergt de invoering en ontwikkeling van wijzigingen aan bestaande institutionele regelingen om water op een duurzame manier te kunnen beheren. Ten derde, een combinatie van de verschillende theorieën over institutionele veranderingen (evolutionair, marktgerelateerd en onderhandelingstheorieën) bieden een goede basis om mogelijke veranderingen binnen het stroomgebied te verklaren en te onderzoeken hoe de bestaande instellingen interacteren met de nieuwe instellingen die zijn opgericht als gevolg van de invoering van integraal waterbeheer op nationaal of (lokaal) bekken niveau. Deze worden aangewend bij het verklaren van het gebruik van een marktgerichte benadering (bijvoorbeeld door middel van kostenherstel, minder staatsbemoeienis) in de watervoorziening en het gebruik van democratische middelen (via decentralisatie, gebruikersparticipatie) ter verbetering van de efficiëntie.


De noodzaak om Ghana’s watervoorraden te coördineren op een meer holistische wijze werd bespoedigd door de bevindingen in de Water Resources Management Studies in 1998. Het paradigma verschaf van sectorale benaderingen naar een geïntegreerde aanpak in Ghana, wat resulteerde in de aanvaarding van IWRM. Dit hield het volgende in: (a) het beheer van oppervlaktewater en grondwater met aandacht voor het milieu vanuit een multidisciplinair en participatief perspectief; (b) een veranderingsproces waarbij de macht en bevoegdheden naar het lokale niveau gebracht wordt om uitvoerende functies te organiseren en uit te voeren; (c) waterbeheer op basis van hydrologische grenzen. De implementatieprocessen laten zien dat Ghana’s ervaring met IWRM nog steeds evolueert, en dat de interpretatie van het concept en de toepassing van de beginselen in de praktijk worden geïntroduceerd in verschillend
Hoofdstuk 6 evalueert de instellingen en organisaties op het niveau van de stroomgebieden voor waterbeheer. Het blijkt dat de betrokken instanties de volgende zijn: overheidsinstellingen, nongouvernementele organisaties, onderzoeksinstellingen, een irrigatiesysteembedrijf, verenigingen van watergebruikers, traditionele autoriteiten en internationale organisaties. Uit de evaluatie blijkt dat (a) sommige van de instellingen en organisaties in het stroomgebied bestaan in theorie maar niet in werkelijkheid, en dat (b) er een kloof is tussen het mandaat en de taken, en de daadwerkelijke uitvoering door deze organisaties. (C) Er zijn zeer sterke verticale banden tussen organisaties op lokaal niveau met die van het bekken niveau en het nationale niveau. Dit komt omdat de verbanden met het nationale niveau worden geregeld door hiërarchische machtsverhoudingen. Deze relaties hebben een politieke en wettelijke basis, aangezien de betrokken organisaties uit de publieke sector komen. Er bestaan geen formele horizontale banden op het bekken niveau tussen deze instanties. Op lokaal niveau, verlaten zij zich op samenwerkingsvormen van coördineringsmechanismen. De horizontale banden zijn zwak, omdat elke afdeling zich alleen bezighoudt met de eigen activiteiten. Dit heeft niet geleid tot harmonisering van besluiten omdat die onafhankelijk van elkaar worden genomen door verschillende belanghebbenden. De veranderingen in een deel van de bekkeninstellingen zijn voortgekomen uit de decentralisatie en de concentratie van de besluitvorming op de lagere bestuurlijke niveaus (endogene factoren). Deze verschuiving heeft meer verantwoordelijkheid gelegd op lokaal niveau. Echter, sommige van de veranderingen zijn gebaseerd op 'geïnduceerde institutionele innovatie' dat het resultaat is van exogene factoren, zoals de marketing van de IWRM filosofie door de westere wereld, en die worden niet altijd begrepen, ondersteund of uitgevoerd op lokaal niveau.

Hoofdstuk 7 brengt de instellingen en organisaties in kaart die betrokken zijn bij de levering van drinkwater, en bespreekt de implicaties hiervan voor het waterbeheer. De GWCL is verantwoordelijk voor de stedelijke watervoorziening. De CWSA zorgt samen met de Assemblees, voor de rurale watervoorziening, en er is ook een aantal NGO's betrokken bij de watervoorziening op het platteland. De GWCL beschouwt water als een economisch goed in de stedelijke watervoorziening. In dit proces komt het concept van publiek-private partnerschappen naar voren, met kostendekkendheid als belangrijkste concept. Dit heeft geleid tot publieke weerstand waarbij maatschappelijke organisaties argumenteren dat deze benadering leidt tot uitsluiting van de stedelijke armen van het gebruik van de natuurlijke hulpbron. CWSA werkt op basis van het concept van gemeenschaps eigendom wat betreft het drinkwater beheer. Het concept lijkt goede acties voor het beheer van de hulpbronen te genereren, maar er is een probleem wat betreft institutioneel samenspel. De CWSA valt onder het Ministerie van Water Resources, Werken en Volkshuisvesting, die alleen is gedecentraliseerd tot op regionaal niveau. Op districts- en gemeentelijk niveau, functioneert de CWSA onder het Ministerie van Lokaal Bestuur, en Plattelandsontwikkeling. Dit leidt tot operationele problemen. Binnen de bestaande regelingen is de Distric Assemblee (DA) belast met de uitvoering en de naleving van de waterleveringsprogramma’s op gemeentelijk niveau, terwijl de CWSA fungeert als coördinerende instantie. Maar de controlerende DAs beschikken niet over de technische capaciteiten om de uitvoering en de evaluatie te implementeren.

In hoofdstuk 8 wordt ingegaan op het waterbeheer ten behoeve van het levensonderhoud in het bekken. De belangrijkste economische activiteiten in het stroomgebied zijn de productie van gewassen, visserij en veeteelt. De productie van gewassen is ofwel “door de regen gevoed” of getriggerd. Verder is er een agro-bedrijf, en er zijn vrouwen die met aardewerk werken, kleinschalige mijnwerkers en lokale ambachtelijke brouwerijen. De instanties die betrokken zijn
bij het beheer van deze activiteiten zijn het Ministerie van Voedsel en Landbouw, de Irrigatie Ontwikkelings Autoriteit, het Milieu Beschermings Agency, de Mineralen Commissie, het Ministerie van Visserij, de Irrigation Company van de Upper East Region en de Water Gebruikers Verenigingen (WUAs). WUAs manier van waterbeheer voor het algemeen welzijn toont het bestaan aan van het collectieve belang en laat zien hoe dit leidt tot collectieve actie. De WUAs hebben hun eigen praktijken, normen en regels die door de jaren heen zijn geëvolueerd en die helpen om de watervoorraden te beheren ten behoeve van hun levensonderhoud.

Hoofdstuk 9 onderzoekt de wisselwerking tussen water instellingen en agentschappen wat betreft grensoverschrijdend waterbeheer. Het onderzoekt de mate waarin regelingen duurzaam beheer van de watervoorraden in het stroomgebied bevorderen en het onderzoekt hoe de verschillende niveaus van deze regelingen in elkaar grijpen. De resultaten tonen aan dat grensoverschrijdende coördinatie van het beheer van de Volta River stroomgebied snel is ontwikkeld. De sub-commissie van de WRC, verantwoordelijk voor de internationale onderhandelingen over het water, heeft goed overleg gehad en er zijn bilaterale overeenkomsten die goede mogelijkheden bieden voor efficiënt gebruik van de middelen ten goede van de oeverstaten. Het project voor de verbetering van waterbeheer in het Volta stroomgebied (PAGEV) is een innovatief hulpmiddel voor het geïntegreerde beheer van de watervoorraden, maar de omvang (in termen van oppervlakte) van de pilot interventies is te beperkt. Opschaling van het project voor een bredere toepassingsgebied kan de uitdagingen aan het licht brengen die inherent zijn aan de IWRM principes en methodes bij het beheer van de internationale wateren. De veranderingen bij de waterinstellingen zijn deels het gevolg van een doelbewust ontwerpproces. Daarnaast zijn er veranderingen als gevolg van de 'geïnduceerde institutionele vernieuwing', die weer een gevolg zijn van exogene factoren zoals de IWRM filosofie die voortkomt vanuit de internationale gemeenschap.

Conclusies

Hoofdstuk 10 herinnert aan het belangrijkste doel van het proefschrift en wil een overzicht geven van de belangrijkste algemene boodschappen. Vier paradigma's in het waterbeheer zijn wereldwijd gepromoot. Dit zijn de verschuiving van “overheid” naar “bestuur”, van centralisatie naar decentralisatie, van water als een geschenk van God naar water als een economisch goed, en van sectoraal naar integraal waterbeheer. Op basis van de bestaande literatuur wordt geconcludeerd dat er sprake is van ineffectiviteit in de sectorale organisatie van het waterbeheer in het oplossen van watercrises, met het oog op het multifunctionele karakter van het water. Dit algemene beeld geldt ook voor de Ghanese watersector, waar versnippering van waterbeheerfuncties, in combinatie met het ontbreken van een gemeenschappelijk coördinatietraject, resulteerde in de verontreiniging van wateren en het opdrogen van de waterbronnen als gevolg van de ongecontroleerde kap van de vegetatie langs de oevers, waardoor de levering van drinkwater aan zowel stedelijke en rurale gemeenschappen werd belemmerd. Om dit probleem te lijf te gaan heeft de overheid nieuwe institutionele hervormingen in de jaren 1990 ingesteld, die uiteindelijk resulteerden in het verlaten van het gecentraliseerde heerschip door de GWSC. Dit werd gevolgd door het proces van decentralisatie en de daaropvolgende goedkeuring van het IWRM concept voor het beheer van de Ghanese watervoorraden.

De IWRM filosofie en methoden lijken zeer uitdagende en complexe uitvoeringstaken te representeren. Echter, er worden mogelijkheden gecreëerd vanuit het implementatieproces. Vroegere ervaringen en de beleidservaringen van het gefragmenteerde benaderingsregime dicteren de huidige acties nog steeds in zeer grote mate. Er is interactie tussen de bestaande institutionele elementen en die binnen het nieuwe concept, die aanleiding geven tot nieuwe samenwerking tussen de organisaties die betrokken zijn bij het waterbeheer. Deze uitkomsten worden niet volledigbepaald door rationele keuzes, noch door ‘padafhankelijkheid’ van het oude
institutionalisme. Ze zijn het gevolg van een soort keuze tussen de verschillende redeneerwijzen die de IWRM aan de actoren biedt. Er zijn geen universele instrumenten voor de uitvoering van integraal waterbeheer. Verschillende uitvoeringsfactoren werken anders op verschillende locaties en een generiek raamwerk van "best practices" zal niet werken voor eenieder. Het idee van managementinterconnectiviteit zal mogelijk ook niet werken voor ontwikkelingslanden. De culturele context van een land is een kritiek punt bij het bepalen van de mate waarin IWRM nuttig zou kunnen zijn. Zonder begrip van informele samenwerking, kan een formeel IWRM kader voor grote uitdagingen komen te staan en institutionele mis-matches zijn een ernstig nadeel van de IWRM implementatie. Hoe groter de link van IWRM initiatieven is met de politieke en wettelijke / institutionele kaders hoe groter de kans op succes. Beleid dat is gericht op de bevordering van ‘eigenaarschap’ van programma’s heeft een betere kans van acceptatie en succes.

Dit proefschrift concludeert op basis van literatuuronderzoek, inhoudelijke analyse van beleidsdocumenten en interviews met betrokkenen, dat ontwikkelingslanden als Ghana de paradigma verschuivingen vaak overnemen door druk van buitenaf (bijvoorbeeld door hulporganisaties en internationale trends), maar dat (a) het ontbreken van nationale verantwoordelijkheid van, en leiderschap in de uitvoering van het concept, (b) beperkte middelen, en (c) institutionele mis-matches, vaak resulteren in de uitvoering van de ideeën op papier in plaats van in de praktijk, met een steeds groter wordende kloof tussen de mandaten en middelen. Dit kan uiteindelijk een averechts effect opleveren! Bovendien, de aanvaarding, in juli 2010, van de Human Right to Water and Sanitation door de Algemene Vergadering van de Verenigde Naties, die is goedgekeurd door Ghana samen met 121 andere landen, werpt nieuwe vragen op. Zal Ghana nu het principe van kostendekking loslaten ten gunste van het mensenrechtenprincipe, zal het de twee principes vermenigen, of zal ze haar commitment aan het geleidelijk doorvoeren van het mensenrechtenbeginsel op nationaal niveau negeren? Als ze besluit tot het doorvoeren van dit mensenrechtenprincipe dan kan ze mogelijk geen geld meer over hebben voor integraal waterbeheer (IWRM).

Aanbevelingen

De volgende aanbevelingen zijn gericht op het ondersteunen van de WRC, WVBB, District Assemblees en de gemeenschappen door aan te geven hoe zij op een praktische manier om kunnen gaan met een aantal knellende problemen die spelen op lokaal niveau, en door verdere regelingen uit te stippelen die kunnen leiden tot een duurzaam beheer ten behoeve van iedereen.

Ghana zou zijn/haar watervoorraden beter beheren als de essentiële elementen voor integraal waterbeheer goed worden geïdentificeerd binnen elk stroomgebied. De nadruk wordt gelegd op de belangrijkste componenten en relaties om zo de complexiteit en onzekerheid die met de operationalisering verband houden, te beperken. Gezien het fluide karakter van het IWRM concept en de beperkte middelen van Ghana aan de andere kant, zal een dergelijk gerichte geïntegreerde interpretatie waarschijnlijk leiden tot het meest geschikte gebruik van de beperkte middelen. Het kan resulteren in minder tijd voor de planning, want er is een kleiner aantal relevante en geprioritiseerde aanbevelingen waarop de aandacht wordt geconcentreerd. Het wordt aanbevolen dat de sub-commissies van het bestuursorgaan van het stroomgebied worden gereorganiseerd in samenhang met doelstellingen op het gebied van levensonderhoud, in plaats van de huidige sub-comités die zijn opgezet rondom thema’s zoals milieu, ruimtelijke ordening, onderzoek, onderwijs en publieksvoorzichtigheid, enz. Er kan, bijvoorbeeld, een sub-commissie komen voor het beheer van water voor de landbouw. In dat geval zal een goede coördinatie van de agrarische agentschappen van MOFA meer kans hebben. Het aantal sub-commissies moet afhangen van de belangrijkste elementen. Deze zullen bijdragen tot het verminderen van het
probleem van "horizontale fragmentatie" en een doeltreffende coördinatie en samenwerking bevorderen. Vervolgens kunnen deze dan effectief worden geïntegreerd en gecoördineerd door het bestuursorgaan van het stroomgebied voor een beter waterbeheer in Ghana.

Het is noodzakelijk om de structuur van de lokale overheid onder de loep te leggen en passende wetgeving in te voeren die de coördinatie door de RCC kan verbeteren op dat niveau, en het zo functioneler maken. Gezien het levendige karakter van de traditionele en lokale instellingen, zou een beleid dat de door de gemeenschap vervaardigde instellingen legaliseert en deze instellingen het waterbeheer laat uitvoeren, de implementatie kunnen verbeteren. De Assemblees, bijvoorbeeld, kunnen de methoden overnemen die gemeenten hebben gebruikt bij het effectief mobiliseren van collectieve duurzame gemeenschapsinitiatieven, en die toepassen in het waterbeheer, indien van toepassing. Andere aanbevelingen zijn onder meer het versterken van banden, de versterking van het technisch ondersteuningsysteem bij de drinkwaterlevering en het goed definiëren en structureren van de rol van NGO's en de donorgemeenschap in het waterbeheer op lokaal niveau. Al deze dingen moeten worden gedaan in relatie tot de geselecteerde doelen in het stroomgebied om tot gerichte inspanningen te komen.

De lessen uit de Ghanese situatie kunnen van belang zijn voor andere ontwikkelingslanden omdat hun economieën gelijksoortige condities kennen. Deze zijn:

Te veel zaken moeten in ogenschouw worden genomen, wat leidt tot complexe organisaties en institutionele interacties die door ontwikkelingslanden niet kunnen worden beheerd;

Door grote informele sectoren kunnen hun economieën niet positief reageren op de economische prikkels voor waterherverdeling en leidt de bottom-up benadering tot te veel participatie en uiteindelijk tot het verlies van focus.

Daarom wordt "beperkt waterbeheer" aanbevolen dat meer is gericht op prioritering dan op holisme; dat de nadruk legt op het eigen maken van ideeën die van buitenaf komen en op het werken binnen de bestaande culturele praktijken die in het verleden succesvol waren, en dat langzaam beweegt in de richting van het ‘tweede orde leren’ dat de vroegere padofhankelijkheden kan uitdagen. Deze aanpak zou de aandacht moeten trekken van ontwikkelingslanden zoals Ghana, want hij zal ruimte bieden aan het bij elkaar brengen van de waarden, belangen en behoeften die binnen een stroomgebied bestaan.1

---

1 Thanks to Wendelien Tuyp and Joop de Boer for the Dutch translation.
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Any errors, omissions and misinterpretations remain my responsibility.
### List of Abbreviations

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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>ADB</td>
<td>African Development Bank</td>
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<tr>
<td>ADRA</td>
<td>Adventist Development and Relief Agency</td>
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<td>AM</td>
<td>Adaptive Management</td>
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<tr>
<td>AVRL</td>
<td>Aqua Vittens Rand Limited</td>
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<tr>
<td>BACH</td>
<td>Binabi Area Community Health Project</td>
</tr>
<tr>
<td>BOT</td>
<td>Build-Operate-Transfer</td>
</tr>
<tr>
<td>CAP-NET</td>
<td>Capacity Building for Integrated Water Resources Management</td>
</tr>
<tr>
<td>CBO</td>
<td>Community Based Organisation</td>
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<tr>
<td>CEPS</td>
<td>Custom Excise and Preventive Service</td>
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<tr>
<td>CIDA</td>
<td>Canadian International Development Agency</td>
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<td>CNA</td>
<td>National Water Commission (Mexico)</td>
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<td>CODI</td>
<td>Community Development Initiative</td>
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<tr>
<td>CSIR</td>
<td>Centre for Scientific and Industrial Research</td>
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<td>CWSA</td>
<td>Community Water and Sanitation Agency</td>
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<td>CWSP</td>
<td>Community Water and Sanitation Project</td>
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<tr>
<td>DA</td>
<td>District Assembly</td>
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<tr>
<td>DANIDA</td>
<td>Danish International Development Agency</td>
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<tr>
<td>DDT</td>
<td>Dichlorodiphenyl trichloroethane</td>
</tr>
<tr>
<td>DFID</td>
<td>Department for International Development</td>
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<tr>
<td>DGIRH</td>
<td>Direction of Hydraulics (Direction Générale de l’Hydrolique, Ministère de l’Environnement et de l’Eau)</td>
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<tr>
<td>DGRE</td>
<td>Direction of Water Resources (Direction Générale des Ressources en Eau)</td>
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<tr>
<td>DWAF</td>
<td>Department of Water Affairs and Forestry</td>
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<tr>
<td>DWST</td>
<td>District Water and Sanitation Team</td>
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<tr>
<td>EC</td>
<td>Energy Commission</td>
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<tr>
<td>ECA</td>
<td>Economic Commission for Africa</td>
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<tr>
<td>ECOWAS</td>
<td>Economic Community of West African States</td>
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<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>EPA</td>
<td>Environmental Protection Agency</td>
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<td>EU</td>
<td>European Union</td>
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<td>FAO</td>
<td>Food and Agriculture Organisation</td>
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<td>Federal Provincial Relations Office</td>
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<td>Forestry Commission</td>
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<td>GEF</td>
<td>Global Environmental Facility</td>
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<td>GIDA</td>
<td>Ghana Irrigation Development Authority</td>
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<td>GLOWA</td>
<td>Global Change in the Hydrological Cycle</td>
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<tr>
<td>GM</td>
<td>General Manager</td>
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<tr>
<td>GoG</td>
<td>Government of Ghana</td>
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<td>GPRS</td>
<td>Ghana Poverty Reduction Strategy</td>
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<td>GSB</td>
<td>Ghana Standard Board</td>
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<tr>
<td>GTZ</td>
<td>Gesellschaft fuer Technische Zusammenarbeit</td>
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<td>GWCL</td>
<td>Ghana Water Company Limited</td>
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<tr>
<td>GWP</td>
<td>Global Water Partnership</td>
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<tr>
<td>GWP-TAC</td>
<td>Global Water Partnership- Technical Advisory Committee</td>
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<td>GWP-WA</td>
<td>Global Water Partnership-West Africa</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>GWSC</td>
<td>Ghana Water and Sewage Corporation</td>
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<td>GWTF</td>
<td>Ground Water Task Force</td>
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<tr>
<td>HI</td>
<td>Historical Institutionalism</td>
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<tr>
<td>HIV/AIDS</td>
<td>Human Immunodeficiency Virus/ Acquired immune deficiency Syndrome</td>
</tr>
<tr>
<td>HSD</td>
<td>Hydrological Services Department</td>
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<tr>
<td>IAS</td>
<td>Institute of African Studies</td>
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<tr>
<td>ICM</td>
<td>Integrated Catchment Management</td>
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<tr>
<td>ICOUR</td>
<td>Irrigation Company of Upper Region</td>
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<tr>
<td>ICWE</td>
<td>International Conference on Water and Environment</td>
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<td>IDA</td>
<td>Irrigation Development Authority</td>
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<tr>
<td>IDGEC</td>
<td>Institutional Dimensions of Global Environmental Change</td>
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<tr>
<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
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<td>IFPRI</td>
<td>International Food Policy Research Institute</td>
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<tr>
<td>INBO</td>
<td>International Network of Basin Organisations</td>
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<tr>
<td>IPCC</td>
<td>Inter-governmental Panel on Climate Change</td>
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<td>IRBM</td>
<td>Integrated River Basin Management</td>
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<td>IRDD</td>
<td>Irrigation, Reclamation and Drainage Department</td>
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<td>IREM</td>
<td>Integrated Resource and Environmental Management</td>
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<td>IRM</td>
<td>Integrated Resource Management</td>
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<tr>
<td>ISSER</td>
<td>Institute of Statistical, Social and Economic Development</td>
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<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
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<tr>
<td>IUCN-BRAO</td>
<td>International Union for Conservation of Nature</td>
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<tr>
<td>IWA</td>
<td>International Water Association</td>
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<td>IWC</td>
<td>International Waters Committee</td>
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<td>IWRM</td>
<td>Integrated Water Resources Management</td>
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<td>JTC-IWRM</td>
<td>Joint Technical Committee on IWRM</td>
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<td>JSS</td>
<td>Junior Secondary School</td>
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<tr>
<td>LAC</td>
<td>Land Allocation Committee</td>
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<td>LACOSREP</td>
<td>Land Conservation and Smallholder Rehabilitation Project</td>
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<tr>
<td>LC</td>
<td>Lands Commission</td>
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<tr>
<td>MC</td>
<td>Minerals Commission</td>
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<tr>
<td>MDA</td>
<td>Ministries, Departments, and Agencies</td>
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<td>MDGs</td>
<td>Millennium Development Goals</td>
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<td>ME</td>
<td>Ministry of Energy</td>
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<td>MES</td>
<td>Ministry of Environment and Science</td>
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<td>MEST</td>
<td>Ministry of Environment, Science and Technology</td>
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<td>MFEP</td>
<td>Ministry of Finance and Economic Planning</td>
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<td>MLF</td>
<td>Ministry of Lands and Forestry</td>
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<td>MLGRD</td>
<td>Ministry of Local Government and Rural Development</td>
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<td>MM</td>
<td>Ministry of Mines</td>
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<td>MOFA</td>
<td>Ministry of Food and Agriculture</td>
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<td>MRT</td>
<td>Ministry of Roads and Transport</td>
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<td>MSD</td>
<td>Meteorological Services Department</td>
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<tr>
<td>MSLC</td>
<td>Middle School Leaving Certificate</td>
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<td>MWRWH</td>
<td>Ministry of Water Resources, Works and Housing</td>
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<td>NCWSP</td>
<td>National Community Water and Sanitation Programme</td>
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<td>NDPC</td>
<td>National Development Planning Commission</td>
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</table>
NEPAD  New Partnership for Africa’s Development
NGO  Non-Governmental Agency
NI  New Institutionalism
NLCD  National Liberation Council Decree
NRCD  National Redemption Council Decree
O&M  Operations and Management
ODA  Oversea Development Agency
OECD  Organisation for Economic Co-operation and Development
PAEC  Public Awareness and Education Committee
PAGEV  Project for Improving Water Governance in the Volta Basin
PFAC  Policy, Finance and Administration Committee
PFCM  Permanent Framework for Coordination and Monitoring
PNDC  Provisional National Defence Council
PPHC  Presbyterian Primary Health Care
PPP  Public-private partnerships
PRA  Participatory Rural Appraisal
PSI  President’s Special Initiative
PSP  Private Sector Participation
PURC  Public Utility Regulatory Commission
PWD  Public Works Department
PWU  Public Workers’ Union
RCC  Regional Coordinating Council
RCI  Rational Choice Institutionalism
RECIEL  Review of European Community and International Environmental Law
RSA  Royal Society of Arts
SARI  Savannah Agricultural Research Institute
SEA  Strategic Environmental Assessment
SI  Sociological Institutionalism
SIDA  Swedish International Development Cooperation Agency
SMC  Supreme Military Council
SNV  Netherlands Development Organisation
SSCE  Senior Secondary School Certificate Examination
TA  Technical Assistance
TAC  Technical Advisory Committee
TIPCEE Trade and Investment Programme for Competitive Export Economic
UER  Upper East Region
UN  United Nations
UNCED  United Nations Conference on Environment and Development
UNDESA  United Nations Department of Economic and Social Affairs
UNDP  United Nations Conference on Environment and Development
UNECE  United Nations Economic Commission for Europe
UNESCO  United Nations Educational, Science and Cultural Organisation
UNICEF  United Nations Children’s Fund
UNMDP  United Nations Millennium Development Programme
URADEP  Upper Region Agricultural Development Programme
USA  United States of America
VBA  Volta Basin Authority
VLTC  Volta Lake Transport Company
VRA   Volta River Authority
WANI  Water and Nature Initiative
WARM  Water Resources Management Study
WATAC West Africa Technical Committee
WATSAN Water and Sanitation
WB    World Bank
WECO  World Commission on Environment and Development
WHO   World Health Organisation
WRC   Water Resources Commission
WRCCE Water Resources Coordination Center
WRCU  Water Resources Coordination Unit
WRI   Water Research Institute
WRIS  Water Resources Information Service
WSDB  Water and Sanitation Development Board
WSRP  Water Sector Rehabilitation Project
WSSD  World Summit on Sustainable Development
WSSPS Water and Sanitation Programme Support
WTC   Water Technical Committee
WTO   World Trade Organisation
WUA   Water User Association
WUC   Water Users Committee
WVBB  White Volta Basin Board
WVBP  White Volta Basin Pilot
WWAP  World Water Assessment Programme
WWC   World Water Council
WWDR  World Water Development Report
ZOVFA Zuuri Organic Vegetable Farmers Association
1. Introduction

1.1 Background

Fresh water is indispensable and irreplaceable, but it is increasingly becoming threatened in specific regions of the world. Water has thus become a critical resource issue for most developing if not developed countries. Population growth, urban growth, and global industrialization have increased the demand for water. During the 20th century, the world population tripled and its water needs multiplied by six times. 1/6th of this population has no access to potable drinking water (Brushweiler, 2003; Falkenmark, et. al, 2009, Shah, 2009). Irrigated areas increased by five times making the agricultural sector account for 70-80 % of worldwide water use (Rijsberman, 2006; Harrington, 2009).

Seventy percent of industrial sewage in developing countries is fed into waterways without any form of waste treatment. 50% of the world’s wet zones have disappeared during the 20th century and 1/3rd of catchment areas have lost up to 75% of their forests. The sectoral organisation of water management institutions has not proved effective in the face of the multifunctional nature of water. But is there a solution in sight in the adoption of integrated management concepts and methods that seem to present highly challenging and complex tasks?

This thesis aims to improve the understanding of institutions and institutional arrangements in the management of water resources in an integrated manner in the White Volta basin of Ghana. The present chapter presents the background information, followed by the problem statement and the research questions. It states the objectives of the study, discusses the importance of the research, the methodology followed and concludes with the structure of the report.

Water is key to sustainable development, crucial to economic, human and social development (GWP, 2000; Kataoka, 2002; WWDR, 2009) and for achieving the Millennium Development Goals (WWDR, 2009). The international fresh water conference organized in Bonn in 2001 was thus appropriately titled “Water, key to sustainable development.” Lives and livelihoods depend on water for development. As such, the proper management of water resources is an essential component of poverty reduction and equity. There can be no sustainable development without access to water for drinking and access to water for productive purposes for all people (Flint, 2004; Rijsberman, 2006).

Freshwater ecosystems are a source of diverse economically valuable commodities and services to society such as agricultural irrigation, manufacturing, transportation, recreation, habitats for plants and animals, and the production of fish and other foods and marketable goods. These benefits diminish when aquatic systems are degraded. As populations increase and societies hasten towards urbanization, industrialization, and commercial development, the need and use of more water becomes imperative (Flint and Houser, 2001). The awareness of its importance was given a greater recognition by the UN with the declaration of the observation of World Water Day every year.

Water is one of the resources managed by human society since the dawn of the early river-based civilizations (Dellapenna and Gupta, 2009). However, the modern debate about why and how we should protect, conserve and preserve the environment including water resources can be traced to the beginning of the conservation movement in the United States during the nineteenth century.
when the utilitarian conservationist movement led by Gifford Pinchot\(^2\) and the altruistic preservation movement led by John Muir\(^3\) worked towards improving the management of the environment. However, the need for serious attention to the issue has gained momentum since the 1990s (Welford, 1995). The generation of this momentum is a result of the increasing recognition of the persistent problem of the “lack of safe and affordable drinking water and basic sanitation, pressure from national economic sectors like energy and agriculture due to lack of water for development, transboundary conflicts and crises and international agreements on water” (Jonch-Clause, 2004: 10). The potential impacts of the new challenge of global warming on the water sector especially in the developing world is also an additional reason to examine water policies with greater care (Gupta, 1997; IPCC-2, 2007).

Water management aims at balancing the regulation of the legitimate uses of water resources so that sustainable management of the resources is achieved. In this respect, the Brundtland report’s definition of “sustainable development” is useful: “Development that meets the needs of the present generation without compromising the ability of the future generation also to meet their own needs” (WCED, 1987:54).

The concept of sustainability refers to a “dynamic condition of complex systems, particularly the biosphere of earth and the human socioeconomic systems within it” (Heintz, 2004:6). The concept draws on the fact that societal development cannot be viewed without considering its natural prerequisites (UNESCO, 1996). Sustainable development then refers to a pattern of resource utilisation that seeks to meet human needs while preserving the environment so that these needs can be met in the present as well as in the future (Valverde, 2008). The term has come to encompass the economic, environmental and social realms (Barbier, 1987; Hasna, 2007). It also includes the bio-chemical and physical dimensions and can be represented in an hour glass figure (Van der Zaag and Gupta, 2008).

The concept stresses the need to change from sector-centred ways of managing resources to approaches that involve cross-sectoral co-ordination and the integration of environmental and social concerns into all development processes (WWC, 2000). One of its arguments is that broad public participation in decision-making is essential for achieving sustainable development (Kirkby et al, 1995). It implies resolving the conflict between the various competing goals, and involves attempts at achieving economic prosperity, environmental quality and social equity in the same breath (Dasgupta, 2007; IUCN, 2006). This is what is famously referred to as the three dimensions; but clearly the bio-physical and chemical aspects also need to be taken into account.

Although much effort has been spent in identifying and promoting actions that are consistent with the principles of sustainable development since the Brundtland report (e.g. IPCC-3, 2007: chap. 12), not everyone approves of the notion of sustainable development (Kirkby et al, 1995). The concept of sustainable development is met with several critiques at different levels (IUCN, 2006) but that is not the focus of this section.

Water is critical to all life and it is integral to sustainable development (WWAP, 2003). For this reason water resources management, using the principles of sustainable development is essential for achieving sustainability. The sustainable management of the water environment also requires the regulation of both the quantity of water available and its quality. The search for sustainable water management, as is crucial for ensuring sustainability, needs to be intensified.

\(^2\)Gifford Pinchot was America’s first professionally trained forester, a conservationist and a republican governor of Pennsylvania under President Theodore Roosevelt.

\(^3\)John Muir was America’s most famous and influential naturalist and conservationist.
management has been responsible for the adoption of different modes of management of water resources. Preferences for different kinds of regimes characterise the change processes. The regime shifts include state regulated regimes to market-driven regulation; centrally administered to user-based institutions and from administrative ones to resource-based management (Pahl-Wostl, 2007).

1.2 Problem Definition

Fresh water scarcity and its degraded quality are one of the most pressing problems confronting humans especially in the developing world in the twenty first century (Catalysta, 2002; McCarthy, 2003; Mehta, 2003). The most serious threat to the provision of various goods and services required by society has to do with the rise in demand for water coupled with the degradation of its quality (FAO, 2000; WWAP, 2003). Statistics show that only 0.3% of global water is available for human consumption (Gleick, 1993). UNESCO (2003) states that 1.1 billion people lack access to sufficient safe drinking water and 2.4 billion lack access to sanitation services; there are over 25 million cases of water related diseases per year. Water related diseases kill more than 5 million people annually; about 2.3 billion people suffer from diseases linked to dirty water, and riverine ecosystems are endangered virtually everywhere by non-sustainable development and misuse of limited freshwater resources (WWAP, 2003). Ground water systems globally provide 25 to 40% of the world’s drinking water (WWAP, 2006) and these are being rapidly depleted.

The scarcity problem is either absolute, economic or due to water pollution. It is also experienced as a seasonal and/or regional issue. On a regional basis there is a different picture of the crises (in improved water supply) showing certain regional disparities (see Table 1).

Table 1.1: Regional disparities in access to improved water supply

<table>
<thead>
<tr>
<th>Regions</th>
<th>% Population With access to improved water supply</th>
<th>Proportional coverage (%)</th>
<th>Sanitation Coverage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>Africa</td>
<td>64</td>
<td>50</td>
<td>86</td>
</tr>
<tr>
<td>Asia</td>
<td>81</td>
<td>73</td>
<td>93</td>
</tr>
<tr>
<td>Europe</td>
<td>97</td>
<td>89</td>
<td>100</td>
</tr>
<tr>
<td>Latin America &amp; Caribbean</td>
<td>87</td>
<td>65</td>
<td>94</td>
</tr>
<tr>
<td>North America</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Oceania</td>
<td>87</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Source: WWAP, 2003

Even in the regions where water resources are well managed and human demands are met, water withdrawals and consumption by and for humans could be 10% higher in 2025 than in 1995 (World Water Council, 2000).
The problem is absolute when there is limited supply especially in drought prone regions but can also be experienced as a seasonal problem due to climatic factors. Changes to global climate as a result of increase carbon dioxide and other greenhouse gases are responsible for the increasing uncertainties associated with seasons (IPCC-2, 2007). Many parts of the world now face the awesome scare of water scarcity and flooding because of climate change. Similarly, there are regional disparities when it comes to flooding.

The crisis is also felt as a result of the inability to control the abundance of water in time of floods. Flooding has been a result of irregular and violent rainy seasons and rising water levels. However, until the nineties water resource protection was not a high priority in many developing countries, particularly outside of drought-prone areas such as North Africa and parts of Asia. This was influenced by the false perception that considerable water resources were available.

The WorldWater Council (2000) states that more than half the world’s major rivers are heavily polluted and/or drying up in their lower reaches because of over-use (high extraction rate, disposal of waste, agrochemicals etc.). Water resources are now experiencing intense and sustained demand from diverse socio-economic driving forces (Swyngedouw, 2009). The rivers are being exploited for industrial, commercial and domestic purposes. It is the over-exploitation and abuse of the resource that has resulted in pollution, degraded physical habitats and depleted river flows and ground water levels. Frequently, the sources of pollution are human waste, industrial wastes and chemicals, and agricultural pesticides and fertilizers. Half of the population of the developing world is exposed to polluted sources of water (WWAP, 2003). In the developed world the pollutants are more of industrial organic and acidifying substances, atmospheric emissions, and heavy metals.

The pollution situation is more serious in developing countries than the developed ones because of poor institutional and infrastructural arrangements for the treatment of municipal, industrial and agricultural waste (WWAP, 2003; GWP, 2004). With current practices, the degradation of ecosystems and the loss of biodiversity will threaten the lives of future generations. Several countries lack sufficient water to produce food and about half of the world’s wetlands have already been destroyed (World Water Council, 2000).

No country is unaffected by these problems and no country has all the answers to the problem. It is felt in the developed countries and pronounced in the developing countries (GWP, 2004). Developing nations need water not only for survival but also as a potential means of improving their economies. In more developed countries there is increasing concern about the risk of water resources being depleted and demands from consumers for higher levels of performance from those responsible for supply. Thus water scarcity is growing and, in some cases, clean water has become too expensive for the poor to afford. Water scarcity and the deteriorating water quality as well as floods are thought of as possessing the potential of becoming critical factors limiting national economic development, expansion of food production and/or provision of basic health and hygiene services to the population of many countries (WWAP, 2003; Jonch-Clause, 2004:10).

These problems with water have persisted because water resource requirements were considered in the context of advances in economic development outweighing the need for environmental and resource management (Howard, 1995; IPCC-2, 2007). Part of the problem is also attributed to shortcomings in the institutions for the management of water. Many have therefore described the water crisis as a crisis of governance (Keen, 2003; Gupta 2004): a failure to integrate policies and practices related to the management of water resources. It goes beyond mere technical challenges.

“The key issues confronting most countries today is that of effective governance, improved capacity and adequate financing to address the increasing challenge of satisfying human and environmental requirements for water. We face a governance crisis, rather than a water crisis.
Consequently, appropriate changes in the water governance processes hold the key to sustainable water resources management in the future.” (World Water Forum, 2003:6)

Institutions are rooted in a centralized culture with supply driven management of water resources. As a result, fragmented and sub-sectoral approaches leading to uncoordinated development and management of water resources have prevailed in many countries (Hooper, 2005; Boutkan and Stikker, 2004; Zarghaam, 2006, Cleaver and Toner, 2006). Jonch-Clause (2004:10) identifies the following facts as contributing to the management problems:

- Awareness and priority at political level of water issues is limited;
- Many environmental problems arise from interrelationships among biophysical, human and economic systems, and therefore it is difficult to treat them in isolation;
- Inappropriate pricing structures and, hence, limited cost recovery result in inefficient operation and maintenance of water systems, as well as in misallocation and loss of water;
- Investments in water sector are too low, and do not get sufficient attention in the national budgeting procedures; and
- Information and data to support sound management of water is generally lacking.

The need to address these weaknesses in water governance structures by the international community led to the organization of a World Water Council with active participation of scientific, engineering, industrial, environmental and government groups to speed up the search for alternative modes of water management to reduce the water crises. In the process of searching for an efficient way of managing water resources, the concept of integrated water resources management (IWRM) emerged as the internationally preferred option for both developed and developing countries. The consensus was reflected in both scientific communities (Conca, 2006) and policy processes.

The choice in favour of an integrated knowledge system has become necessary because of the rapid social change taking place in most developed and developing countries. The result is that new values and ways of thinking and solving increasingly complex and interrelated issues in the management of water resources are emerging from both western science and traditional knowledge (Wolfe et al, 1992; Biswas, 2001). Water theorists now favour IWRM as the best way to manage water resources (Figueroes et al, 2003; Boutkan and Stikker, 2004; Cleaver and Toner, 2006) and it enjoys international endorsement at the highest level, such as the 2002 World Summit on Sustainable Development, Johannesburg, the 2nd (2000) and 3rd (2003) World Water Forums (Hooper, 2005:8) and even at the 4th in 2006 and the 5th in 2009. Some even contend that it is an imperative (Wijkman, 1999).

This global paradigm shift from single purpose/sector specific approaches to IWRM is attractive to the international water related policy agencies because (a) it brings on board environmental (land, forests, biodiversity, etc.), social and economic issues together and ‘reinforces an ecological approach to land use and planning’ (Pahl-Wostl, 2007:49). (b) By its very nature, water creates networks: it is linked to other natural resources, social and economic activities (Brushweiler, 2003). (c) It is a reflection of the biophysical reality, which demonstrates the links the livelihood of the catchment through which water flows and resource perspective. (d) It can build on the latest scientific knowledge on the biochemical and physical aspects (Van der Zaag and Gupta 2008).

Despite these developments, there are questions regarding “the full consequences of this strategy for both social and environmental systems and for fulfilment of the notions which underlie
sustainable development” (Cleaver and Toner, 2006:207-208; Pahl-Wostl, 2009). In addition, the methodology and relevance of IWRM are still being debated.

Developing countries are also being encouraged to adopt this approach though they have a different socio-economic context. Meanwhile, successful examples of IWRM implementation are said to be few (Adeel, 2004; Tortajada et al., 2003). The reason lies partly in the fact that bridging knowledge and policies across sectors is often a complex and difficult task (Adeel, 2004; Pahl-Wostl, 2009). Fresh thinking on institutions for IWRM is suggested in the literature and policy documents. The 3rd water Forum (2003) noted that new policies, strategies and laws for water resources development and management in a large number of countries, use the principle of IWRM. The forum suggested that such plans have to deal with restructuring of the institutional framework, as well as river and lake basin organizations for implementing IWRM.

However, western values and peer-reviewed science influence the design of these international water and environmental policies. Such policies then influence the domestic design of institutions and instruments, especially in the developing countries through international agreements. Thus the concepts and theories underlying these recommendations often reflect Western values, research and experiences and may lead to counter-productive results (Gupta 2009a and b).

The problem that arises from this is that because values are not universal, different stakeholders may have different values. The concept of value, in this context is described by the expression of societal preferences, perceptions, and interests with regard to functions provided by the resources (Lamoree & van Steenbergen, 2006). This implies that values can emerge from social, economic, ecological, financial as well as temporal and spatial interests, and cannot be separated from the stakeholders. The stakeholders probably include farmers, industries, local towns and the general public but these categories may vary from one economy to the other or one society to the other. Consequently, their preferences, perceptions and interests as far as water resources are concerned are expected to vary.

The focus of many of these policy statements is on the macro and meso levels of institutional frameworks. There is an assumption that “access to services will be secured through local level institutions, nested into these wider governance arrangements” (Cleaver and Toner, 2006:208). Few policy statements and research documents focus on the workings of local level institutions. Policy documents express concern about the “careful balance between local institutions and the centre” in the interests of protecting the needs of the poor (UNMDP, 2005:8). However, there is limited attention given in policy to demonstrate the institutions that achieve such outcomes, and how they do this, and the methods for tracking institutional processes of inclusion and exclusion (Melloul & Collin, 2003; Cleaver and Toner, 2006). The research thesis then is that these internationally crafted policy recommendations are not directly appropriate for developing countries. These frameworks need to be context relevant.

IWRM approaches need institutional support for their operationalisation at the national to the basin level. Institutions define the interrelationships among biophysical, human and economic systems, the arrangement of which is the cause of many environmental problems (Young; 2002). Different institutional arrangements may require different management approaches. The critical factors that bring about different interpretations of IWRM are institutional, organizational, economic and socio-cultural (Bhat and Blomquist, 2004; Hooper, 2005) but others single out institutions as the most important (Young and Underdal, 1997; King, 1997). Consequently, attention must be paid to political, institutional, and other factors, especially those at the basin level (Koudstaal et al., 1992) that affect the ability and willingness of basin policy makers to convert IWRM from policy to practice.
The main challenges concern establishing appropriate policies, viable political institutions, workable financing arrangements, self-governing and self-supporting local systems, and a variety of other institutional arrangements that help to mitigate the crisis (Grigg, 1999). Yet institutions do not function in isolation. They either interact with or affect, and are affected by other institutions. The outcomes of these interactions affect institutional performance and survival (King, 1997). This may validate King’s assertion that analysis of institutional interaction could lead to ‘deriving design principles to promote positive, mutually reinforcing linkages among institutions at different or the same level of scale’ (King, 1997:2) Again, institutions are constrained by both external and internal factors. Young (1999) argues that institutions have to “fit” their context and discusses the problems of scale and interplay.

All these bring into the picture the issue of the competent authority for delivering IWRM. There is therefore the need to understand fully the role of institutions in affecting human behaviour that, in turn, impacts water resources. This is what this thesis seeks to do, particularly in a developing country. The thesis aims to help determine whether the original theory based recommendations for IWRM are universally applicable considering the institutional differences applicable in specific contexts.

1.3 Problem Definition for Ghana

Globally, there is the evidence that water has become a critical resource issue (WWC, 2003, Biswas, 2004). In Africa some of the rivers dry up in the dry season, which results in severe water shortages in some regions/communities (ECA, 1995). These problems are not uncommon in Ghana, the country of focus for this research. Even though Ghana is well endowed with perennial rivers and ground waters, seasonal water shortages are common (WRC, 2002). Seasonal variability and wide fluctuations in rainfall is the source of water shortage (drought). Such shortages have had adverse socio-economic effects on people in the country.

Large quantities of water are pumped on the land for agricultural purposes. The water withdrawal for irrigation for 2000 was 617.45×10^6 m^3. Withdrawals for livestock production for 2005 were 31.39×10^6 m^3 whereas that for rural domestic water supply was at 88.7×10^6 m^3 (WARM, 1998; WRC, 2005). These amounts are continuously increasing. The growing population with its associated urban and industrial development and increased exploitation of land resources has also contributed to increased competition for and conflicts over, the limited fresh water resources.

Pollution is increasing and poses a big challenge as more waste is discharged into the water bodies without any form of treatment. Some portions of rivers get polluted through human activities to the extent that ecosystem services are threatened. The pollution is partly due to the disposal of solid and liquid domestic wastes, wastes from small-scale industrial activities, untreated mining effluents, and leaching of agro-chemicals used for agricultural purposes into rivers (WRC, 2005). In addition, the issues of social inequity, economic marginalization and poverty are compelling people to overexploit soil and forest resources (ECA, 1999) which subsequently impact negatively on the water resources.

The cumulative impact of all these has been scarcity of fresh water in general and seasonal shortages in some parts of the country. The Water Research Institute of the Council for Scientific and Industrial Research predicts that a severe water deficit will hit Ghana by 2025 and hence making Ghana one of the water-stressed countries. Uncontrolled flooding has become a serious issue in the northern part of the country (the worse in 2007). Often women and children are the worst hit as they have to both walk long distances and spend too much time in search of water for the households. In some instances the educational calendar was affected because schools and

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4 Daily Graphic, WRI predicts water deficit in 15 years, November 18, 2010 edition, No. 18385
colleges could not function because of water shortage. The low level of water in the Volta in such dry spells affects hydropower generation downstream, which inadvertently affects industrial and economic activities. In case of flooding lives, settlements and other properties including farmlands are lost. The spread of water borne diseases affect the health of the people and their ability to work.

Prior to the 1990s, water management systems adopted sectoral approaches. Different sectors used their own approaches without any coordination with other sectors of the economy. In the process an attempt to solve one problem in a sector created another in a different sector. These problems coupled with globalization, technological advancement, and the information and communication revolution are calling for new paradigms – especially the adoption of the integrated approach (IWRM) with the creation of the Water Resources Commission (WRC).

The logical questions that need to be answered are: Do the institutions in Ghana including their underlying values permit or support this approach? What institutional arrangements can support IWRM in solving the water management problem in a developing country like Ghana?

These questions call for improved understanding of institutions and institutional arrangements in the management of water resources in the Ghanaian context. This thesis seeks to do this by employing a single layered case study approach focusing on the White Volta basin (see 1.6.5). This is expected to generate the empirical evidence needed to strengthen analysis of the conditions under which IWRM can be effectively implemented in developing countries like Ghana.

1.4 Research Questions

The overarching questions are: (1) How has the IWRM philosophy been interpreted and implemented by developing and developed countries in general? What does the literature say about this and what lessons can we learn from Ghana?

(2) How do the institutional arrangements and the interactions among the institutions in Ghana influence IWRM interpretation and implementation? The three sub-questions are:

(i) To what extent can the problems in the use and protection of water resources be attributed to institutions in Ghana?

- What are the problems in the use and protection of water resources in Ghana?
- What institutions exist in the river basin and in Ghana and what are their implications for water resource management?
- Which institutions function and which do not and why?

(ii) How do the different socio-economic factors in the White Volta basin influence the practice of IWRM?

- What socioeconomic activities prevail in the basin and how and what are the linkages with water use?
- How is the IWRM process experienced in the basin?
- What is the level of administration and regulatory capacity of the basin?

(iii) How can the IWRM model be improved based on a general literature survey and the lessons learnt from water institutions in the White Volta Basin of Ghana?

- How has Ghana been interpreting IWRM? What theoretical considerations influence IWRM practice?
To what extent is IWRM devolved to lower government authorities?

How can better institutions be designed to manage the water problems within the basin?

1.5 Importance of the Research

Research work in the area of how institutions achieve outcomes in water management is limited; so also is the attention given to the methods for tracking institutional processes of inclusion and exclusion (King, 1997; Kemper, 2003). “The critical linkages between formal and informal institutions and the structural and spatial linkages among local, regional and national institutions are ignored” (Saleth, 2006:3). The result is failure in programmes and policies to yield expected outcomes in water management efforts. This situation emanates from the inability to exploit strategic aspects that are found in water institutions and the course of their change process (Saleth and Dinar, 2004; Saleth, 2006). Furthermore, change often results more from exogenous, rather than endogenous forces; but how and why this happens is not always clear (Gupta 2009a and b). This research intends to fill this gap in knowledge on linkages between institutions and the change process.

The study therefore aims to assess how some contextual factors affect the concept and practice of IWRM and to suggest ways for improving the theory underlying IWRM. It also examines the management arrangements that exist on the selected river basin and analyses their implications for sustainable development in developing countries. It is expected that the findings will improve the knowledge about integrated water resource management under a contextual framework that is different from that of the developed world, which could contribute to the designing of a model that incorporates the knowledge and experience of the people in developing countries. This may help people to optimize the beneficial use of water resources without compromising on sustainability.

The results may contribute to the understanding of the extent to which institutions influence water use and protection and to identify which institutions work and which do not work in specific contexts and ascertain why they do or do not work. Based on an understanding of which institutions are effective within the “local” context, it will contribute to understanding how better design criteria can be adopted for designing more effective institutions for water resources management, particularly in developing countries.

1.6 Methodology

1.6.1 The Scope of the Study

This section discusses the methodology of the study under four headings: the theoretical framework, the literature reviewed, the case study methodology and the limitations of the study.

1.6.2 Theoretical Framework

This thesis uses an institutional approach. What are institutions? Institutions come in different shapes and are associated with forms of social organisations. Institutions are systems of rights, rules, and decision-making procedures and programmes that give rise to social practices, assign roles to the participants in these practices, and guide interactions among the occupants of the relevant roles (Young et al., 1999:89; Young, 2002:5). Institutions exist to affect human behaviour and have important long-term impacts on how decisions are made, yet they do not eliminate the free will of policy makers (Hall and Taylor, 1996). However, once they are created they take on a life of their own (March and Olsen, 1989). They change continuously in response to both endogenous and exogenous forces. The exogenous factors include climate change and the...
state of the economy whilst the endogenous factors are the structural features within the institutions (Saleth, 2006). In the course of this study, exogenous factors have also included the impacts of global epistemic communities, globalization, the role of aid agencies and international policy bodies.

Institutions serve as instruments for human cooperation and also establish a stable structure for human interactions. In this sense the study of institutions related to water resource management becomes very significant. The most critical element of integrated water resource management is coordinating among various human uses of water.

Water institutions can be looked at from two perspectives: the formal and informal institutions. The formal can be conceptualized as an entity defined by its three main analytical components: water law, water policy and water administration (see Chapter 4). The informal consists of norms, behaviour, conventions, and self imposed codes of conduct, and the habits and cultural symbols for guiding human action.

In the 1960s and 1970s agent-centred behaviourism dominated political science. Scholars became dissatisfied with agent-centred behaviourism arguments because (a) they did not study the policy process in terms of systems, stages, subsystems and arenas, but rather studied particular actors like executives, legislatures and constitutions (O’Riordan & Jordan, 1996). (b) They did not provide answers to understanding the roles of institutions in shaping political outcomes (Crawford and Ostrom, 1995). (c) They portrayed the individual, rational, decision makers as the primary unit of analysis. The increasing eagerness to seek a more open and flexible interpretation of the roles of institutions in the conduct of human affairs led to the new institutionalism (NI) movement. The general assumption is that individual preferences and perceptions are critically influenced by the institutional context in which they operate.

Three main variants of institutionalism were put forward:

- **Historical institutionalism**: Policy outcomes need to be understood in the light of the specific configuration of institutions and organisations that exist within each country. Some configurations are conducive to certain political outcomes, whereas others will lead to rather different policy pathways.

- **Rational choice institutionalism**: Individuals are said to behave rationally and strategically, using whatever resources they command to maximise their utility.

- **Sociological institutionalism**: The influence of institutions is seen in almost every aspect of human life. They can be habits and social protocols right through to cultural templates and frames of meaning. The proponents are convinced that these define what is expected and what is regarded as ‘rational’ or appropriate in a given situation (Hall & Taylor, 1996).

Unlike the behaviouralists, the new institutionalism makes explicit the links between human agency (policy process) and structure (organisation and position). A slightly different typology offered by O’Riordan and Jordan, (1996: 77-87) distinguishes institutions as including: (i) Sectoral policy networks; (ii) National policy styles; (iii) Structures of power and legitimacy; (iv) international regimes; (v) Standard operating procedures and barriers to ‘rational’ decision making. This thesis examines the relevance of new institutionalism in understanding the interactions of water institutions in the White Volta basin of Ghana and their influence on IWRM.

In order to facilitate the institutional analysis, the science plan of the Institutional Dimensions of Global Environmental Change (IDGEC) project of the International Human Dimensions Programme is adopted. This focuses on the analytical themes of fit, interplay, and scale (see 4.9). Fit concerns the argument that an institutional arrangement that performs well in dealing with one
problem may be a failure in solving other problems. Interplay deals with the relationship of an institution to, and interactions, with one or more other institutions (Young and Underdal, 1997). These kinds of interactions may be experienced among institutional arrangements at the local level, the national or societal level, and the international level (Young, 1992).

Scale has to do with the levels at which phenomena occur in the dimensions of space and time. Analysis of scale examines whether institutions can be scaled up from one administrative level to another and the conditions under which this might be effective. Scale also examines the issues of the politics of scale; do agents have specific reasons for scaling issues at particular levels or not (Gupta, 2008).

Water management is an activity that involves multiple and partly conflicting goals (Pahl-Wostl, 2007). Water and the issues concerning water are changing always, both on a spatial and temporal scale. The scale at which various types of knowledge can be applied to water management also varies (Sullivan and Meigh, 2007). Therefore the need to study the relationships between interplay and scale becomes relevant. A proper examination of these is likely to lead to understanding the ways in which institutions interact to shape human behaviour and the outcomes of social processes (King, 1997; Saleth, 2006).

This framework has the potential of coming out with a better understanding of institutional interplay (examining the vertical links as well as the horizontal links) in the given context in order to comprehend institutional effectiveness. These will help to identify the part of the problem caused by the institutional framework in place and also to identify those that function as well as those that do not function. Based on this analysis, a workable institutional framework could be recommended or designed.

Many water theorists argue in favour of IWRM for sustainable water resource usage (Tortajada et al., 2003; Biswas, 2003; Cardwell et al 2006). This work focuses on a discussion of the content of the IWRM concept (see Chapters 2 & 3). The proponents say that IWRM takes a comprehensive consideration of all related issues, e.g., social, environmental, institutional, and political (Bandaragoda, 2000; Boutkan & Stikker, 2004; Adeel, 2004; Jonch-Clausen, 2004; Biswas, 2004; Anderson et al, 2008). The concept builds further on the Dublin statements and principles (Savenije and van der Zaag, 1998; Hens & Nath, 2003). The emphasis of the concept is shown in these areas:

- Integrated water resources, implying an inter-sectoral approach, representation of all stakeholders, all physical aspects of water resources, and sustainability and environmental considerations;
- Sustainable development, which is sound socioeconomic development that safeguards the resource base for future generations;
- Emphasis on demand-driven and demand-oriented approaches; and
- Decision making at the lowest possible level.

The IWRM framework and approach recognise that complementary elements of an effective water resources management system must be developed and strengthened concurrently. These elements (enabling environment, institutional roles and management instruments) are discussed in Chapter 2. How the institutions interact and function to bring about effective integration under the IWRM concept is the focus of this thesis. Functioning institutions involves stakeholder participation and the livelihoods of the beneficiaries. Stakeholder participation and livelihood analysis are therefore the other theoretical areas that have been discussed (see Chapter 2 & 8 respectively).
1.6.3 Literature


A general search of relevant journals was also carried out in addition to the systematic review. Relevant books in the area of study were also reviewed. Other materials consulted include newsletters and documents of water management organisations like the Global Water Partnership and International Water Management Institute.

1.6.4 The Case Study Methodology

This section deals with the case study methods used. These are choice of case study, the selection of communities and respondents, the sources of data, methods of data collection and the analyses to be done.

1.6.4.1 Choice of Case Study

The case study is Ghana including the White Volta Basin (see Figure 6.1 for basin map). I chose Ghana because of the (a) limited information on water management experiences of the country; (b) the serious water problems the country has despite the many perennial rivers and ground waters; (c) the adoption of IWRM principles in water resources management in recent times; (d) the selection of the White Volta Basin as one of the priority basins for the implementation of the IWRM principles and prescriptions; (e) the many socioeconomic uses/benefits of the White Volta basin to the country and (f) last but not least, my own detailed experience and knowledge of the country.

The freshwater resources of Ghana are derived from rainfall, rivers, streams, springs, and various groundwater aquifers. Ghana is drained by three main river systems: The Volta basin, the Southern western system, and the Coastal Rivers system. These systems cover 70, 22 and 8 percent respectively of the total area of the country. The Volta basin system is shared with Cote d’Ivoire, Burkina Faso, Togo, Benin and Mali. The Pra, Tano, Bia, Ankobra, and their tributaries are the major river basins that form the South-western system. The White Volta basin (which is a part of the Volta Basin) provides water for domestic uses, agricultural purposes, and industrial use and for hydropower generation purposes. This is an indication of the role the basin plays in Ghana’s development efforts.
An analytical case study methodology was used for the study. This involves a description of the selected basin using the following categories: Policies (national, local government, organizational policy); Laws (formal laws, rules and procedures, informal rules, norms and practices, traditional laws, internal rules of organizations); and Administration. The case study design was preferred because: (a) the study covers contextual conditions, i.e. it investigates a contemporary model within its real-life context; (b) it deals with a distinctive situation in which there are more variables of interest than data points; (c) the types of research questions posed require case studies to provide the needed answers. The strategy gives the opportunity to know ‘how’ or ‘why’ some institutional incentives have worked (or have not worked); and (d) the extent of institutional control over actual behavioural events.

The selection of the case offers the opportunity to maximise what can be learnt considering the time constraint (Stake, 1995). My case selection and procedures meet the criteria for a case study because it offers the opportunity to: a) explain the causal links in real-life interventions that are too complex for a survey and too difficult to allow for an experimental strategy; (b) describe an intervention (IWRM) and the real-life context in which it has occurred; (c) explore the outcome of the intervention because the intervention (IWRM) has no clear, single set of outcomes (see Yin, 1998; Tellis, 1997; Yin, 2008). The use of case studies presents the likelihood of achieving a holistic understanding of cultural systems of action (sets of interrelated activities engaged in by the actors in a social situation) and possesses the potential of developing critical thinking (Alvarez, et al., 1990).

The single case study design was employed as opposed to multiple design since there was no intention of following up with a replication (see Tellis, 1997). There may be exploratory case studies, descriptive case studies, or explanatory case studies. The case study strategy is preferred in examining a contemporary issue like IWRM, where the relevant behaviour cannot be manipulated, as in an experiment, or studied as a survey, as is possible with ethnography. As reported by Yin (1998:8), “case studies rely on many of the same techniques as a history, but it adds two sources of evidence not usually included in histories: direct observation and systematic interviewing”. Despite the fact that case studies and histories overlap (Yin, 1998), a case study approach was chosen for the study because of its unique strength of making use of a full variety of evidence - documents, interviews, artefacts, archival records and observations (Tellis, 1997).

There are frequent criticisms against the use of case studies: First, is the concern of the lack of rigor of case study research. Yin (1989a) argued that there can be general applicability depending on the set of methodological qualities of the case, and how the case is constructed. Case studies can satisfy the three tenets of the qualitative method: describing, understanding and explaining (Tellis, 1997). Its reliance on multiple sources of evidence provide for triangulation to limit biases or inaccuracies in collecting data. The second prejudice is that case studies provide little basis for scientific generalisation. But Yin (1998) contends that case studies, like experiments, are generalisable to theoretical propositions and not to populations. And since in this study the case do not represent a “sample” but the researcher’s goal is to expand and generalise a theory (analytic generalisation) and not to enumerate frequencies (statistical generalisation) it (case study) becomes an appropriate approach.

The third concern is that case studies take too long and result in massive, unreadable documents. This argument is not true. It emanates from confusing the case study strategy with a specific method of data collection, such as ethnography or participant observation (Yin, 1998; Yin 2008). A case study does not depend solely on data from ethnographies or participant-observation but rather “benefits from the prior development of theoretical propositions to guide data collection and analysis” (Yin, 1998:13).

1.6.4.2 Selection of the Study Organisations/agencies
There are many actors involved in water resources management in Ghana at the national level. An extensive, but not exhaustive, list includes: Water Resources Commission; Ministry of Water Resources, Works and Housing; Ministry of Food and Agriculture; Country Water Partnership (a forum that pushes for IWRM); the International Water Management Institute (IWMI); Ghana Water Company; Irrigation Development Agency; Other Regulatory agencies (Forestry Commission, Minerals Commission, Environmental Protection Agency); Ministry of Children and Women’s Affairs; Water Research Institute; Hydrological Services; and Community Water and Sanitation Agency (CWSA).

The actors at the intermediate (basin) level include The White Volta Basin Board, The Basin Secretariat, Regional Coordinating Council, Non-Governmental Organisations which deal with water, Community Water and Sanitation Agency, Irrigation Development Authority, Ghana Water Company Ltd, Ministry of Food and Agriculture, Hydrology department, University of Development Studies, Water Research Institute (CSIR), Savannah Agricultural Research Institute (SARI), Environmental Protection Agency (EPA), Forestry Commission, Ministry of Fisheries and Gesellschaft fuer Technische Zusammenarbeit (GTZ).

In order to obtain a balanced and representative data the basin was stratified into three: the upper stream, middle and lower streams. At the community level, ten communities were selected from these sections of the basin to be included in the study. In each section, the communities selected included a rural and an urban settlement in order to have a fair representation of the socioeconomic activities that go on in the different settlements. Communities with specific activities like mining, industry and agriculture were selected for the study. A reconnaissance visit to the basin enabled me to decide on the number of communities to be included.

Actors at the local level include water user associations (WUA), (farmer groups and fishermen groups), traditional authorities, water and sanitation board/WATSANS, the district assemblies, the Irrigation Company, industries, and small scale miners. One water user association each was selected from upstream, middle stream and downstream and studied to understand institutional dynamics at the local level. Within each community, the selection of respondents was influenced by the use of the key informant approach. This approach required the careful identification of a select group of formal and informal leaders, influential leaders, persons or experts within the community. These are individuals expected to have particular or “expert” knowledge about the community, its people, and environment and, in particular, water issues. This was done with the assistance of the assembly member of the area, the head of the District Water and Sanitation team and/or the leader of a youth group. These people helped me in identifying the key informants to have either direct interviews or focus group discussions with them. This approach was employed because of the nature of the information that was being sought (i.e. knowledge on water resources that makes it necessary to rely on knowledgeable and influential people in the communities e.g. Chiefs, elders, youth groups, and other identifiable individuals and groups).

Table 1 below gives the summary of those interviewed at the various levels (total=133)

<table>
<thead>
<tr>
<th>Institutions/ Organisations</th>
<th>Govt. bodies</th>
<th>NGOs</th>
<th>Industries</th>
<th>WUAs</th>
<th>Experts/civil society</th>
<th>Traditional bodies</th>
<th>Households/ Youth groups</th>
<th>Total</th>
</tr>
</thead>
</table>

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### 1.6.4.3 Sources of Data

Both primary and secondary data were collected. The primary data were collected through interviews with individuals, traditional rulers/opinion leaders in the communities, women’s groups, and the local government agencies/district assemblies on their plans for the development of the resource. The data collected included issues on their perceptions about water resources, water use practices, involvement in the management of the resource, and local knowledge in water resource management, the responsibilities of traditional institutions, control and ownership of the resource, institutions that are involved in water management and the problems associated with applying the water laws. Interviews with heads of water agencies and non-governmental organisations that deal with water were undertaken.

These sources and types of data were considered important because it was necessary to understand the situation with the advent of central government taking control and ownership of water resources and setting up technocratic institutions to manage water resources. It also helped to understand the responsibilities of traditional institutions and their influence over water resources.

The secondary data was collected from organisations or agencies involved in managing the resource. The collected data covered issues on the national water policy in place and its content, the role the identified organisations/ministries like community water and sanitation agency and Ministry of Food and Agriculture have played in the management of the resource, the responsibilities of those bodies and the problems they have encountered in their participation in the management of the resource. Other sources of secondary data included: policy documents, written reports and studies relevant to the study and from official sources or institutions that have responsibilities in the basin area. These sources include the Water Companies, the various district assemblies/local governments within the basin area, Forestry Department, Ministry of Mines, Water Resource Institutes and the Water Resources Commission.

### 1.6.4.4 Methods of Data Collection

Multi-stakeholder meetings were held to collect data on existing institutions for water management and the resulting water governance systems. Some of the issues or questions that arose from these multi-stakeholder discussions include: whether the institutions fit with existing arrangements for water resources management and use; whether the legal instruments assist with the participation of stakeholders in the decision making processes; what are the water governance roles of local authorities and other stakeholders in managing water resources at local level; who gets involved, and how they are involved and when; and many more issues.
For the water user associations, PRA (Participatory Rural Appraisal) tools such as open interviews, group discussions, informal conversation, walking through the community and observation (observing the group undertake communal activities and meetings) were employed. This was based on the assumption that water problems are a common concern, the management of which requires the active involvement of the entire community/stakeholders (Chambers, 1994; Bhandari, 2003, Mukherjee, 2003). This method allowed for triangulation in the data collection. Interviews were undertaken with local NGOs and donor agencies, individual experts and academic/research institutions.

A combination of an interview schedule and focus group discussions was used in collecting data on social and livelihood characteristics, managerial responsibilities and local knowledge in water resource management, water use practices (ways of water extraction, waste disposal) and initiatives being undertaken by the communities for the management of the catchment area (see Appendix I for samples of interview schedules).

1.6.5 Institutional Analysis

The analysis of the various institutions was undertaken to identify how they are useful in dealing with the different water problems, the different incentives, and the role of contextual features within the basin. Data analysis helps to identify (a) the critical regional, national and/or local institutional and governance issues, and (b) to reveal the critical political issues at each level of water governance.

The institutional analysis draws on Young (1999) and IDGEC (1998/2005). First, the institutions are examined in terms of how they are related to the existing problems. This was done in the light of the existing socioeconomic activities and problems associated with each of them. Which incentives work and which do not? This goes with the identification of areas of policy, laws and organisational arrangements which best suit the situation or may need to be improved. Thus the suitability and adequacy of each element related to laws, policies or organisational arrangements were assessed. These were examined with respect to the existing socio-economic situation in the basin, the current technology used for operations, and the water availability and quality situation in the basin. The changes that have taken place in the institutions were examined and how these can be redesigned to bring about effectiveness explored.

1.6.6 Limitations of the Study

The study is limited to the extent that it is based on only one basin in one country. This makes it difficult to extrapolate from just a single case though there could be some useful lessons. The analysis is basically qualitative without much quantitative discussions.

1.7 Structure of the Thesis

Figure 1.1 provides a representation of the structure of this thesis.
Chapter 2 is devoted to literature review on the IWRM concept. This is done under various headings including evolution of the IWRM concept, the meaning of the concept, the principles and processes of IWRM and the weaknesses of the concept. It concludes with some inferences. A review of experiences in IWRM in some developed and developing countries is presented in Chapter 3. Chapter 4 reviews the theory of institutions and water governance. It discusses the nature of institutions and governance structures necessary for an efficient water resource management. Chapter 5 analyses Ghana water management at the national level whilst chapter 6 deals with the White Volta basin institutions: their nature, linkages and appropriateness. Chapter 7 concerns itself with domestic/potable water management and the institutions involved and chapter 8 looks at community water management for productive/livelihood purposes. In chapter 9 the top-down / bottom-up interface and the transboundary management attempts are examined. Chapter 10 deals with conclusions and recommendations.
2. Integrated Water Resource Management: Understanding the Concept

2.1 Introduction

Chapter one introduced the concept of Integrated Water Resources Management (IWRM) and its adoption throughout the world since the early 1990s (Mitchell, 1990; Dublin Statement, 1992; GWP, 2000, 2005). At the conceptual level, IWRM has become an accepted framework for good water governance (Bandaragoda, 2000; Boutkan & Stikker, 2004:150; Adeel, 2004:3; Jonch-Clausen, 2004; Biswas, 2004; Anderson et al, 2008). The concept has been actively promoted by international organizations including the Global Water Partnership (GWP), the International Water Association (IWA), the World Water Council (WWC), the International Network of Basin Organisations (INBO), the International, American & Canadian Water Resources Associations, and the Stockholm Water Symposium (Hooper, 2005).

This chapter reviews the literature on IWRM to explain the concept, how it evolved, the elements included and why it is important in the sustainable management of water resources. It explains the underlying principles and processes or approaches involved.

The chapter explains the evolution of the concept (see 2.2), examines the meaning of the concept (see 2.3), discusses the IWRM principles (see 2.4), and the elements involved (see 2.5). The approaches of IWRM in the sustainable use of the resource are reviewed under section 2.6. The processes involved, strengths and weaknesses of the concept are dealt with in 2.7 and 2.8 respectively. The chapter ends with some inferences (2.9). Contextual challenges and country experiences are reviewed in Chapter 3.

2.2 Evolution of the Integrated Water Resources Management Concept

For centuries, countries have used different forms of institutionalised water management (Dellapenna and Gupta (eds.) 2009) which serve as forerunners of the present IWRM paradigm (Rahaman and Olli, 2005, Anderson et al, 2008). This concept has evolved over 70 years or more (White, 1998:21). White (1998:22) identifies three phases of IWRM development. (1) At the beginning of the 20th century the single purpose mode of managing water resources was predominant (e.g. developing streams for hydroelectric power or irrigating fields from canals). (2) Then came (by the third decade) the period of multi-purpose development in basins such as the Tennessee, the Loire, and the Ganges with the aim of utilizing water and energy in facilitating regional economic growth and human welfare. (3) By the sixth decade, awareness about the social and environmental impacts of the networks of river management works came into focus. But these developments or approaches did not happen in a vacuum. They were influenced and “dictated by the prevailing government policies at the time as well as the societal values of the day” (Hooper, 2005: 3). The concern about the social and environmental impacts ignited international initiative along two paths: (1) international policy for development, and (2) basic research and data collection.

Policy events on water can be traced back to the 1949 Lake Success Conference on the Conservation and Utilization of Resources. This conference sought to review experiences with natural resources management. These included water resources, minerals, fuel & energy, forest, land & wildlife and fish. The next significant activity recorded by the UN (1958) was a review of the administrative, economic and social implications of integrated river basin development by UN Economic and Social Affairs department in 1956. In 1966 the Helsinki Rules on the Uses of
Waters of International Rivers was adopted by the International Law Association, an academic association. Then in 1971 the UN Department of Economic and Social Affairs issued a World Plan of Action for the application of Science and Technology to development. Water resources were one of the resources earmarked for development included in the action plan (White, 1998: 23).

The 1970s witnessed a series of UN organised global mega-conferences on critical global issues. These included the Stockholm Conference on the Human Environment (Stockholm, 1972) and the Water Conference in Mar del Plata (1977). It was the 1977 conference that gave rise to the formulation of general principles for application to both national and international agencies on water. The 1980s were declared as the UN Water and Sanitation Decade and in 1992 the UN Conference on Environment and Development adopted a chapter on fresh water in Agenda 21 (White, 1998; Savenije & van der Zaag, 2000: 1, Coulomb, 2002: 129). The agenda outlined programmes and activities for water management and assessment, water quality and sanitation, and agricultural and rural water supplies in the context of possible climate change. The idea of recognising the multi-sectoral nature of water resources and the need to manage them in a more holistic manner was first intimated in this document (Gerlak, 2004: 400). Nevertheless, water issues were scarcely prioritized in the UN arena during most of the 1980s and 1990s (Biswas, 2001: 351; Lane, 2002: 301; Rahaman & Varis, 2005: 15). In the vacuum that was created, many governments and non-state actors stepped in and organized their own water related conferences.

Based on an assessment of the 1977 Conference, some governments set up the Dublin Conference in 1992 focusing on Water, Environment and Development (Savenije & van der Zaag, 2000: 1). The Dublin consensus statement on Water and Sustainable Development with its focus on integrated water resource management have influenced policies ever since. Many states committed themselves to the IWRM philosophy which emphasized the need to keep in sight the important links between water resources and land management (Smet and van Wijk, 2002).

State and non-state actors have also established the World Water Forum series: the first conference was held in Marrakech in 1997. Since then meetings have been held every three years in The Hague (2000), Kyoto (2003), Mexico (2006), and Turkey (2009). There are also annual Stockholm Water Conferences. In 1996, the World Water Council (WWC) was established (Abu-Zeid, 1998: 10; Biswas, 2001: 351) and subsequently the Global Water Partnership (GWP).

These two bodies collaborate to further discuss and deliberate on the world water crises. The WWC acts as the international water policy think-tank and its mission is “to promote awareness of critical water issues at all levels, including the highest decision-making level; to facilitate efficient conservation, protection, development, planning, management and use of water in all its dimensions on an environmentally sustainable basis for the benefit of all life on earth” (Coulomb, 2002: 12). IWRM was therefore developed as a response to international water governance crises. The policy evolution is shown in Table 2.1 below.
<table>
<thead>
<tr>
<th>Year</th>
<th>International Policy Sector Developments</th>
<th>Key principles/issues/ targets agreed upon</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>UN Conference on Human Environment, Stockholm</td>
<td>Principle 13 of the Declaration: To ensure that water development is compatible with the need to protect and improve environment</td>
</tr>
<tr>
<td>1977</td>
<td>UN Water Conference, Mar Del Plata in Argentina</td>
<td>Encouraging governments to establish guidelines for effective intervention plans for comprehensive and effective water resources management</td>
</tr>
<tr>
<td>1992</td>
<td>International Conference on Water and Environment, Dublin</td>
<td>Harmonization of development and environment; participatory approach to management; gender mainstreaming in the provision and management of water; recognition of water as an economic good; management of international watersheds endorsed and backed by international agreements.</td>
</tr>
<tr>
<td>1992</td>
<td>UN Conference on Environment and Development, Rio de Janeiro</td>
<td>By the year 2000: (i) Put in place appropriate institutional structures and legal instruments; (ii) establish efficient water-use programs to attain sustainable resource utilization patterns. By 2025: achieve sub-sectoral targets of all freshwater programmes based on General Assembly resolution (financial transfer of 0.7% of GDP from developed countries to developing countries).</td>
</tr>
<tr>
<td>1997</td>
<td>1st World Water Forum, Marrakech</td>
<td>Renewed partnership to operationalise the Mar del Plata and Dublin Principles and Chapter 18 of the Rio Summit for sustainability of water resources.</td>
</tr>
<tr>
<td>2000</td>
<td>2nd World Water Forum, The Hague</td>
<td>Call for coherent national and, where appropriate, regional and international policies to overcome fragmentation, and for transparent and accountable institutions at all levels for IWRM.</td>
</tr>
<tr>
<td>2002</td>
<td>World Summit on Sustainable Development, Johannesburg</td>
<td>By 2005 each state should prepare its IWRM policies including its efficient use of water plan</td>
</tr>
<tr>
<td>2003</td>
<td>3rd World Water Forum, Kyoto</td>
<td>By 2005 each state is encouraged to prepare its plan of IWRM and its water efficiency plan.</td>
</tr>
<tr>
<td>2005</td>
<td>World Summit on MDGs</td>
<td>Added an important proviso to the 2002 WSSD Plan of Implementation (JPOI): foreign assistance should be provided to developing countries in preparing IWRM and water efficiency plans as part of comprehensive national development strategies to achieve the MDGs.</td>
</tr>
<tr>
<td>2006</td>
<td>4th World Water Forum, Mexico</td>
<td>Expressed awareness and responsibility of local and regional leaders concerning water and sanitation and called on national governments for a more effective partnership in IWRM implementation</td>
</tr>
<tr>
<td>2009</td>
<td>5th World Water Forum, Istanbul</td>
<td>UNESCO IWRM Guidelines on Consensus for Local and Regional Authorities for water management in the face of global changes</td>
</tr>
</tbody>
</table>
It is not very easy to separate the scientific evolution from the policy evolution as both processes have fed into and reinforced each other. The discussions within the epistemic communities are dealt with below.

2.3 What is Integrated Water Resources Management?

The history of the international water agenda shows that there is a paradigm shift towards integrated water resource management approaches and principles. The shift focuses on the sustained use of these resources (Jewitt, 2001: 103; Pahl-Wostl, 2007: 49; Zarghaami, 2006: 215). To better understand the IWRM concept some related concepts are explained first.

2.3.1 Related Concepts

In the water resources domain different expressions are given to this shift. Some have referred to it as Integrated Water Resource Management (Jewitt, 2001:103); others prefer to call it Integrated Catchments Management, or Integrated River Basin Management (Hooper 1997; Swallow, Johnson & Meinzen-Dick 2001: 450; Hooper, 2005). Integrated catchment management takes into consideration the role of the ecosystems in supporting flora and fauna, providing services to human societies, and regulating the human environment. It also takes into account the complex relationships within those ecosystems. Integrated River Basin Management involves complex decision-making in a river basin. These involve issues such as water resources development, river and floodplain management and policy analysis which are carried out using multi-disciplinary approaches.

Hooper (2005:9) provides a definition for integrated river basin management (IRBM) and draws a distinction between IWRM and IRBM. He defines IRBM as “an integrated and coordinated approach to the planning and management of natural resources of a river basin, one that encourages stakeholders to consider a wide array of social and environmental interconnections, in a watershed context.” This definition of IRBM is seen as a composite part of IWRM.

Some take a more generic approach and call it integrated resources management (IRM) or integrated resource and environmental management (IREM) (Hooper, 2005: 4). Watershed management is used to refer to the use, management, and investment in a number of interdependent resources within “watersheds” that shed water into streams and “catchments” that collect water into a common outlet point (Swallow, Johnson & Meinzen-Dick 2001: 449).

Other terms that are used to describe watershed are drainage basin, catchment, catchment area, catchment basin, drainage area, river basin, and water basin (Lambert, 1998). In the technical sense, a watershed refers to a divide that separates one drainage area from another drainage area (Ritter, 2006; watershed.org.). Cardwell et al, (2006:16) state that watershed management is “one logical entry to IWRM” and argue that the watershed concept is not universally applicable or comprehensive enough to embrace all of the necessary considerations for effective water resources management.

On the other hand, a catchment geographically refers to that area of land which drains to a single defined point but in the physical sense a catchment is made up of soil, water, air and vegetation. The definition given by Hooper (1997) to “catchment management” conveys a similar meaning as watershed management. Here, integrated catchment management involves the coordinated management of land, water and other resources within a region (river valley or bioregion).

The main objective in such instances are the conservation or rehabilitation of the resource and its environment so that biodiversity is ensured, land degradation is minimised for the attainment of specified and agreed land and water management as well as social objectives. Table 2.2 explains...
the differences in these related concepts. Though these closely related concepts have been accepted and used at a point in time, in the view of Cardwell *et al.* (2006) none conveys the full meaning of the IWRM concept.

**Table 2.2 IWRM related concepts compared**

<table>
<thead>
<tr>
<th>Concept</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Catchment Management (ICM)</td>
<td>Environmental planning which tackles sustainable resource management from a catchment perspective as opposed to the piecemeal approach that separates land from water management.</td>
</tr>
<tr>
<td>Integrated River Basin Management (IRBM)</td>
<td>The management of water systems as part of the environment; entails the technical, socio-economic and ecological aspects of river basin.</td>
</tr>
<tr>
<td>Integrated Resource Management (IRM)</td>
<td>Recognizes the interactions between resources and resource users as well as their impact management solutions. IRM aims to balance social, economic and environmental demands on resources to ensure sustainable use and reduce conflicts.</td>
</tr>
<tr>
<td>Integrated Resource and Environmental Management (IREM)</td>
<td>IREM is both a management process and a philosophy that takes into account the many values associated with natural resources within a particular area (Ewert <em>et al.</em> 2004: 6).</td>
</tr>
<tr>
<td>Watershed Management</td>
<td>The process of generating and implementing programs/ plans to sustain and enhance watershed functions that affect plant, animal, and human communities within a watershed boundary</td>
</tr>
</tbody>
</table>

2.3.2 IWRM Defined

Although IWRM has been promoted for many years it connotes different things to its users and advocates, giving rise to diverse definitions. Most definitions state that IWRM should meet human requirements for the use of freshwater. At the same time the hydrological and biological processes and biodiversity should be maintained to ensure the sustainable use of water resources (Zarghaami, 2006: 215; Pahl-Wostl, 2007: 49; Cardwell *et al.*, 2006). This is so because those processes are considered essential for the functioning of ecosystems. From this standpoint the concept is seen as one that embraces much of the philosophical framework of ecosystem management (Jewitt, 2001; Kees *et al.*, 2008) and “transactional planning which goes beyond the single resource and multi-objective approach paradigm” (Hooper, 2005: 3). Sewell and Biswas (1986: 295) agree on the premise that any attempt to develop water resources results in some modification of the environment. Table 2.3 below presents the different definitions.

**Table 2.3: Selected definitions and their main features**

<table>
<thead>
<tr>
<th>Definitions: IWRM is ...</th>
<th>Main Features</th>
<th>Author</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A process of formulating and implementing a course of action involving natural and human resources in an ecosystem, taking into account the social, political, economic and institutional factors operating within the ecosystem in order to achieve specific societal outcomes</td>
<td>Natural and human resources; societal, political and economic objectives; institutional factors</td>
<td>Dixon &amp; Easter</td>
<td>1986</td>
</tr>
<tr>
<td>Objectives</td>
<td>Watershed as unit; interdependency of biophysical and socio-economic institutions</td>
<td>Newson 2000: 205</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>Holistic approach that considers the contributions of all users, planners, sciences and policy makers, thereby promoting increased communication between different public and private stakeholders groups as well as with the wider public</td>
<td>Holistic approach, effective stakeholder participation, information sharing</td>
<td>Jeffrey &amp; Geary 2004: 6</td>
<td></td>
</tr>
<tr>
<td>Proactive or preventative measures that maintain the environment in good condition for a variety of long-term sustainable use. Alternatively … coordinated control, direction, or influence of all human activities in a defined environmental system … to achieve and balance the broadest possible range of short- and long-term objectives</td>
<td>Environmental maintenance, time scale, coordination, social and physical dimension, sustainability</td>
<td>Scherer (1994), cited in Born &amp; Sonzogni 1995</td>
<td></td>
</tr>
<tr>
<td>A process that ensures that social, environmental and technical dimensions are taken into account in the management and development of water resources</td>
<td>Goal of sustainable development; tech., environmental and social dimensions</td>
<td>World Bank 2003a:1</td>
<td></td>
</tr>
<tr>
<td>Based on the perception of water as an integral part of the ecosystem, a natural resource and social and economic good</td>
<td>Water is ecological, social and economic good; natural resource</td>
<td>UNDP 1990:22</td>
<td></td>
</tr>
<tr>
<td>A process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems</td>
<td>Process: coordinates social, environmental, economic, physical, institutional facets; equity sustainability issues</td>
<td>Global Water Partnership 2000: 22</td>
<td></td>
</tr>
<tr>
<td>A coordinated, goal-directed process for controlling the development and use of river, lake, ocean, wetland, and other water assets</td>
<td>Goal-directed process, coordination, development of physical assets</td>
<td>Cardwell et al. 2006: 9</td>
<td></td>
</tr>
<tr>
<td>A framework for planning, organizing and controlling water systems to balance all relevant views and goals of stakeholders</td>
<td>Social interdependence, ecological interdependence</td>
<td>Grigg 1999-527</td>
<td></td>
</tr>
</tbody>
</table>

The various definitions stress different aspects of the concept depending on which component is the focus of the author. The implication of the definition given by the World Bank is that the technical, environmental and social dimensions need to be considered in the sustainable development of the resource. The Global Water Partnership (2000: 22) in an attempt to provide a common framework defines IWRM as “a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (also CAPNET, 1999: 4). This definition sees IWRM as a coordinated, goal-
directed process for controlling the development and use of rivers, oceans, wetlands, and other water assets.

Although this definition appears impressive to its proponents there are others who fault it on many grounds. First, it gives limited practical guidance for water management (Biswas, 2004). The GWP attempts to give a specified goal - “to maximize the resultant economic and social welfare in an equitable manner” taking into account the maintenance of vital ecosystem (CAPNET, 1999: 1). This definition falls short in giving any indications as to what elements are to be considered when determining the economic and social welfare. In addition the exact parameters to be maximized are unclear or not known (Biswas, 2004).

Second, the definition sees IWRM as a process (and not a goal). However, others describe IWRM as a goal and claim that adaptive management is a necessary means or style in realizing IWRM (Pahl-Wost et al., 2004). Third, water has different use values in qualitative terms. As noted by McDonald & Ruiters (2005), these are expressed as religious practice, aesthetic beauty, and recreational enjoyment and as a physiological necessity. These value systems implicit in the IWRM concept can influence the priority given to water use and therefore serve different goals in managing the resource (Cardwell et al., 2006: 14). Thus, IWRM can be directed by any of the various goals considered a priority at a point in time. These may include the promotion of agricultural development, economic growth, ecological productivity, or to improve human welfare. The argument is that the priority for managing water may vary from one basin to another. The IWRM plans may emphasize one particular goal but will also take care of the others. Clearly, this is in essence more like the single purpose or single sector approach. It then seems that the IWRM processes focus on the critical water resources issues of any country and that its role will vary depending on the development stage of the country.

Burton (2001) and Cosgrove & Rijsberman (2000) observe the inextricable relationship between water and land uses because decisions on land uses affect water resources and decisions on water resources, in turn, affect land uses and the environment. Similarly, decisions on the economic and social future of a people affect hydrology and the ecosystems in which they live. The IWRM concept is thus concerned with coordinating all the competing uses of water resources and ensuring that stakeholders participate in the decision-making processes.

There are those who think that IWRM should be looked at within the context of sustainable development (Jonker, 2002; Thomas and Durham, 2003; Cardwell et al., 2006). They argue that by integrating the concepts of sustainable development and IWRM it will become possible to look at practices (micro-level) within the context of IWRM (meso-level) and see how it impacts on sustainable development (macro-level). Others define IWRM as suitably managing people’s activities in a manner that promotes sustainable development (Jonker, 2002). Here reference is made to improving livelihoods without disrupting the water cycle. Thus, the definition links sustainable water management to livelihood improvements. But different livelihoods will have different objectives or goals. Inadvertently, this gives rise to varying goals of different stakeholders with diverse values (see Biswas, 2004).

Grigg’s definition (1999) like Jonker reveals two dimensions of interdependence: social and ecological interdependence. The social interdependence highlights the need for a framework for planning, organizing and controlling water systems in such a manner that there is the balance of all relevant views and goals of stakeholders. This is to be done within the context of ecological systems. How this is achieved in a real life situation is yet to be shown. Some authors have argued that the IWRM concept is to be viewed as an integral part of a nation’s social and economic development (Koudstaal et al., 1992).

There seems to be ambiguity about the concept. Even at the conceptual level the views about what IWRM actually means vary widely. It appears that there is no clear knowledge as to what
the concept actually means. The debate on what IWRM means and how it can be implemented continues to engage many scholars. The general lack of agreement around its definition is ideological (Figuères et al., 2003). The conflict is over interests, opinions, or interpretations rather than on the substance of the definition, which refers to the complexity and interdependency of the economic, social and environmental dimensions of the resource and the interactions involved. No matter how it is defined there is a general theme of coordination, sustainability, holistic approach and being seen as a systems concept.

Although the concept is still evolving within the general concept of sustainable development, it focuses on the diverse water needs, on water as a social and economic good and on achieving maximum economic and social welfare without compromising on equity. Who determines what ‘equitable’ means and for whom are still some of the issues being debated. Thus, integrated management comprises many components, dimensions, scales and levels with interdependencies that need to be balanced together. Conca (2006) describes the search of the epistemic communities to understand this concept as an ‘elusive quest’.

This thesis adopts the GWP definition of IWRM because IWRM is considered as a process and submits that if its principles are applied to the management of the resource it could lead to the efficient and/or equitable use of the resource. Once it is accepted as a guiding principle then differing ways may be employed by different societies to achieve what that society considers appropriate.

2.4 Different Views on IWRM

Those who talk about the ‘discovery’ of the concept of IWRM were not aware that the ‘new’ concept was in fact not really new (Biswas, 2004). The various definitions arouse different views about the concept which affects its applicability. In his comment about the IWRM approach Braga (2001) describes it as a holistic and integrated approach that considers economic, environmental, technical, social as well as cultural issues, while ensuring the sustainability of water resources for future generations. The approach is credited with creating a clearer link between and better understanding of human and ecosystem requirements and the interactions between them (Wallace et al., 2003). Yet Biswas (2004) argues that despite its popularity, it is difficult to fathom how a single paradigm is relevant for all countries and regions, each with very different physical, economic, social, cultural, and legal conditions.

The necessity to adapt the IWRM concept to suit different local contexts makes it very difficult to develop a generic and overall description of strategies and techniques (Jeffrey and Geary, 2004). The promotion of cross-sectoral coordination and partnerships among stakeholders and government agencies are what the GWP definition seeks to achieve (Dungumaro & Madulu, 2003). However, depending on the context there could be varying degrees of coordination or cooperation (Cardwell et al., 2006). The question then is what kind of integration or coordination is necessary in this process of water management? Jeffery and Geary (2005) observe that there is no general agreement on the aspects and dimensions to be integrated, how they should be integrated and by whom. It is not even clear whether such integration in a wider sense is possible (Biswas, 2004).

Nonetheless, four dimensions of integration are proposed: spatial, objective, institutional and temporal (Cardwell et al., 2006:12; Thomas and Durham, 2003). Spatial integration implies achieving common objectives and goals within a geographical area in the concept of watersheds or water catchments. The many demands on water resources create the need to achieve multiple objectives. This, in turn, calls for integration because of the fragmented nature of water management institutions.
As knowledge expands, operations may vary with time and, hence, the importance of coordination of activities on different time scales arises. However, Biswas (2004) and Cardwell et al., (2006) think that this coordination and integration of IWRM approaches gives rise to operational difficulties. What indicators or parameters are to be monitored to give a measure of success or otherwise of integration is not even known. Consequently what constitutes integration in this definition is itself vague. It may end up compounding the complexities of the problems rather than solving them.

The IWRM concept assumes that water management should involve the entire water cycle with all its natural aspects, as well as the interests of the water users in the different sectors of a society or an entire region (van der Zaag & Savenije, 2000: 48). However, how can one identify what constitutes the natural aspects of water and what these different interests are? Which sectors have to be brought under water management and with what ease so as to achieve the anticipated efficiency of the proponents? What constitutes “land and related resources” in the IWRM definition? All these compound the complexity problem.

The equity issues and what is to be coordinated can vary from one basin/society to the other. In an attempt to explain what IWRM is Odendaal (2002) arrives at another debateable conclusion. He states that the objective for effective IWRM is to achieve sustainability in the use of the resource and, hence, sustainability is the goal while IWRM is a strategy for pursuing this goal. In contrast to this, Pahl-Wostl et al (2004) focus on IWRM as the goal and adaptive management as a management style in order to realise IWRM. However, the GWP (2000) definition emphasises that IWRM is a process, not a goal in itself. IWRM is a continuous process of balancing and making trade-offs between different goals and views in an informed way (Jeffrey and Geary, 2004). Biswas (2004) considers some fundamental questions in terms of the applicability of the definition in the real world and draws the conclusion that the definition of IWRM given by GWP is difficult to implement.

2.5 The Elements of IWRM

The operational aspect of IWRM is integration. Integration itself is a complicated exercise (Anderson et al., 2008; Rahaman & Olli, 2005) because there are four dimensions involved: sectoral (and sub-sectoral) integration; geographical integration; economic, social and environmental integration; and administrative integration (water resource planning and management responsibilities). It therefore requires certain conditions to make it feasible. The IWRM concept hinges on three broad elements: the so-called “three pillars” namely, organizational framework, management instruments and enabling environment. These pillars are seen as the broad elements of IWRM (GWP, 2004; Jonch-Clausen, 2004, Biswas, 1990).

Implementing IWRM is then seen as a question of getting the “three pillars” right. That means moving toward an enabling environment of appropriate policies, strategies and legislation for sustainable water resources development and management; putting in place the organizational framework through which the policies, strategies and legislation can be implemented; and setting up the management instruments required by these institutions to function. But practically getting the three pillars right may be a daunting task.

These three pillars of IWRM are sometimes referred to as the scope of IWRM (GWP, 2004:38; Boutkan and Stikker, 2004:151). The first element, organisational roles, consists of: Creating a framework through which implementation is carried out— from trans-boundary to basin level,

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5 Although the authors use the word institutional framework, they actually mean organisational framework, in the terminology of this thesis, and hence for internal consistency I will use the same.
and from regulatory bodies, to local authorities, civil society organisations and partnerships; developing human resources; upgrading the skills and understanding of decision-makers.

The second, enabling environment encompasses three issues:

- Policies: Developing appropriate policies, strategies, and legislation for sustainable water resources development and management;
- Legislation: Covering ownership of water, permits to use (or pollute) it, the transferability of those permits, and customary entitlements; and
- Financing and incentive structures: allocating financial resources to meet water needs (Jonch-Clausen, 2004).

The third aspect has to do with management instruments. The management instruments are a mixture of regulatory, economic and suasive tools (Tobin, 2001). These include (i) water resources assessment information, (ii) social change instruments (encouraging a water-oriented civil society, conflict resolution, regulatory instruments), and (iii) economic and financial instruments which include taxes and charges, (using polluter pays principle), subsidies, using value and prices for efficiency and equity, user fees, sales and royalties (Ferrier, 2000: 52). The legal instruments like licensing, regulations, permits, water courts, and customary law and practice and real property tools (conservation easements and zoning) are also another aspect of the management instruments (Di Leva, 2002: 86-90).

The decision as to which one of these instrument is to be used is influenced by whether water is considered as a commodity or a public resource. However, there are criticisms against treating water as a commodity because of its non-excludability, i.e. people should not be prevented from using it because they cannot pay for it (McDonald and Ruiters, 2005). In neoclassical theory water is referred to as ‘merit good’— it would almost certainly not be provided in adequate quantities if left solely to market forces. In such situations it is the poor and women who are adversely affected.

### 2.6 The Principles of IWRM

The concept of IWRM is linked to the principles adopted by the Dublin Conference on Water and the Environment (ICWE 1992) and Agenda 21 of the Earth Summit in Rio de Janeiro (UNCED 1992) (Bandaragoda, 2000: 11; Savenije & van der Zaag, 2000, Wongprasong, 2007). This is however contested. It is argued that the United Nations Conference, held in Mar del Plata in 1977, which was endorsed by all member governments, had more to say on IWRM than the Dublin Conference, which did not even have any governmental approval (Biswas, 2004). The Dublin principles are presented below:

- Water is a finite, vulnerable and essential resource which should be managed in an integrated manner;
- Water resources development and management should be based on a participatory approach, involving all relevant stakeholders;
- Women play a central role in the provision, management and safeguarding of water;
- Water has an economic value and should be recognized as an economic good, taking into account affordability and equity criteria.
In other words the Dublin principles are described as (1) the holistic principle; (2) the participatory principle; (3) the gender principle; and (4) the economic principle, which provided an important orientation for water resources development and management. In the process of the evolution of the sound management of water resources a number of themes, which in essence reflect the ideas of the Dublin principles or Mar del Plata views, have been identified. These are listed as:

- Adoption of a comprehensive view point,
- Recognition of water as an economic good,
- Use of river basin as a unit of area in water management,
- Involvement of the public in planning & policy making,
- Consideration of environmental concerns,
- Assessment of social effects, and
- Promotion of a search for a wide range of choice (David, 1986: 309; Sewell and Biswas, 1986:297)

The adoption of any of these themes in water management often results in a different institutional response (see Appendix 2). The next section discusses the four basic principles.

2.6.1 Comprehensive View Point

This principle otherwise referred to as the holistic principle calls for adopting a comprehensive approach in managing water resources. It aims to manage activities to meet both socioeconomic and environmental objectives (David, 1986: 309). It is applicable to individual projects as well as basin-wide level taking into account the co-existing functions. These functions involve the interrelationships between water, land, climate and biota. Thus several important concepts come into play when one adopts the comprehensive viewpoint. This situation arises because there are many potential uses of a given resource and each has some effect on others. In some cases in trying to achieve one of them the attainment of the others may be prevented (Sewell and Biswas, 1986).

Under this principle, if all potential uses are considered at the same time there is the possibility of obtaining the optimal use of the resource (Jonch-Clausen, 2004). The combination of and balance between different uses could be, for example, hydroelectric power generation, irrigation development and flood control or the preservation of a particular ecological zone. The other implication is that integration of water planning with overall economic and social planning leads to the efficient use of the resource (Keen, 2003) especially as there are interrelationships between water developments to the development of other resources (David, 1986; Sewell and Biswas, 1986; Naiman, 1992). Thus water resources management requires inputs from a wide range of disciplines such as economics, politics, geography, sociology, and law (see Boutkan and Stikker, 2004:151).

The comprehensive view is accepted by many (Jeffery & Geary, 2005) because it implies taking a holistic view (McCartney & Sally, 2003), and resolving specific resource management problems in that context. It considers economic, environmental, technical, social as well as cultural issues, while ensuring the sustainability of water resources for future generations (Braga, 2001). The approach presents a better opportunity for understanding the links and interactions between humans and the ecosystem (Wallace et al., 2003) for efficient management. The integration encompasses different sectors, and institutions (Cardwell et al, 2006; Svendsen, 2005). Because
coordination does not occur in a vacuum it becomes relevant to investigate the institutions which are responsible for achieving this.

Cleaver and Toner (2006:208-209) indicate that the adoption of such a comprehensive viewpoint works only with a number of modifications to existing institutions - different legislation and administrative agencies. Economics of integration also become apparent together with their associated conflicts. The interrelationship may also be looked at with respect to specific functions of water management. As the interrelationships multiply as many issues are being considered at the same time there is a gradual increase in the scale and sophistication of function. The need to reconcile conflicts and to link water management to overall economic and social development become imperative as the scale of management grows (Sewell and Biswas, 1986). It is this all-encompassing character and the flexibility associated with it that makes the comprehensive approach complex (Jønch-Clausen and Fugl, 2001) and difficult to manage (Biswas, 2005, Jeffery and Geary, 2005), even if one argues that integration refers to issues dealing with coordination and co-operation and not amalgamation (Burton, 1993).

2.6.2 Recognition of Water as an Economic Good

The fourth Dublin principle that water has an economic value in all its competing uses has been accepted by the advocates of IWRM as a pivotal principle (ICWE, 1992; GWP, 2000; Smith, 2004; Rahaman & Varis, 2005). Based on this economic good principle water is to be treated like any other natural resource, such as fisheries or minerals (Rogers et al, 2002:1; Jonch-Clausen, 2004). Generally, the argument is that the owner (the government, community or private party) should charge satisfactory fees for water use (Sewell and Biswas, 1986) and the price of the services provided by its development should reflect their costs. The interpretation of this principle generates considerable controversy (Berck, 1996; Shiva, 2002; Barlow and Clarke, 2002; McDonald and Ruiters, 2005; Savenije, 2002; Savenije and Van der Zaag, 2002).

There are two different interpretations given to this principle. First, economists argue that water should be allocated among competing users or uses on the basis of the economic value derived, that is, the value of the use (Savenije and Van der Zaag, 2002; Smith, 2004: 2) and the market is expected to ensure that water is allocated to its highest value use (Briscoe, 1996; Rogers et al, 1998). Thus price policy can bring about allocation efficiency (GWP, 2005; Placht, 2007) and help maintain the sustainability of the resource (Rogers et al., 2002:2). In the management of water resources in an integrated manner where the economics, legal and environmental aspects complement each other three things supposedly occur: increased prices improve equity, efficiency and sustainability of the resource (Rogers et al., 2002; Jonker, 2002; Placht, 2007). There must, however, be appropriate use of management instruments to achieve economic efficiency in water usage (Rogers et al, 1998) and this must be done in an enabling environment through legislation and policies to address equity issues (Jonch-Clausen, 2004). The World Water Commission endorses the argument for the need for full-cost pricing of water: “Commission members agreed that the single most immediate and important measure that we can recommend is the systematic adoption of full-cost pricing of water services” (World Water Commission, 2000: 33). This position calls for the construction of appropriate tariff structures to meet different social, political and economic goals in different situations.

But the idea of full-cost pricing of water has been increasingly questioned in the literature (Berck, 1996; Jaglin, 2002; Tod et al., 2003; Transnational Institute, 2004; McDonald and Ruiters; 2005:21; Cleaver and Toner, 2006: 209). The first concern expressed is that full-cost pricing could transfer costs to low income households. A solution to this problem is the development of two-tier systems, based on the ability to pay principle. However, if full-cost pricing is indiscriminately implemented the poor will be excluded from quality service while providing better services for the wealthy few in society (Bond, 2002). Second, the full-cost
pricing principle is clearly seen as being in opposition to traditional public sector operating principles of integrated planning, (cross) subsidization, supply-driven decision making, and equity orientation as expressed in the ideas of McDonald and Ruiters (2005:17). In fact the two appear contradictory: full-cost pricing and equity. If this principle is applied, the role of the State in intervening in local arrangements to ensure that equity goals are not compromised becomes limited. However, what is actually meant by equity and how it is determined are also debateable. Third, this implies a commodification of water. The commitment to full cost recovery in water often conflicts with the commitment to ‘a better life for all’ as observed by McInnes (2005: 115). It is difficult to understand how water, with its many different use values could be treated as a "homogenized and quantitatively differentiated commodity in the exchange process and valued only by its price” (McDonald and Ruiters; 2005: 21).

Treating water as a commodity has been noted to produce some transformative effects: (1) the focus on exchange value becomes the driving force for water production instead of a social rationale. Consequently the making of profits takes precedence over public good ethics and professional values; (2) “a rationalization of service delivery along industrial lines” i.e. the division of tasks into smaller and smaller components, separated from other water activities and analyzed for efficiency improvements” (Smith, 2005: 169). This neo-liberal principle shifts the emphasis on the supply of services based on the need to supply according to the ability to pay. “Using price mechanisms to redirect water to high-value uses is proving complex” (IWMI, 2007) and these complexities make the application of IWRM very difficult.

The second interpretation of water as an economic good is the “process of integrated decision making on the allocation of scarce resources, which does not necessarily involve financial transactions” (Savenije and Van der Zaag, 2002: 98). This implies that on the basis of all the costs and benefits of alternative options (using the marginal utility of water) the most appropriate choices should be made about the allocation and uses of water resources (IWMI, 1998).

2.6.3 Stakeholder Participation

The next key principle of IWRM is public involvement or stakeholder participation (World Bank, 2002; Thomas and Durham, 2003; Jonch-Clausen, 2004), justified as a key way to ensure equity (Jaspers, 2003; Giupponi et al, 2006). This strategy for involvement may take a wide variety of forms (Sewell and Biswas, 1986:302). In the past it was believed that planners and politicians could accurately determine what the general masses wanted and how they would react to what is provided. However, at the international through to local levels, local participation is now seen as centrally important in the creation of sustainable livelihoods, promotion of good governance and the alleviation of poverty (GWP, 2002; DfID, 2002; World Bank, 2002; Peters, 2002; Howard, 2004).

The principle emphasises “active citizenship” and “community empowerment” since participation contributes to good water governance at the local level by ‘helping to achieve synergy in pursuing multiple development goals’, although others question whether managing water through the local community helps to achieve the goals of increased sustainability and improved equality of access for the poor to adequate supply of water (Ohnson, et. al., 2001, McDonald and Ruiters; 2005; Cleaver and Toner, 2006). The contention is that ‘active citizenship’ and ‘community empowerment’ principles are just a representation of the neoliberal ideals of transfer of water service decision-making power and responsibility to the community. This is seen as an affair of the state abdicating its responsibility and shifting it to the individual or community (Koppen et al, 2007), often referred to as the private sector (McDonald and Ruiters; 2005).

The adoption of this principle has serious implications for social impacts. Examples of these social impacts are how far the development and management of water resources will disrupt
traditional lifestyles and promote a probable change for a new political structure for the
management. The different impacts have the potential of resulting in a variety of institutional
responses - restructuring of water management legislation, policies and administrative apparatus
(Bandaragoda, 2000; Biswas, 1990; Sewell and Biswas, 1986). This is meant to deal with
differing problems with their varying severity from place to place.

Although there is a general acceptance of the importance of stakeholder participation in
supporting the successful implementation of IWRM approaches, it has been observed that
effective public engagement is not possible unless there is considerable strategic planning

2.6.4 The Gender Sensitivity Principle

This principle is closely linked with that of involving all stakeholders in the management of the
water resource but calls for gender sensitivity. This is embedded in the assumption that
participation by both men and women as equal partners is essential for sustained water
management (UNDP, 2003). Forums such as the International Drinking Water Supplies and
Sanitation Decade Review (1990), the Dublin Conference (1992), the World Summit on
Sustainable Development (1992), the Beijing Conference on Women (1995) and the World Water
Conference (2000) have endorsed this principle. This principle is anchored on the idea that
women play a central role in the provision, management and safeguarding of water (Savenije &
van der Zaag, 2000; van Wijk-Sijbesma, 1998). Women’s pivotal role as providers and users of
water must be acknowledged and reflected in the institutional arrangements for the development
and management of water resources (Wijk, 2001; van Wijk-Sijbesma, 1998).

There are three elements in an approach to gender and IWRM: (1) understanding the differences
and relations among and between women and men in each specific water management context;
(2) incorporating women’s and men’s perspectives, needs and interests in all management
initiatives and promoting the advancement of women (i.e. reduce gender inequalities); and (3)
using participatory approaches that facilitate the equitable participation of women and men
especially at decision-making levels (Stulina et al., 2006).

Water resources, if managed at the lowest appropriate level serves better the wellbeing of
communities. But the community is not made up of equal people living in a particular geographic
region. It usually comprises individuals and groups who command different levels of power,
wealth, influence and ability to express their needs, concerns and rights (UNDP, 2003). These
communities have competing interest groups and those at the lowest end of the power spectrum
(often the poor men and women) are disadvantaged in times of scarcity. Power issues place
women in a disadvantaged position.

Gender inequalities are evident in terms of knowledge and experiences in such areas as water
services, water policy and water availability (Stulina et al., 2006). Water management is male
dominated but the way water resources are managed affects men and women differently (Cleaver
and Elson, 1995; (UN-Water) GWTF, 2006). It calls for policies to address women’s specific
needs and to equip and empower them to participate at all levels of water resources programmes.
If the way women are included in decision making and implementation is defined by them
management becomes very relevant to their needs and it will make the needed impact on their
lives (Cap-Net, undated; GWP, 2005).

Social and cultural circumstances vary among societies. There is therefore the need to explore
different mechanism for increasing women’s access to decision making in order to influence the
participation spectrum (see 2.6.3).
A gender perspective in IWRM is necessary for a variety of reasons: (i) Involving both women and men in integrated water resources initiatives can increase project effectiveness. (ii) Social and economic analysis of natural resources use become complete because there is better understanding of gender differences and inequalities. The understanding of the differential impact on women and men ensures that all implications are clearly understood and there are no/limited unintended negative repercussions. (iii) Without specific attention to gender issues and initiatives, projects can reinforce inequalities between women and men and even increase imbalances (an issue IWRM intends to address). (iv) Participatory processes in IWRM initiatives do not automatically recognize inequalities and differences between women and men (UNDP, 2003). Power differentials make it difficult for some people to voice opinions that contradict general views and may even affect who participates in decision making.

The question that needs to be answered is: How are these broad principles of IWRM operationalised? This is addressed in the next section and in Chapter 3.

2.7 Approaches to IWRM

Integrated approaches can be seen as a philosophy, a process and/or a product (Burton, 1993 quoting Mitchell and Hollick, 1993). The philosophy involves fostering an organizational culture and associated attitudes that view collaboration and cooperation as essential. It is anticipated that all the players in a catchment management setting understand the process. But the products of catchment management are numerous and vary, ranging from a new process of developing guidelines, to policy products, to a catchment management plan.

IWRM stresses the management of water supply and demand (Placht, 2007). Consequently, there are two interrelated approaches to achieving the integration meant in IWRM (ADB, 2007). “These are the natural system approach and the “human system” approach. The natural system focuses on integrating different elements of the water resources itself. This involves integrating land and water management, freshwater management with coastal zone management, surface water with groundwater, water quantity with water quality and upstream with downstream water related interests recognising the full hydrologic cycle (Jaspers, 2003; Jonch-Clausen, 2004:17).

The human system focuses on integrating the different groups of people and sectors that manage and use a particular water resource. This involves the integration of the human systems, which relates to cross-sectoral integration of policies and strategies and integration of all relevant stakeholders in the decision-making process (Jonker, 2002). To obtain the coordination of water management efforts across water related sectors and throughout entire water basins, formal mechanisms and means of cooperation and information exchange need to be established (GWP, 2000; GWP, 2005).

Apart from these two basic approaches four other approaches are suggested based on the ideas of Mitchell and Hollick (1993), which they referred to as building blocks. These are considered necessary for Integrated River Basin Management, but do not appear to be completely different approaches from the two basic ones. They seem to me to elaborate various aspects of the two basic approaches. These are:

1. Use of a Systems Approach in which attention is directed towards both natural and human systems, their component parts, and the interrelationships among those parts (Stephens and Hess, 1999; Radif, 1999; Anderies et. al., 2004; Saravanan, 2008). Here, “approaches to IWRM do not regard the ecosystem as a “user” of water in competition with other users, but as the base from which the resource is derived and upon which development is planned” (Jewitt, 2002: 887; Mitchell, 2002, 2005).
2. Use of a strategic approach in which attention is directed to key, not all, issues and variables identified through consultation with stakeholders and to linkages among the key issues and variables (Mitchell and Hollick, 1993). This approach limits the complexity issues associated with IWRM (Mitchell, 2005).

3. Use of partnership approach in which state governments, local governments and non-government organisations and individuals each have a role, requiring common objective setting, definition of roles and responsibilities, and conflict resolution mechanisms. In this approach resources are managed through collaborative and partnership-based initiatives in a single coordinating basin-wide organisation (Saravanan, 2008). However, the multiple actors interact with diverse rules across complex decision-making areas which go beyond individual coordinating bodies (Ostrom, 2005a; Genskow and Born, 2006) and thus make water management a socio-political process (Bhat and Mollinga, 2006).

4. Use of a balanced approach in which concerns for economic development are weighed against ecosystem protection, and satisfying social norms and values (Mitchell and Hollick, 1993; Pollard, 2002; Jeffrey and Gearey, 2006).

The use of these approaches varies from country to country and the success of each approach can only be assessed within a particular given context.

From a systems perspective, two distinctive approaches are identified: hard systems approach and soft systems approach (Ohlson, 1999). The hard systems approach focuses on problems with well-defined boundaries and simple linkages with other problems, including well-defined goals, alternatives and consequences. The soft systems approach pictures a problem as not having a well-defined boundary; but complex linkages with other problems, goals, alternatives and consequences, which are also not well defined or well understood (Ohlson, 1999; Bouwer, 2000: 227). The iterative management of such problems involves conflict and negotiation among multiple stakeholders who have divergent interests and values. From the issues discussed so far IWRM seems to be more of the soft systems type.

Approaches to the application of integrated methods for natural resource policy-making have been discussed in many contexts (Sullivan and Meigh, 2007: 111); including the provision of ecosystem services (Jewitt, 2002) and the management of land use change (Lambin, 1997). However, much of the conceptual development and experience with integrated approaches concern water and related land resources, with catchments and bioregions being used as the site of implementation (Hooper, 2005: 5).

The systems approach operates on the principle of the river basin being seen as the unit for water resources management. This stems from the concept of a river being an organic entity (Jonch-Clausen, 2004; Bouwer, 2000; Sewell & Biswas; 1986), so that interference with or modification of any part of it is felt elsewhere in the system. Though geographers and engineers are said to be the key proponents of this idea, economists have also associated themselves with it, since it is an attractive way of internalizing externalities (North, 1990). However, the extent to which the river basin has been adopted as a unit varies considerably from country to country (see Chapter 3).

2.8 The Process of IWRM

IWRM is a continuous process where efforts are made to balance and make trade-offs between different goals in a systematic way. IWRM also involves the mediation of conflicts of interest (Jonch-Clausen, 2006:15; Genskow and Born, 2006) and the use of multidisciplinary approaches (Wijkman, 1999: 350; Boutkan and Stikker, 2004:151). The process requires that decision-making processes are devolved to the lowest appropriate level capable of handling such tasks,
normally to local government and community-based institutions. This involves multiple actors who interact with diverse rules across complex decision-making spheres making the IWRM process a socio-political process (Bhat and Mollinga, 2006).

In operational terms the IWRM process can be described as a cyclical process - “Integrated Water Resources Management cycle” (Jonch-Clausen, 2004:18). The cycle starts with the planning processes and continues into implementation of the frameworks and action plans and monitoring of progress. Feedback loops in the process cycle are created through active stakeholder involvement and may result in certain phases in the process having to be repeated. The cycle represents ongoing learning and development process.

Different countries may be at different stages of the cycle (GWP-TAC, 2000). It can then be decided whether new reform needs have appeared or whether the reform process has led to the expected improvements. If the latter is not the case then the cycle must be repeated. This, in effect, means that no country “completes” the cycle. This cyclical decision-making process results in a learning cycle, which is a key tool for adaptive management approaches.

Although the creation of policies and institutional frameworks logically precedes the use of specific management instruments, in reality the steps are not fully sequential. Parts of the latter steps may be started before policies, laws and organisations are in place. This occurs because institutional change, requiring new legislation, is typically a time consuming activity. It is therefore often better to start somewhere, working as far as possible with existing arrangements, rather than waiting for the more wide-ranging reform measures to be enacted.

The implementation processes are facilitated by:

- Strong political will, often motivated by a need to address burning and high profile issues;
- A clear distribution of roles and responsibilities among the stakeholders;
- Highly motivated drivers maintaining commitment throughout the process;
- Exchange of knowledge and experience between countries at various stages of the process;
- Setting clear milestones for the achievement; and,
- Monitoring and evaluation of progress, performance and impact.

Achieving IWRM, in practice, demands a systemic approach to water management. That means the whole system should be taken into account, including the relationship and dynamic interactions between human and natural systems, land and water systems, and key stakeholder agencies and groups (Keen, 2003). As noted in 2.4.1 this is because the different elements and components within the system are interconnected making the translation of IWRM concept into practice very complex. Since systems operate at different hierarchical and interconnected scales and levels, the systems can only be effectively managed if their holistic nature and overall interconnectedness are acknowledged (Everard & Powell, 2002).

A number of attributes characterise the integrated management approach:

- Sectoral coordination;
- Environmental sustainability;
- Institutional arrangements;
- Public participation;
- Quality and biological aspects of both groundwater and surface water;
• Capacity building; and
• Implementation aspects, including financing and monitoring & control (Everard & Powell, 2002).

How to address and relate all these dimensions holistically to bring about sustainable solutions makes the situation complex. The literature reveals that different authors consider different issues and dimensions that should be integrated in the IWRM process (Biswas, 2004). This, of course, has led to many diverse views of the IWRM concept, many of which are just rhetorical. What stands out here is that IWRM addresses a broader set of issues including social impacts, varying social values and ecosystem functioning. This, however, does not eliminate the risk that the concept may be unable to deal with the various value systems at the same time (Tortajada et al., 2003; McDonald & Ruiters, 2005).

2.9 Strengths and Weaknesses of IWRM

At the superficial level, the IWRM approach uses stakeholder participation, cross agency coordination and a wide range of innovative tools to improve water management (Hooper, 2005: 5; Neela, 2003). The model/approach has the potential to address the weaknesses in water governance structures. The approach aims at overcoming the dysfunctional mechanisms within and between government departments and communities in the management of water resources. This participatory approach seeks the involvement of stakeholders through negotiation and building partnership agreements (Neela, 2003). It is meant to provide mechanisms for combining top-down with bottom-up management.

The approach can help produce strategies that are more coordinated, more cognisant of interconnections and more inclusive of the diversity of goals. The table 2.4 below gives an overview of the typical characteristics of the non-integrated regime and that of what is considered by the proponents to be the typical characteristics of integrated approach to water resource management. These reveal the strengths and weaknesses inherent in the IWRM model.

Table 2.4 Integrated vs. non-integrated water resources management

<table>
<thead>
<tr>
<th>Description</th>
<th>Integrated water resource management</th>
<th>Non-integrated water resource management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature</td>
<td>Comprehensiveness and holistic, coordinated; Widespread international acceptance</td>
<td>Fragmented, uncoordinated</td>
</tr>
<tr>
<td>Scale</td>
<td>Bigger agencies/institutions (heterogeneous)</td>
<td>Relatively Smaller agencies/institutions (homogenous)</td>
</tr>
<tr>
<td>Coverage</td>
<td>All sectors (land, water and all resources in the bioregion) i.e. environment</td>
<td>Single sector specific</td>
</tr>
<tr>
<td>Purpose</td>
<td>Multipurpose, not very specific</td>
<td>Single purpose and often well focused</td>
</tr>
</tbody>
</table>
Conditions | Includes elements of good water governance (coordination, equity, Stakeholder participation, less state interference) | Limited/no participation, centrally administered
---|---|---
Expected Consequences | No water crises: competing usage understood, water as a social, economic and environmental good, economic value regarded, equity considered, ecological concerns considered | Leads to water crises: economic value ignored, equity not considered, ecological concerns neglected

One of the main benefits of using IWRM model is its focus on the blending of viewpoints (Grigg, 1999; Kees et al, 2008); and achieving ecological sustainability (Cardwell et al, 2006; Giupponi, et al, 2006; Rahaman and Varis, 2005). The ecosystems benefit from integrated approach because environmental needs are given a voice in the water allocation debate (Kees et al, 2008). It allows for focusing more attention on a systems approach to water management, which leads to several levels of intervention such as protecting upper catchments, pollution control and environmental flows. Achieving an appropriate balance between using water for livelihoods and conserving the resource to sustain its functions and characteristics contributes to ecological sustainability. That is, a management approach that is integrated, efficient and equitable (as purported by IWRM) successfully adapts to new challenges and thus utilizes water resources in a sustainable manner (Placht, 2007).

Current literature shows that IWRM is increasingly challenged and contested (Biswas, 2004; Hooper, 2005: 7; Conca, 2005; Anderson et al, 2008). Jeffrey & Geary (2004) argue that empirical evidence of the expected benefits is either non-existent or poorly reported. Weaknesses include the nature and the concerns over its political discourse. The concept seems to mean everything - it means so many things to different people that it is difficult to understand what it actually means in operational terms (Biswas, 2004: 3; Conca, 2005). At the conceptual level it is argued that words such as ‘development’, the relationship between ‘economic and social welfare’ and ‘sustainability’, ‘equity and economic efficiency’ in the definition of the concept, are difficult to define. IWRM appears as a “safe and sensible bet rather than high risk gamble” (Biswas; 2004: 250), with words like ‘integrated’, ‘participatory’, ‘decentralization’, ‘pro-poor’, and ‘transparent’ or ‘accountability’. In the real world, integrated water resources management becomes very difficult since water has linkages to all development sectors as well as social issues. To bring all the sectors under one umbrella is practically impossible.

The idea of transferring ‘best practices’ under IWRM practice behind successful river basin management institutions (often from developed countries) is also questioned in the literature. This practice, if carried out, is likely to result in: (1). Transposing ‘North’ to ‘South’ models of management as a ‘blueprint’; (2). Imposing institutional models in vastly different socio-ecological contexts (Svendsen; 2005). These are more likely to have dysfunctional and counter-productive effect rather than provide a good solution for appropriate water management. IWRM also has to contend with differing interpretations of property rights, conflicts over use, spatial and temporal variations in access to water, susceptibility to hazards of water surpluses or deficits (Hooper, 2005: 7). One of the critical challenges is the lack of ongoing financing. Although it is a common practice to use river basins, lakes, and groundwater aquifers as the basic unit for
managing water resources it has been shown that the practice does not always meet the competing needs of all stakeholders involved (Boutkan and Stikker, 2004). In such situations the results has been ecologically harmful and not attractive in economic sense.

The soft system nature of IWRM (see 2.7) gives rise to challenges such as: ambiguous boundaries and complex linkages; difficulties with objectives, alternatives and consequences; pervasive uncertainty; and multiple stakeholder conflict (Ohlson, 1999). These challenges are described under three headings (Geldof, 1997):

- **Complexity** - the more component parts considered, the greater the interactions involved and hence the more information needed;
- **Subjectivity** - the information collected is not always free of values; it could be biased based on interests;
- **Uncertainties** - the differences between the amount of information we need and the information we actually have.

Another major challenge is to identify the essential elements for IWRM. If water and other resources are to be managed in an integrated and holistic manner, it is likely to lead to “large and unimaginable institutions”, which could be counterproductive (Wallace *et al.*, 2003). The many complex social aspects in water together with between water and law may pose a governance challenge. The complex social aspects have cultural and religious beliefs as contributing factors as well as the expectations of societies for various water resource uses.

The IWRM concept is generally struggling with two other major weaknesses that cause most of its perceived failings. These are the nature of the science which has informed its development as well as its ambiguous character in terms of current intellectual paradigms (Jeffrey and Geary, 2004). Besides these, the principles of IWRM do not elaborate on water management under uncertainty, nor do they explicitly articulate adaptive capacity as a significant feature of water management strategies. Ecosystems, however, are often referred to as complex adaptive systems, which are highly variable, dynamic and self-organising. Adaptive management (AM) as a concept has been designed primarily to support managers in dealing with these highly connected systems.

**Table 2.5 Summary of content and nature of IWRM**

<table>
<thead>
<tr>
<th>Basin scale or catchment level approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full participation by all stakeholders</td>
</tr>
<tr>
<td>Full-cost pricing</td>
</tr>
<tr>
<td>Equitable allocation of water resources</td>
</tr>
<tr>
<td>Reliable and sustained financing</td>
</tr>
<tr>
<td>Strengthen women’s role in water management</td>
</tr>
<tr>
<td>Integrate different elements of the water resource: (land with water, Water supply &amp; water demand, Urban &amp; rural water issues</td>
</tr>
<tr>
<td>Policies of all different sectors that have implications for water</td>
</tr>
</tbody>
</table>
Transboundary river basin management

Competing usage understood

Water as social, economic and environmental good

Those who defend the concept argue that IWRM is faulted on characteristics it was never meant to have (Placht, 2008). They interpret IWRM as a guiding principle that incorporates integration, equity, and efficiency to achieve sustainability.

2.10 Summary and Inferences

This literature review shows that, first, the evolution of the IWRM concept is as a consequence of the perceived failure of the fragmented, sectoral approaches in the past. International debates at various forums, conferences and symposia with the objective to discuss the multi-sectoral nature of water resources and the need for holistic management approaches influenced the adoption of the IWRM concept. The concept is still evolving.

Second, that IWRM is superior to sectoral approaches because it recognises water as a social and economic good and gives room for exploring ways of achieving equitable access to water resources and obtaining maximum economic and social welfare out of it. It seeks to the coordinated development and usage of water resources, which is able to promote sustainable utilisation of the resource. But these are contested.

Third, at the conceptual level the views about what IWRM actually means vary widely. Though there is a most widely quoted definition, there is no consensus about this definition in the literature. Some of its proponents see it as a systems concept. Others see the concept as being fashionable rather than a radical new approach. There are still those who regard it as adaptive management. In addition there are varied interpretations on what “integration” in the IWRM approach really means. Some even see its principle of treating water as a social good and at the same time as an economic good as contradictory and impracticable to work with.

Fourth, the deferring interpretations of the concept may even confuse water governance rather than making it better. However, no matter how it is defined there is a general theme of coordination, sustainability, holistic approach and maximum utility implied.

Fifth, the strength of IWRM approaches over the sectoral approach, its proponents say, is in the emphasis placed on the fact that the many different uses of water resources are interdependent and therefore needs to be developed together. The inclusion of elements of good water governance (coordination, equity, stakeholder participation, and less state interference) in its operationalisation adds to its strength and makes it more appealing to policy makers.

Sixth, despite the attractiveness of IWRM to policy makers who believe in win-win situations the critics view the concept as meeting a lot of practical problems: (a) The challenge is seen in the identification of the essential elements for IWRM; (b) The operational aspect of IWRM is integration. Integration itself is a complicated exercise. It is complex because there are different complicated dimensions that are involved. (c) If water and other resources are to be managed in an integrated and holistic manner, then there is the likelihood of dealing with elaborate institutions which some countries may not be able to manage; (d) the interface between water and law as well as the many complex social aspects to water may pose a governance challenge.

Is the adoption of the IWRM concept then a political cosmetic? Or is it a way to legitimize the actions of governments/international organisations? These informed the kind of information to look for from the field and hence influenced the design of the interview instruments. The review
of the IWRM process, the instruments, principles and the interpretation give a basis for comparison with the Ghanaian situation. To what extent has the concept of integration been applied in developed and developing countries and what have been the overall relevance and usefulness of the concept? These are examined in the next chapter.
3. IWRM Experiences in Developed and Developing Countries

3.1 Introduction

The previous chapter has explained the concept of integrated water resources management (IWRM); its strengths and weaknesses. This chapter goes further to analyze: how has the concept been interpreted and applied in different developed and developing countries? How are the transitions towards participatory and integrative processes supported by these countries? Are the outcomes of its applications favourable? What elements have influenced implementations? What have been the challenges and the benefits to the countries applying it to their water resources management and what lessons can be learnt for theory?

In finding answers to these questions this chapter discusses country experiences beginning with the concepts, then proceeding to the operational level and ending with the implementation. The barriers at these levels are then examined and conclusions drawn. The selected countries include both developed (Australia, Canada, New Zealand, Netherlands, USA) and developing countries (South Africa, Tanzania, Pakistan, India, Mexico) to give the opportunity to examine if there are significant differences between the outcomes in developed and the developing countries. The assessment here is based on an extensive literature review.

3.2 Interpretation of IWRM

Many water management problems arguably result from the failure to have a holistic view and approach (Biswas, 1990; Swatuk, 2005; Cleaver and Toner, 2006; Jalobayev, 2007). This failure is reflected in several distinct ministries who all use water but work in isolation from the ministries of water and environment or the ministry dealing with water may be isolated from that of the environment (Biswas, 1990). While the concept is theoretically appealing, the question is – is this concept universally applicable?

Snellen and Schrevel (2004: 3) describe four different types of integration in the development of the concept of IWRM to show how the concept has been interpreted and applied. The first type of integration in the historical development of the concept is “integration of water resource management in the broader development context”. This kind of integration links water resources management with a nation’s economic planning and development. It also links up with the general social, technological, and environmental development of the country.

The second type integrates different uses of water/ different water using sectors. This is usually referred to as sectoral integration. The different water uses include domestic, agricultural, industrial and recreational. Consequently the sectors that deal with water usage and water issues are also many. Integration is used to refer to coordination of the various sectoral plans and development; and the coordination among water management agencies and usage within the water sectors.

The third type sees water as an integral part of the ecosystem. It takes into account the aquatic ecosystem (fauna and flora), land, environment and infrastructural development in the basin; integrating the (biophysical) resource base. Spatial integration (upstream/ downstream inter linkages) is the fourth. Here, the water resource in a basin is believed to have users/uses upstream and downstream. The general argument from this conceptualisation is that planning and development considers upstream and downstream as one entity, and therefore links them together to bring about efficient management.
These distinctions are not mutually exclusive. These types of integration can be attached as labels to specific time periods. They could also be attached to different projects in different countries or even different projects in the same country (Snellen and Schrevel, 2004). From quite a different perspective, integration in IWRM is seen as the blending of actions and objectives, considered appropriate by different actors, for the attainment of maximum utility in a river basin or watershed (Grigg, 1998; Margerum and Born, 1995). The expectation is that the process will include the range of physical, biological, and socioeconomic variables necessary for sustainable development and management of the resource (Hooper, 2003; Mitchell, 1990).

The Netherlands Ministry of Foreign Affairs (see Ballweber, 2006: 74) defines integration in terms of three dimensions: political, technical cooperation, and legal/institutional. The development of these ‘pillars’ to support IWRM was based on the perception that if IWRM institutions have a good mix of representative stakeholder bodies they could harmonise complicated top-down and bottom-up management approaches to IWRM. The political pillar describes the vertical integration of national, provincial and local IWRM policy development and legislation for the implementation of IWRM.

In this conceptualisation of integration in IWRM, technical cooperation encompasses vertical (federal, provincial, local) and horizontal (public, non-public, academic, etc) linkages to identify, and share data gaps for implementation (Ballweber, 2006: 74-75). For the political pillar to be functional laws may have to be amended or enacted to integrate legal and financial authority for river basin institutions/organisations. These three pillars are thought of as having the potential of providing a supportive environment for sustained IWRM. However, in times of water crises or disasters there could be the emergence of locally led IWRM efforts even in the absence of these pillars (Ballweber, 2006). Table 3.1 summarises the different conceptualisation of IWRM by both developed and developing countries.

Table 3.1: Interpretations of IWRM

<table>
<thead>
<tr>
<th>Integration</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sectoral integration</td>
<td>Integration of different waters (domestic, agricultural, industrial and recreational) and water using sectors (Industry, mining, etc.). Integration implies coordination between sectors of sectoral plans, programmes and instruments.</td>
</tr>
<tr>
<td>Integration of water resources management in the broader development context</td>
<td>Integration links water resources management with a nation’s economic and development planning including plans for social, technological, and environmental development.</td>
</tr>
<tr>
<td>Water as an integral part of the ecosystem</td>
<td>Integration takes into account the aquatic ecosystem (fauna and flora), land, environment and infrastructural development and the (biophysical) resource base.</td>
</tr>
<tr>
<td>Spatial integration</td>
<td>Integration of upstream and downstream uses treating the entire basin as one entity.</td>
</tr>
<tr>
<td>Blending of actions and objectives</td>
<td>Integration blends objectives and actions considered appropriate by different actors to maximise utility.</td>
</tr>
<tr>
<td>Political, technical cooperation, and legal pillars</td>
<td>Integration is vertical (national, provincial and local) and horizontal. IWRM policy development and legislation to identify and share data gaps to integrate legal and financial authority for river basin organizations.</td>
</tr>
<tr>
<td>Supply and Demand</td>
<td>Managing demand to meet supply on a sustainable basis</td>
</tr>
</tbody>
</table>
At the operational level, the EU’s application of the philosophy is indicated by the key elements of its Water Framework Directive (2000) (Pascual, 2007). According to Barreira (2006: 82) these elements of the directive, which are supposed to be integrated for each river basin, include:

- Protecting all waters, surface and ground waters in a holistic way;
- Good quality (“good status”) to be achieved by 2015;
- Integrated water management based on river basins;
- Combined approach of emission controls and water quality standards, plus phasing out of particularly hazardous substances;
- Economic instruments: economic analysis, and getting the prices right to promote prudent use of water; and
- Getting citizens and stakeholders involved: public participation.

This, to a large extent, represents a pattern in the developed countries. Examples of these developed countries include Canada, New Zealand, Netherlands, USA, and Australia. The literature review will be centred on the experiences of these countries to represent the developed countries.

The developing countries, however, adopt a narrow view of the concept (or the philosophy) (IWMI, 2007). This has led to the acceptance of IWRM as a blueprint package comprising: a national water policy, a water law and regulatory framework, recognition of the river basin as the appropriate unit of water and land resources planning and management, treating water as an economic good and participatory water resource management.

Often the national policy document indicates the central and/or local government’s intentions. The document may show the integration of the nation’s water law with the overall legal framework. The water law may specify the scope of public/private sector participation, provision for accountability, conflict resolution, water rights and the legal coverage of water and related issues.

A second ingredient takes the form of identification of river basins and/or the renaming of water departments as water basin organizations with the expectation that management planning will embrace the basin length. Treatment of water as an economic good requires efforts aiming at allowing markets to allocate water to the various uses and sectors for optimal benefits. The main driving force is cost recovery. The participatory approaches are demonstrated by the promotion of the formation of water user associations or committees at the local level for involvement in water management decision-making process.

In Canada two distinct interpretations are given to the concept: an “integrated” and a “comprehensive” definition (Mitchell, 2006). The integrated definition adopts the idea of considering the basin as a system and paying attention to the key components and relationships that account for the greatest variability in system behaviour. The comprehensive definition theoretically considers or examines all variables and their relationships and thus loses the benefits of a systems approach. The former interpretation gives rise to integrating economic, social and environmental considerations and incorporates the perspectives of stakeholders. It is used to address “the issue of overlap of responsibility and authority between two or more public agencies as well as vertical and horizontal fragmentation” (Mitchell, 2006: 51). To operate within the confines of this interpretation of “integrated” different levels of detail is sought, depending on spatial scale. If this integrated interpretation is adopted there is the likelihood of spending less time in planning.
To some IWRM is used as a tool of analysis (Biswas, 1990; Pascual, 2007; GWP, 2001; Lamoree and Steenbergen, 2006; Medema and Jeffrey, 2005; Mitchell, 2006) as in the case of finding out how the management agency has fared in its performance. On the other hand, others use IWRM as a tool to facilitate improvements in water use efficiency (Grimble, 1999; Jaloobayev, 2007; Saleth and Dinar, 2000; Davis and Threlfall, 2006). Each one has its own implications and outcomes.

Generally, it is relatively easy to draft new water laws or rename water departments as basin organisations, or to declare water an economic good (IWMI, 2007). The real issues still remain: how to enforce the laws or how to manage the resources at the basin level. The diverse ways that countries apply IWRM reflects one or more of the theoretical issues discussed above.

3.3 The Implementation of IWRM

Implementation of IWRM can take many forms although it often follows general pathways. A number of countries have adopted different approaches and/or processes that fit their interpretation of the IWRM concept but in some cases the approach is based on whether the country is located upstream or downstream within a river basin, or how well developed its water resources infrastructure is. IWRM is thus expected to be sensitive to the political, cultural and social conditions of a nation (IWMI, 2007). Consequently, the approach adopted by one nation or for one international basin may not be appropriate in another. But a clear understanding of the alternative national IWRM approaches may serve as a platform for the identification of the strengths and weaknesses of the different political and institutional environments for IWRM (Ballweber, 2006). This section is therefore devoted to looking at some examples of processes or approaches of IWRM adopted by some developed and developing countries.

3.3.1 Experiences from Developed Countries

According to Ballweber (2006: 75) the United States has “been unable to provide substantive national leadership for IWRM” though there have been a number of collaborative watershed management efforts that show a high degree of technical cooperation”. The political and legal/institutional pillars, which are needed for long-term sustainability of the ad hoc collaborative efforts, are lacking (Schad, 1998; Viessman, 1998; Ballweber, 1999, Galloway, 2003) as cited in Ballweber (2006: 77). Early approaches defined a comprehensive approach to river basin management (Margerum, 1995) but the development of a “new pluralism”challenged this orientation between 1970s and 1980s (Gregg, 1989; Muckleston, 1990; Margerum, 1995). Current water resources management is refocusing on the watershed with ecologically-minded approach (Thomas, 1990; Burton, 1991). The country’s approach to watershed management has been informal bottom-up, collaborative, with individual watershed partnerships which are struggling “to gain legitimacy with federal and state agencies in adopting management plans, or wean themselves off of agency grant funding” (Ballweber, 2006: 77; Dellepenna, 2009). Though the agencies easily participate in the collaborative efforts they are not in the position of delegating any of their authority or responsibility to these new partnerships because they are often legally prohibited. An attempt to provide the needed leadership for watershed management and other elements of IWRM was undertaken in the Clean Water Action Plan (1998 /2000). The Plan aimed to:

1. enhance public health protection from water pollution threats,
2. ensure effective control of polluted runoff, and
3. promote water quality protection on a watershed basis.
Although the plan had the support of impacted interest groups and stakeholders, it never received congressional review and was abandoned due to a change in the executive branch of the county’s administration. Though there has been lack of a national IWRM strategy, the national government has shown political, legal and institutional support for some water body initiatives e.g. Florida Everglades, Great Lakes, and Chesapeake Bay (Ballweber, 2006, Hall, 2009; Dellapenna, 2009).

The approach in the US is greatly influenced by the advocates of markets as the best method for managing water resources (Anderson & Snyder 1997; Kumar & Singh 2001; Lee 1999: 53–87; Young & MacDonald 2003, Dellapenna, 2009); although Dellapenna (2009) argues that the market approach is unlikely to lead to good water management.

The Canadian experience started with the establishment of a conservation authority and comprehensive river basin planning and management based on a partnership of municipalities and the provincial government (Mitchell, 2006). The conservation authorities were established through legislation in 1946 to undertake basin wide management initiatives. Six principles underlie these authorities, namely:

1. the watershed as the management unit,
2. local initiative is essential,
3. provincial-municipal partnership is a core aspect,
4. a healthy economy based on a healthy environment,
5. a comprehensive perspective is required, and
6. coordination and cooperation are to be pursued.

For over 60 years the conservation authorities have operated under these principles to manage land, water, and related resources within river basins. The main characteristics of the Canadian process have been efforts at collaborative and cooperative approaches as well as overcoming vertical and horizontal fragmentation. The Canadian experience shows that planning and management should focus on one of four different levels: watershed, sub watershed, tributary, and (environmental) site (Mitchell, 2006; Blomquist et al, 2005). Ideally, at the basin level the important elements include the goals, objectives, and targets for the entire basin together with documentation of resource and environmental problems. Catchment-wide policy that seeks to protect surface and ground water, natural features, fisheries, open space systems, terrestrial and aquatic habitats and other important features are provided.

Sub catchment IWRM is designed to fit local conditions and pays attention to the form, function, and linkages of the natural system; environmentally sensitive or hazard lands; areas where development may be permitted and best management practices (Mitchell, 2006: 53; Cervoni et al, 2008). Tributary plans normally document the environmental resources; establish environmental protection targets, identify best management practices and this ideally, covers the drainage basin of the tributary. But this may not always be the case in practice.

Implementing IWRM principles in Canada in watershed management has facilitated collaborative and cooperative approaches as well as overcoming vertical and horizontal fragmentation in water management (Mitchell, 2006). Thus, it has been possible to incorporate environmental considerations into planning and incorporate public participation in a systematic manner to achieve sustainable resource management. The differentiation among four spatial scales (see 3.2) has helped to avoid collecting inappropriate data for a given scale.

The process in New Zealand took the form of promulgation of a national water policy. It went through various amendments and in 1991 the Resource Management Act became the governing legislation for resource use (Ericksen, 1990). This Act repealed more than 60 acts and amended
over 150 others and so generated an integrated regime for air, water, land and ecosystem management (Harris, 2004; Government of New Zealand, 2005) as cited in Davis and Threlfall (2006: 87). The Resource Management Act, the 1987 Conservation Act and the 2002 local Government Act together became the foundation for IWRM.

Water is treated as a public good in legal, economic and social terms. The result of reorganizing the regional and local councils together with the aforementioned acts brought in its wake (Burton and Cocklin, 1996 as cited in Davis and Threlfall, 2006: 88):

i. wholesale privatization of the country’s resource base and infrastructure,

ii. redrawing of the internal political map using catchment boundaries as the primary organising principle,

iii. amalgamation of local councils, and

iv. explicit adoption of sustainability as the dominant national policy for renewable natural resource management.

The process also touched on the reconciliation of European and Maori cultures and Maori resource claims and environmental values. The implementation of IWRM is mainly controlled through national and regional policy statements and the rules are spelt out in regional and district plans. Therefore it is at the regional and local council levels that implementation actually takes place.

There is public consultation and stakeholder input in existing legislation at regional level policy development, regional plans, and district plans. The granting of water rights permits also receives public participation and review. Various sources are used in financing IWRM activities. These sources include resource consent user charges, general regional and local council rates and national initiatives, which differ from region to region and from local council to council (Davis and Threlfall, 2006). In New Zealand, some principles of IWRM were initiated to address early erosion and flood control problems. Later they added on water, soil conservation, flood alleviation, community water supply needs, and ecosystem protection as well as water quality (Davis and Threlfall, 2006: 87).

In the New Zealand experience, the lack of central government involvement in strategic guidance, especially the lack of national policy statements has led in part to each region producing different water sharing and water quality regulations. There is also evidence to show that there are differences within small areas even under similar conditions (Davis and Threlfall, 2006: 95). Each region and council expends efforts to devise their own rules about similar issues at greater cost. Thus, the creation of links across scales has been a big challenge in the process.

Another challenge confronting the New Zealand central government is water allocation in particular areas. Turia (2006) reveals that the use of the water market concept to fix the situation has been resisted in some circles and it is actually proving complex (IWMI, 2007). To streamline the provision of government services to the many city and district councils poses a big challenge to the central government. Deliberations to unify these services to provide economies of scale and efficiencies exists (Davis and Threlfall 2006: 96) but government reform and unification of the services are inseparable from politics.

The level of public participation in the New Zealand experience strongly reflects local issues and provide for added local accountability. It has also demonstrated that the existence of a strong enabling legislation based on sustainable development criteria holds a good prospect for efficient water resources management.

Generally it appears IWRM is scarcely implemented in its totality in the developed world. The EU sees water as a common heritage; the US scarcely integrates, but sees water as an economic
Table 3.2: Reasons for IWRM success or failure in developed countries

<table>
<thead>
<tr>
<th>Reasons for success</th>
<th>Reasons for failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Their economies respond to the regulatory instruments (e.g. direct controls such as land use plans and utility regulation, economic instruments - prices, tariffs, subsidies etc. and encouragement of self-regulation (Davis and Threlfall, 2006; Dellapenna, 2000; Viessman, 1998).</td>
<td>1. Institutional structures not supporting integration (Biswas, 2004; Margerum 1995: 41; Anderson et al, 2008).</td>
</tr>
<tr>
<td>2. Availability of and effective data collection networks, risk management tools, e.g. for floods and droughts and effective communication and information process (Mitchell, 2006; McDonnell, 2008; Gardner, 2006).</td>
<td>2. Limited or no horizontal coordination that impedes efficient implementation and a very weak vertical linkage with national policy (Ballweber, 2006; Smith, 1998).</td>
</tr>
<tr>
<td>3. Participation relatively successful because of lower power distance between various levels of society and between sexes (Hooper, 2005; Hussey &amp; Dovers, 2006).</td>
<td>3. Too many issue at time leading to too many implementing tools at a time and adding to the complexities (Mitchell, 2006; Hooper, 2006; Allan, 2003).</td>
</tr>
<tr>
<td>4. Adequate capacity to enforce laws and regulations; good monitoring (Galloway, 2003; Coulomb, 2002).</td>
<td></td>
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<tr>
<td>5. Ability to overcome vertical and horizontal fragmentation in water management (Mitchell, 2006; Blomquist et al., 2005).</td>
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<td>7. Application of IRBM institutional models (Hooper, 2005)</td>
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3.3.2 Experiences from Developing Countries

Selected developing countries featured here include South Africa and Tanzania (from Africa), Pakistan and India (from Asia), and Mexico from Latin America.

The South African government, adopting a top-down approach codified a formal IWRM strategy at the national level in 1998 (Swatuk, 2008), “though it lacked experience with collaborative institutions” (Ballweber, 2006: 77). The policy was an expansion of statements of IWRM principles in its 1996 constitution (Swatuk, 2008) after the introduction of democracy in South Africa in 1994 (Kidd, 2009). The policy embraced environmentally sound, sustainable economic and social development and codified this National Water Law of 1998 (Ballweber, 2006; Kidd,
This approach led to the creation of the Department of Water Affairs and Forestry (DWAF), which was given the responsibility for IWRM. The approach was clearly based on the preference for the IWRM’s political pillar (see 3.2) above. The process had had organisational, institutional and legal issues as its focus and implementation was less important (Kees et. al, 2008). The water reform is described as a very comprehensive and innovative approach to water management (UNDESA/UNDP/UNECE,). Water is considered a national resource vested in the state. The law provides for catchments agencies that have the responsibility of preparing a management plan, issuing water licenses, and promoting community participation. However, there were problems with the institutional/legal pillars and vertical and horizontal integration issues. For example, Ballweber (2006) argues that whereas the National Water Act (1998) recognises national jurisdiction over water resources protection, use, development, conservation and management, the Water Services Act (1997) has vested the responsibility for potable water supply and wastewater management in the local municipal authorities.

The process in Mexico is that of the transformation of the water management institutions. It involved the establishment of the National Water Commission (CNA) in 1989 and the National Water Law in 1992, which was amended in 1994 (Hearne, 2004: 4; Mumme & Brown, 2002; Haggarty et. al., 2001). In this law, water resources are treated as national property and concessions grant only the right to use resources but not ownership. The market transfer of these concessions was permitted under regulations established by the CNA. The law mandated the transfer of management of irrigation districts from the federal government to the users. Implementing these reforms resulted in the creation of new entities. These included river basin councils, state water commissions, aquifer management committees, and water user associations to promote citizen participation and coordinate water management across three levels of government within watershed boundaries (Hearne, 2004; Maganda, 2003). However, not all districts were ready for devolution of power at the same time. It was implemented in some selected districts first and the lessons learnt carried to other districts. The process thus tends to be more adaptive management rather than integrated management.

A bottom-up approach has been the practice in the planning process and the operations are also decentralised. The CNA maintained a planning group, which has evolved into the Mexican Water Technology Institute. The CNA was moved from the Ministry of Agriculture and relocated within the Ministry of Environment and Natural Resources. Hearne (2004: 8) identifies two key trends that influenced the reforms of Mexico’s water management institutions: 1) adoption of market mechanisms, such as cost recovery and demand management, and 2) decentralisation of decision making and user participation (see also Mumme & Brown, 2002). These happen to reflect part of the Dublin principles (water with an economic value and stakeholder participation). The new water law in Mexico does not apply to anyone who stores less than 1030 cubic metres of water.

Hearne (2004: 9) lists the challenges encountered with the water management institutional reforms in Mexico to include:

i. Poor surface water quality control (continued deterioration of quality);

ii. Weak river basin and aquifer management organisations. They have no real authority, autonomy, or budgetary power making it difficult for them to achieve some of the benefits of common property management and self governance;

iii. Overexploitation of key aquifers, especially in Mexico City due to lack of capacity of the CNA to enforce pumping restrictions. Yet the over-exploitation of aquifers is identified as a primary threat to sustainable water management; and

iv. The inability of market to facilitate intersectoral water transfers (Intersectoral transfers are impeded by restrictions of transfers of water from irrigation districts which also limits the
movement of water from low valued agricultural uses to higher valued municipal/industrial uses).

IWRM has proved to have the potential of providing a logical continuation of the local enthusiasm for a long-term operation of water projects. A number of successful practices from Mexico’s water management reform efforts include:

i. The irrigation management transfer which has improved cost recovery. This implies getting the most value for money from investments in infrastructure although this may have the potential also of shifting the cost burden to the poor in society ((Berck, 1996; Jaglin, 2002; Tod et al., 2003; McDonald and Ruiters; 2005; Cleaver and Toner, 2006);

ii. The periodic practice of gathering information, reviewing priorities, and establishing a national water plan has been very impressive;

iii. The cautious approach to private sector participation in water supply which was intended to create opportunities for further public-private collaborations was lauded as having the potential to deal with the imperfections in existing institutions. Notwithstanding, this approach has been challenged in the literature as a neoliberal ideology which amounts to an abdication of central government’s responsibility (McDonald and Ruiters; 2005); and

iv. The national registry of water users which allows the CNA to collect fees for water use as well as identifying the over allocated water sources and imposing a degree of demand management on users of national waters (Hearne, 2004: 9). This can only be seen as a success if there is adequate capacity to monitor and effectively manage/regulate the allocations.

In Tanzania, the IWRM implementation process placed emphasis on institutions: design and implementation of new institutional arrangements, both at the national and the local level (Sokile et al., 2006; Cleaver and Toner, 2006). The IWRM concept was adopted in the country gradually from the late 80s onwards (Hyden, 1980; Kapile, 2003, Maganga et al., 2002). It resulted in the creation of basin water boards. The 1991 National Water Policy was revised to accommodate the use of the IWRM concept. Issues addressed by the new National Water Policy (2002) include the importance of equity, water supply, environmental priorities and sustainability, polluter pays principle, gender, and cost recovery (URT, 2002; Sokile et al., 2003; URT, 2004).

The central role of stakeholders and water users associations as the nucleus of water management is emphasized (Cleaver and Toner, 2006). Consequently, district councils are made to play a primary role in defining and implementing rural development plans including agriculture. This resulted in changes where new institutional roles and responsibilities are being given shape, particularly in agriculture and water. However, as far as institutional reforms are concerned little national guidance is available to allow for successful implementation at the local level (Sokile et al., 2006; Cleaver and Toner, 2006). Consequently, a number of institutional dilemmas are encountered (see 3.4).

However, there is a bias towards the formal state-based institutions for water management under IWRM, thus overshadowing the local informal ones (Sokile & van Koppen, 2003). This happens despite significance informal local institutions in water management (see Bruns and Meinzen-Dick, 2003; Mwakaje and Sokoni, 2003; Sokile et. al., 2002; van Koppen, 2002; Sokile & van Koppen, 2003).

The Tanzanian experience gives some insight into how IWRM implementation may face institutional imperfections especially in developing countries. Practical lessons as to how to move towards a process of IWRM in the face of these imperfections could emerge with a better understanding of the various dilemmas that are encountered (see 3.4).
In India, domestic water law is spread through many laws whose scope increases over time. Provinces had traditionally greater control over water resources and the central government control over transboundary and inter-State issues. The division of powers and the evolutionary process led to sectoral policies that failed to keep up with the changing uses and abuses of water. Water sector reforms have been initiated in India, but Cullet (2009) questions the application of the integrated water resources management concept to India which, he argues, undermines the commitment to meet equity goals. Although many changes are in the early stages Cullet argues that the focus on seeing water as an economically productive resource tends to minimize its role in the social and environmental aspects of development; that new water institutions have to work in parallel to existing government institutions and that this is likely to be unworkable; that irrigation focuses more on managing existing infrastructure rather than creating new systems; and that participation is interpreted more as giving land owners more control than creating a truly participative system. This implies a patchwork of ideas imposed on the existing framework rather than a clear reform process.

Since the 1960s there have been schemes to provide safe drinking water free of cost to residents leading to millions of hand pumps in rural India, but cost recovery is likely to reverse this trend of increasing access. He argues that the idea of the willingness to pay is flawed because there is always a disproportionate burden on the poor if they have to pay for water services. The reform efforts have focused mainly on direct regulations, though water economies in India are largely informal with little interface with any public institution (IWMI, 2007). India’s rural water economy is based largely on self-supply and local, informal water institutions. Under such a situation the resort to regulatory approaches may not achieve the expected results of IWRM. In other words this implies expecting more than the legal provisions and formal institutions can do to influence water use patterns.

Much of the water reforms taking place in India face difficulties because of high transaction costs including: 1) costs of research and information; 2) costs of negotiation, bargaining and contracting; and 3) costs of policing and enforcing property rights, rules and laws (IWMI, 2007; Mehta, 2003). The transaction costs increases with the increase in the number of stakeholders. For this reason some countries do not include those who irrigate with low volumes of water in licensing (e.g. the new water law in Mexico does not apply to anyone who stores less than 1030 cubic metres of water and Australia excludes those who irrigate less than 2ha). But if India exempts those who irrigate less than 2 ha, the majority of their water users and water diversion would get excluded (IWMI, 2007).

The reforms seek to support communities with a range of measures to improve their well-being and livelihoods. The institutional innovations meant to reduce transaction costs, improve welfare and raise productivity spontaneously (swayambhoo). These exist to serve the interest of their participants and not the entire society (Shah & van Koppen, 2006).

The water resources schemes promote the construction of mini dams and installation of wells, designed to intercept runoff and pond water. The planning process includes a mix of local traditional establishments and the new organisations. Communities are to operate and maintain the mini dams and the related water distribution systems using their own financial and physical resources. GWP (2006) states that the water resource schemes achieved the purpose of improving community access to and availability to water for various uses: domestic, agricultural, and other uses. Other benefits derived include positive environmental impacts, improved health, sanitation and hygiene. This type of approach is referred to in the policy briefings as “local action”. 

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Another example of the local action approach is the Communities and Water Resource Management in Municipal Sustainable Development Projects of Brazil. The objective is to improve water resources and land management issues to address increasing urban and regional environmental pressures. The process involves institutional reforms and reinforcement of Protected Areas measures aimed at improving watershed protection, reducing negative impacts on water resources, and enhancing existing planning instruments and policies through the development of new tools. These include municipal development plans, water resources management and monitoring systems, enforcement procedures and measures, social inclusion and environmental education.

There is also the use of stakeholder involvement and public-private sector partnerships in achieving the aims of the process. The lessons learnt in this process include the strengthening of partnerships among different levels of government and sectoral stakeholders in support of the mechanism facilitating integration of local actions within broader national/regional frameworks to address sustainable water resources management (IWMI, 2007). In addition, mechanisms to address service provision to poor urban communities within a sustainable water resources framework are employed. Through the creation of capable water user organizations the approach employs a participatory planning and decision-making process.

Theoretically, the cooperation from multiple sectors to solve water problems through the IWRM process makes the implementation of effective solutions easier to accomplish without creating another in a different sector. It also allows for strategic water allocation in the light of national goals and the links between allocation decisions and national development. Consequently, it makes it possible to effectively address the issue of avoiding poor investment and expensive mistakes but this is not the case for developing countries.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>1. Allowing local water rights to work in the conservation of water resources and distribution of water (through local negotiations, agitations, customs and traditions based on the principles of enforcements of personal positive behaviour and equity). Local rights are participatory in operation, self-regulatory, sensitive to the vulnerable (e.g. widows &amp; the poor), and able to contain conflicts.</td>
<td>1. Comprehensiveness requires huge administrative capacity and financial resources which are not readily available</td>
</tr>
<tr>
<td>2. Improvement and modernization of irrigation and drainage infrastructure projects (“local actions”) since there is so much funding and monitoring by donor community together with expert support/assistance.</td>
<td>2. Conflicting policies with some responsibilities of state bodies overlapping creating confusion over implementation.</td>
</tr>
<tr>
<td>3. Preparation and implementation of Integrated Water Management plans in selected/limited areas,</td>
<td>3. Definition of Acts not adequately capturing what is envisaged in policy documents</td>
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<td>4. Relatively, richer urban centres where public water supply systems are under the ambit of direct influence of the formal institutions.</td>
<td>4. Existing formal water rights are complex to operate—issued under different water regimes and alien to pre-colonial Africa; so many water users with flexible, changing off-take structures leading to difficulty in monitoring all abstractions</td>
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<td></td>
<td>5. Central government’s unwillingness to transfer water rights to WUAs</td>
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<td></td>
<td>6. Linking water management with conventional theories of common resource management. (In Sub-Saharan Africa for example, water is more than</td>
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</table>
5. Where top-down model management approaches which depend on professionals to lead the planning process because they have clear understanding of a collaborative planning process and where stakeholder inputs are needed a common resource—"it is a basis for life for agro- and pastoral societies and its allocation mechanism is firmly anchored in the deeper socio-cultural and economic context that cannot be simply understood by mainstream economic, social, and legal principles”

7. Little connection of the water economy with public systems and formal organisations through which policies, laws and water administrations operate (IWMI, 2007: 2).

8. Decentralisation not accompanied by changes in power relations.

9. Limited ability to enforce laws and regulations

Source: Kidd, 2009, IWMI, 2007; Sokile & van Koppen, 2004; Biswas, 2004; Cleaver and Toner, 2006; Mitchell, 2006; Mostert, 2006; Davis and Threlfall, 2006; Cairns, 2003; GWP, 2006; Bruns and Meinzen-Dick, 2003; Berck, 1996; Jaglin, 2002; McDonald and Ruiters, 2005; Hearne, 2004; Ballweber, 2006; Hall, 2009; Dellapenna, 2009.

### 3.3.3 Types of Implementation Processes

There are basically two types of implementation process or approaches that are adopted in all the examples discussed. There are top-down approaches that rely on agency professionals but make use of citizen input, and bottom-up approaches that transfer considerable decision-making power to citizens (Cairns, 2003). However, Davis and Threlfall (2006: 87) observe the emergence of, at least three patterns in IWRM application processes in the developed countries. First, the creation of river basin organizations or water infrastructure related organizations to develop water resources (the Tennessee River Valley Authority in the US and the Murray-Darling Basin Commission in Australia are typical examples of this pattern). Second the type that reflects sub components of IWRM. In this approach, issues (often with an environmental focus), like restoring river habitats or reconciling competing water uses generate actions that demand some form of IWRM and third, reorganisation of water and other regulatory governance institutions around natural basin boundaries. The New Zealand and the European Union experience are examples of this type. The notion of water as an economic good is not treated equally in the different developed countries.

There are some countries that treat IWRM plans as a product. In such situations participants carry out implementation independently (e.g. USA). On the other hand there are participants (countries) who view IWRM plan as an adaptive instrument to guide their actions (e.g. Australia). The literature shows that in some cases IWRM is used to promote nature conservation or economic development (IWMI, 2006; Mostert, 2006; Davis and Threlfall, 2006; Mitchell, 2006) but the debate as to whether all water-related competencies should be integrated in one organisation is inconclusive (Biswas, 2004a; IWMI, 2006).

River basin organisations in the developed countries concern themselves mostly with issues such as pollution, sediment build-up and degradation of wetlands; these may not be the top priorities for developing countries’ policy makers who may preoccupy themselves with issues like providing access to water for drinking, food production and poverty eradication (IWMI, 2007). At
the operational level, developing countries take a narrow view of the concept. Often there has
been the drafting of new water laws or renaming of water departments as basin organisations, or
the declaration of water as an economic good. What remains problematic is how to enforce the
laws or how to manage the resources at the basin level. It seems that the local action strategy has
been relatively better in the developing countries in terms of implementation. The reasons may be
because of the limited scope the projects cover or more probably because these are often
sponsored projects with external flow of resources and the particular attention these projects
received from the sponsors.

Generally, there appear to be some institutional complexities that have made the application of
the broad IWRM concept difficult (see 3.4). These complexities differ from country to country
and various reasons have been advanced to explain these varying complexities and to these we
turn our attention in the next section.

3.4 Factors Responsible for Varying Complexities/Challenges in Different Countries

Converting the IWRM philosophy into practice has not been without challenges (IWMI, 2007: 1).
Historically it has proven difficult to achieve and/or sustain either locally or universally (White,
1998; Biswas, 2004; Conca, 2006). The challenges and problems confronting countries
implementing IWRM differ depending on country approaches and interpretations of IWRM and
specific country conditions. This section discusses some of these challenges and/or problems and
the factors responsible for varying complexities.

First, the “grafting of IWRM onto institutional structures that favour single-issue, single agency
decision making” (Margerum 1995: 41; Biswas, 2004; Davis, 2007) as occurred in Australia and
the USA creates implementation difficulties. This is because there are a number of agencies and
local government authorities (preoccupied with their direct responsibilities) with management
responsibilities for IWRM, which involves cross cutting issues and a range of actions. Reforming
institutional structures to make it capable of supporting integration may be a necessity. This is
probably a concern in many other countries.

Second, the issues of integration and coordination remain the key challenges in both bottomo-up
cultures like the US and top-down cultures like South African (Allan, 2003; MacKay et al,
2003 and McKay 2009). Reconciling top-down with bottom-up planning calls for not just change in
rules but also in working cultures. The difficult institutional choices that pose a challenge here are
the dilemma of top-down versus bottom-up planning.

Third, engaging stakeholders in practice at multiple levels of governance in the hope of achieving
an integration of the different needs and uses of water is difficult. Local stakeholders need to
fully understand the process and how it will impact their activities. National stakeholders need to
understand how local stakeholders may make decisions and whether this will lead to inconsistent
policies nationally, as in the case of New Zealand. The fact that different catchments may be
ready for IWRM at different times because the development of infrastructure and other basin
characteristics may not be at the same stage poses a challenge as well. The literature emphasises
the bottom-up approach and public/ stakeholder involvement rather than the technocratic top-
down planning structure (GWP, 2000; Jaspers, 2003; Chambers, 1983); but local stakeholders
also tend to externalize impacts that may occur at other levels of governance. The challenge is
how to meet sufficiently what has been termed the pre-condition for participatory process to
begin. This comprises commitment of decision making agencies to a participatory approach;
commitment of all stakeholders; urgency for resolution of an issue or issues; absence of
fundamental value differences; democratic structures, and existence of feasible solutions (Gunton
Fourth, the implementation of IWRM is resource intensive because of the numbers of participants, sectors, policies and instruments involved. The ability to cope with these needs/demands varies from country to country. The issues then become very difficult to address because they bring on board many actions and participants. The number of interrelated problems that are brought on board determines the level of complexities that are involved.

Fifth, the structure of decision making determines the extent of the complexities (Margerum, 1995: 43). Those countries whose management approaches are more top-down depend on professionals to lead the planning process. These have a clear understanding of a collaborative planning process and where stakeholder inputs are needed. On the contrary, the countries that adopt the bottom-up model operate with many groups of people who often struggle to find a clear direction and focus. This affects the “nature of the inter-institutional communication and the linkages between bottom-up community participation and the top-down policy and public investment components” (Margerum, 1995: 43; Davis, 2007; Allan, 2003). In fact the more there is open communication in the planning process the better the building of mutual understanding and trust which are prerequisite to efficient implementation.

Sixth, the dynamics of the water economy in a country and the stage of “formalisation” of the water economy and policy (among other things) influence its ability to adopt IWRM. The hypothesis put forward is that as a low-income economy begins to grow economically, the organisation of its water economy undergoes a transformation in consonance with the changes in the society as a whole (IWMI, 2007). The main drivers of this transformation are identified to be urbanisation and occupational diversification. In the rural poor societies, self-provision of water by households is the dominant feature. This is gradually replaced with specialized water provision services as urbanisation and economic growth occurs. It is expected that the associated informal institutions will also give way to large, professionally run private and/or public corporate. Based on this hypothesis IWMI (2007) categorizes all economies into four different phases in the transformation process and suggests possible institutional arrangements that can support efficient IWRM application under such conditions.

The categorisation of all economies into: (1) completely informal, (2) largely informal, (3) formalising and (4) highly formal water industry suggests that ≤5%, 35%, 35-75% and 75-95% represents percentage of users in the formal sectors respectively. These categories are characterised by the following different institutional arrangements respectively: 1. Self help, where mutual help and feudal institutions dominate, 2. Informal markets (presence of mutual help and community management institutions), 3. Organised service providers- self-supply declines; informal institutions decline in significance, 4. Self-supply disappears; all users get served by modern water industry. These findings by IWMI (2007) seem to suggest that institutional arrangements are very crucial in the application of IWRM and that an omnibus policy prescription for all economies at different development stages may not achieve the desired purpose.

It can be deduced that the IWRM approaches can take on a variety of forms and apply to problems at all levels – community to city to district and national level. This makes the issue of integration very important. However, the specific tools to be employed in any instance will depend on the context and the problem at hand.

Seventh, effectively empowering local collaborative initiatives or partnership is challenging if decentralisation is not accompanied by the devolution of power, training and budgets. This can result in a number of implementation problems. A number of ad hoc watershed management partnerships with minimal state guidance (like that of the US) face challenges. There are limited or no horizontal coordination which impedes efficient implementation and a very weak vertical
linkage with national policy. A better result is envisaged if IWRM initiatives are linked with political and legal/institutional framework for water resources development/management.

Eighth, IWRM is a process – a means to an end (see 2.4). Mitchell (2006: 52) observes that rather than comprehensive programmes, “the crucial thing that needs to be pursued is to have a clear vision or a direction about a desired end state for a catchment or river basin”. It is only then that IWRM can become one means to assist in achieving the desired end. Mitchell argues that it is the developing of a shared vision which is normally challenging due to the fact that many values, interests and needs that exist within a river basin will have to be reconciled.

Ninth, the challenges associated with institutional choice in the implementation of IWRM (Sokile et al, 2005). Sokile et al identify the following institutional dilemmas:

- Using new versus existing institutional structures to facilitate the transition towards IWRM. If care is not taken this can generate a confused diversity of local water management institutions. The creation of new institutions within an existing institutional environment must be done with a bit of caution.
- Neutral reforms versus actively reshaping power relations: One of the central issues in institutional reform is about allocating and distributing power among stakeholders. This comes up in trying to decentralise to effect IWRM implementation because changing institutions affect the existing power relations. Often the benefits of the changed power structures are hijacked by the elites in society. This is demonstrated mostly in institutional reforms and formalisation of water rights.
- Incremental changes versus visionary master planning. Most policy plans are characterised by “incremental changes rather than drastic new steps” (Lindblom, 1959) as cited in Sokile et al. (2005: 19). As a result having ones’ focus on a comprehensive strategy, may result in disappointing experiences (see Mitchell, 2006). At the local level the changes that can be made successfully are incremental shifting towards adaptive management.
- Centralised versus decentralised management structures: Decentralisation for public consultation and stakeholder involvement has become a necessary condition for efficient IWRM implementation (see 2.5) because most of the water management institutions are centralised, hierarchical and/or technocratic (Ravensteijn et al., 2002) but decentralised systems have their own problems. Decentralisation is often needed to improve the functioning of existing institutions; however, an important part of the water management problems may be the result of national level developments, which require a national rather than a local solution. The role of the “intermediary” institutions comes into focus in trying to strike a balance between centralisation and decentralisation.

Institutional reforms for IWRM present institutional choice problem: transaction costs versus perceived pay-offs dilemma (IWMI, 2007). This condition usually comes with four separate options: the first two are the interventions with poor implementation efficacy. Such situations arise because policy recommendations have either (a) high transaction costs and low perceived pay-offs or (b) low transaction costs and low perceived pay-offs. The third is a promising intervention but based on an institutional model with high transaction costs (e.g. participatory irrigation management). This occurs because the conditions that increase pay-offs and thus reduce transaction costs in community irrigation systems may not be the same in the developed and developing countries. The fourth challenge is the situation where vibrant institutional innovations are ignored. This is a real example of new versus existing institution dilemma.

It can be concluded that implementing IWRM has not been without challenges. These diverse challenges stem from different factors ranging from cultural, economic, institutional, social, and even political. Some of the challenges have got to do with the unclear nature of the IWRM concept which results in these practical difficulties.
3.5 Inferences

The chapter has shown that IWRM has received various degrees of adoption in diverse ways in different economies. Different countries have applied the concept depending on the water development problem at hand and/or interpretation given to the philosophy of IWRM. Some interpret it to mean linking water resources management with a nation’s economic planning and development whilst others look at it in terms of integrating different use of water/ different water using sectors (referred to as sectoral integration). Those with ecosystems leaning consider water resources as an integral part of the ecosystem. Spatial integration (upstream/ downstream inter linkages) is the other interpretation given by some countries. However these are not mutually exclusive.

Most of the interventions to get IWRM to work have concentrated on what legal and regulatory systems do but not much about people. The implementation approaches of IWRM in the developed countries have been different from that of developing countries. This is because the implementation of IWRM is resource intensive because of numbers of participants and the several actions involved. The ability to cope with these demands varies from country to country.

The implementation difficulties have been as a result of the grafting of IWRM onto institutional structures that favour single-issue, single agency decision making. The erroneous grafting of institutions without giving adequate attention to the vibrant informal institutions is a result of the assumption that best practices are applicable under varied conditions. But institutional arrangements are very crucial in the application of IWRM and that an omnibus policy prescription for all economies at different development stages may not achieve the desired purpose. It ends up complicating the problems associated with implementation.

The few success stories are with the countries where the structure of the economy and the institutional arrangements do respond to legal and regulatory measures. Thus the institutional arrangements in a developing country like Ghana will be examined to ascertain how they thrive and actually serve the purposes important to the agents involved. In this direction the importance of the incentive structures come to the fore. If there are no proper incentive structures participants either do not get involved or work to defeat the change process. However, a universal incentive structure is doubtful since the prominent change factors are different in different countries.

The factors that influence the process are social, economic, and political. Institutional analysis for prescriptions that will fit policies to their context becomes imperative for better implementation. Water institutions have not remained static in trying to apply IWRM principles in the countries reviewed; they have evolved along with societies. It will be interesting to examine how the processes have been and the presence or otherwise of the institutional dilemmas discussed and to find out how they play out in the Ghanaian situation.

The next chapter therefore examines the conceptual issues of institutions, institutional change and water governance to be able to place issues in their rightful contexts. Each country’s experience has shown that both internal and external factors contribute to institutional change. The external factors may include macroeconomic issues and politically motivated decentralisation.

Integration of the local resources and in the local context is crucial if IWRM is to be successful. To this end a thorough understanding of how the local context of developing water economies is different from the more developed water economies is paramount. On a different plain there is the need to examine how the creating of links across scales for integration could be effected.
4. The Theory of Institutions and Water Governance

4.1 Introduction

There has been an increase in the discussion of a shift in water management from government to governance since the end of the 1990s with emphasis placed on the role of institutional factors (Allan, 2003; Rogers and Hall, 2003; GWP, 2003; Gleick, 2000). The shift has been described variously as: (i) from state to market-driven regulations; (ii) from centrally administered to user-based management institutions and (iii) from administrative to resource-based management by different authors.

The shift from government to governance meant that governing no longer is under the exclusive control of government officials, but is a task shared with a wide range of social actors – including scientists, social movements, and business (Kooiman, 1997; Rhodes, 1997; Pierre, 2000; Høj and Wagenaar, 2003; Blatter, 2003; Arts and van Tatenhove, 2005). A very important component of this shift is the need to engage stakeholders in decision-making from global (Bene and Neiland, 2006; Peters, 2002; Genskow and Born, 2006) through to local levels including the private sector (Franks, 2007; Thomas and Durham, 2003; Lant, 2003; Jonch-Clausen, 2004; Giupponi et al., 2006).

This implies that water governance institutions require good governance processes to ensure effective government and civil society stakeholders’ engagement (Ashton et al., 2006). It therefore becomes important to examine institutions at the local, basin and the national levels and also investigate the emergence and functioning of local, indigenous institutions as a result of IWRM.

In this chapter I review literature to understand what are institutions, what is institutional arrangement? And what are the roles of institutions in water management? Some theoretical issues explaining institutional change as well as analytical frame for water institutions are discussed. I finally review water governance and show the link with institutions.

4.2 What are Institutions?

4.2.1 Institutions Defined

A variety of definitions of institutions are used by different authors but the most commonly cited definition is that advanced by Douglass North: institutions “are the rules of the game in a society, or more formally, are the humanly devised constraints that shape human interaction” (North 1990a: 3). Institutions “reduce uncertainty by providing a structure to everyday life” (North 1990a: 3), and include both formal rules such as laws and constitutions, and informal constraints such as conventions and norms. The diverse definitions can be seen as reflections of variant forms of North’s definition.

Most people often use the term “institutions” to mean “organisations”. The connotation becomes pronounced in the use of the term “institution building,” which often refers to the building up of new organisations (e.g. farmer organisations, academic institutions, river-basin organisations, etc. (Bandaragoda, 2000:3). “Institutions are a pervasive phenomenon with diverse origins” for the fact that they affect various dimensions of human relationships and interactions (Saleth and
Dinar, 2004: 23). This has contributed to diverse definitions and interpretations emanating from different disciplinary perspectives and theoretical traditions.

O’Riordan and Jordan (1999: 81) define institutions as the “multitudes of means for holding society together, for giving it a sense of purpose, and for enabling it to adapt”. This definition reflects in such uses as ‘the institution of marriage’, ‘the chieftaincy institution’ and ‘the institution of priesthood’. Young (2004:215) quoting Onuf, N.G. explains institutions to mean collection of rights, rules, and decision-making procedures governing human actions in specific issue areas. The acts of creation, rather than processes of discovery become important in the refinement of institutions. Institutions include socialised ways that are shown through communication, culturally ascribed values, and patterns of status and association (O’Riordan & Jordan, 1999: 81; Kabeer, 1994). Some scholars even claim that institutions shape the very needs and wants that create the processes that induce climate change but this view is disputed.

Kabeer’s (1994: 104) definition presents institution as a framework of rules for achieving certain social or economic goals. Similarly, North (1990: 4) refers to institutions as the “framework within which human interaction takes place”. This definition clearly shows that there are formal institutions and informal institutions. Formal institutions are the written laws, rules and procedures, which “influence and shape interaction and behaviour” (Bandaragoda, 2000: 4; North, 1990: 4; Kingston & Caballero, 2008: 3). Informal institutions can be described as the ‘unwritten rules’ which govern behaviour (Helmeke & Levitsky, 2004) or informally established procedures, norms, practices and patterns of behaviour, conventions, and self imposed codes of conduct (North, 1990: 4, Saleth & Dinar, 2004). This gives a broader perspective of the concept but the informal rules are not legitimised and enforced by formal structures.

Perhaps the definition given by Bandaragoda (2000: 4) is specific to resource use—“institutions set the ground rules for resource use and establish the incentives, information, and compulsions that guide economic outcomes”. However, the outcomes may not be only economic but also social. From the perspective of Hall and Thelen (2005), institutions may be conceptualised as a set of regularised practices where the actors expect the practices to be observed, whether they are backed by law or not. Saleth (2006: 4) provides a definition of water institutions in the light of the general definitions of institutions as “rules that define action situations, delineate action sets, provide incentives and determine outcomes… in the context of water development, allocation, use and management”.

Veeman and Politylo (2003: 322) follow the line of argument that institutions are “social decision systems that provide rules for the use of resources and for the distribution of resultant income or other benefit streams”. This definition restricts institutions to only informal aspect of the broader perspective. However, looking at it from a different perspective institutions are defined as “ordered relationships among people which define their rights, exposure to rights of others, privileges and responsibility” (Schmid, 1972: 893). This implies that institutions serve the purpose of shaping and stabilising human action.

Institutional economics adopts a similar interpretation in which “institutions” are defined as basically “the rules of the game in a society, or the humanly devised constraints that shape human action” (North 1990: 3; Hearne, 2004: 2; DFID, 2003). But the human actions thus shaped could in turn influence future constraints through the activities that grow up with the efforts to implement the rules. In this regard tradition and informal practices also become “rules” in their own right, when they are accepted by society. These informal and formal institutions define and fashion the behavioural roles of individuals and groups in a given context of human interaction (O’Riordan and Jordan, 1999: 82). Thus, institutions may be thought of as consensual
arrangements of behaviour constituting conventions, or as rules and entitlements that define individual and group choice sets.

It is clear that there are different views about what institutions are depending on different institutional approaches adopted. But simply put institutions can be viewed as a set of regularised practices that shape human actions/interactions or as stable rules which govern human interactions, and which are also humanly-devised. An important question then is how do institutions constrain and shape behaviour when they are themselves the product of human choices? (See 4.2.4)

4.2.2 Nature and Characteristics of Institutions

Most contributors concerned with showing how institutions fashion human behaviour give definitions which demonstrate the set of defining characteristics of institutions: institutions are “systems of rules of decision-making procedures, and programmes that give rise to social practices, assign roles to the participants in these practices and guide interactions among the occupants of the relevant roles” (Young et al., 1999: 89; Young, 2002: 5). Institutions are subjective constructs in terms of origins and operations (Saleth & Dinar, 2004). It is in recognition of this subjective nature that institutions are characterised as “belief systems” and “habits”. However, this subjective nature does not preclude their objective manifestations and impacts (Saleth & Dinar, 2004). This is what Hodgson (1998: 181) refers to as “subjective ideas in the heads of the agents and objective structures faced by them”.

A summary of theoretical literature by O’Riordan and Jordan (1999: 82) suggests general characteristics of social institutions to include the following: “institutions

- Comprise rules that entail values, norms and views of the world. These rules define roles and provide a social context for action.
- Take time to develop. They come about through repeated processes.
- Once developed have a degree of permanence and are relatively stable (Merrey, 1993). They constitute the enduring regularities of human action.
- They are continually re-negotiated in the permanent interplay between conscious human agency (action) and the wider structures in society (e.g. laws, the economy, common perceptions) over which individuals have relatively little control.”

Thus, “institutions are never static; they change continuously in response to both endogenous and exogenous forces” (Young et al., 1999: 90) (see 4.5). Once created, institutions take on a life of their own, acting as independent variables between the preferences of the actors that created them on the one hand, and the ultimate outputs and outcomes of the policy process on the other hand (Young, 2002; O’Riordan & Jordan, 1999: 83; Coriat & Dosi, 1998).

Institutions have a path-dependent nature (Saleth & Dinar, 2004: 27). This is to say history is important in understanding the direction and scope of institutional change. Path dependence implies limited scope for sudden and radical change. Based on the different definitions and terminologies used in practice Bandaragoda (2000: 5) describes institutions as a combination of:

- Policies and objectives
Institutions define what is expected and what is regarded as ‘rational’ or appropriate in a given situation. Where they arise to deal explicitly with matters involving human/environment relations, it is referred to as environmental or resource regimes (Young et al., 1999: 89; King, 1997: 1). Following from this, Young et al. (1999:89) describe different environmental/resource regimes at different levels of social organization to include the following: local institutions (e.g. local water management systems), sub national institutions, national institutions, regional institutions, and global institutions. The variations within these institutions are functions of many characteristics which include “functional scope, geographical domain, extent of formalization, mix of formal and informal elements, density of rules and programmes, structure of administrative organizations, stage of development, and links to other institutions” (Young et al., 1999: 90).

Institutions are not actors in their own right (Young, 2004: 216) but have characteristics that are relatively stable; possess a self-reinforcing nature and persistence though they may change over time. The durability nature is explained in terms of “path dependence and the self-reinforcing mechanisms such as network externalities and learning” (Saleth & Dinar, 2004: 28). Adelman et al. (1992: 106) note that the stability and durability features do not “preclude the malleability or adaptive flexibility of institutions, which are the key to initiating and sustaining the process of development”.

Another feature of institutions is that they are hierarchic in nature and nested. In the view of North (1990a: 83) and Ostrom (1999: 38) institutions are a “constellation of hierarchically nested rules”. Thus, institutions are mutually nested and structurally embedded within each other. For example formal institutions are embedded within informal institutions. As such the effectiveness of the formal cannot be realised without the informal institutions.

These institutional characteristics are important in understanding the changes in institutions, institutional arrangements and the linkages between institutions and performance in the water sector.

4.2.3 Institutions and Organisations

A clear distinction is made between organisation and institutions in the literature (Bandaradgoda, 2000; Young, 2002; Alaerts, 1997; Uphoff, 1986; Pai & Sharma, 2005) though casual discussions sometimes use them interchangeably. The DFID (2003) distinguishes between institutions and organisations as suggested by North (1990) and refers to institutions as ‘the rules-of-the-game’ and organisations as ‘how we structure ourselves to play’.

Organisations are treated as material entities possessing offices, personnel, equipment, budgets, and legal personality (Bandaradgoda, 2000; Young, 1994). They are bodies with explicit structure and hierarchy of authority. They possess enforcement characteristics such as enforce rules, norms, conventions and codes whether formal or informal. The hierarchical arrangement is what
is often referred to as the “organisational structure”. Organisations play significant roles in administering or operating institutions but some institutional arrangements operate effectively in the absence of organisations or with the bare minimum of administrative apparatus.

Cernea (1987: 15) defines organisations as “networks of behavioural roles arranged into hierarchies to elicit desired individual behaviour and coordinated actions obeying a certain system of rules and procedures”. A similar definition by Merrey (1993: 8) describes organisations as “structures of recognised and accepted roles”. Therefore organisations could be conceptualized as groups of individuals with defined roles and bound by some common purpose and some rules and procedures to achieve set objectives. But every organisation has its own rules which define its hierarchy of authority and the formal allocation of tasks and responsibilities.

Like institutions, organisations also shape human action. In this vein, North (1990:73) sees organisations as “purposive entities designed by their creators to maximize wealth, income, or other objectives defined by the opportunities afforded by the institutional structure of society”. Chambers (1999: 221) uses institution to refer to organisations as well as to rules, procedures and norms expressed in repeated activities and relations between individuals in organisations. This is seen as emanating from the institutionalist perspective where organisations are treated as institutions or cultural patterns. Traditional approaches stress functional explanations and view organisations as “the structural expression of rational action” (Goodman & Jinks, 2003: 1754). But contemporary approaches understand organisations as products of institutions. Goodman & Jinks’ distinction is that institutions (the regulative and cognitive environment) affects organisations and that, organisations are not institutions. Institutions are understood as the rules and shared meanings that define social positions.

North (1990) establishes that institutions affect economic performance by determining transaction and transformation (production) costs. In this case the technology employed is of great importance. The constraints imposed by the institutional framework define the opportunity set and therefore the kind of organisations that will come into existence.

Bandaradgoda (2000) suggests two different ways of looking at the link between institutions and organisations. One way is to look at how organisations come into existence and how they evolve. This is fundamentally influenced by the institutional framework. For example, international agreements have given rise to multilateral organisations such as the UN. This demonstrates that institutions and organisations are inseparable, and together, they, provide a structure for human interactions. Once established, the organisations, in turn, influence how the institutional framework develops. For this reason, the study of water-related organisations become relevant in attempts to understand the influence of changing social, economic, and political situations on institutional framework.

The other perception is a reflection of what Chambers (1999) put forward that “established organisations are in fact institutions” themselves. Examples include irrigation departments, water boards and well-established river-basin organisations. This perception points to the fact that established organisations can be seen as agents of institutional change (Bandaradgoda, 2000: 6). Though this is important because it may be possible to identify the extent to which these organisations have played a role in fashioning the existing institutional framework, organisations are treated as different from institutions in this work.

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4.2.4 How Institutions Shape Human Behaviour

The eagerness to demonstrate the role of institutions in shaping political outcomes and to understand the actual roles that institutions play as determinants of the interactive human behaviour gave birth to the “new institutionalism” (NI) movement in social science (Powell and DiMaggio, 1991; Rutherford, 1994; Crawford and Ostrom, 1995; Peters, 1999). There has since been a rise of institutional theories and applications of these theories (Khalil, 1996; DiMaggio & Powell, 1991; Peters, 2000). The rise has been from sociology and economics.

The new institutionalism was supposed to go beyond the characteristic features of behaviouralism and rational choice theory (contextualism, reductionism, utilitarianism, functionalism and instrumentalism) as well as to build on the attributes of the “old institutionalism” (legalism, structuralism, holism, historicism and normative analysis) (Peters, 1999). What the proponents of NI try to do is to place policy process within the context of political institutions. The NI is touted as being pragmatic, empirical, and marked by emphasis on rules in use (Ostrom, 1990). Hall and Taylor (1996) differentiate between three main variants of institutionalism: historical, rational choice and sociological, though there are several different strands of institutional analysis (see Marsh & Stoker, 2002) . The understanding of these strands is important in helping me understand institutional arrangements and explaining changes and from what perspective.

“Historical institutionalism assumes that change is difficult at best” (Peters, 2000: 6). It conceptualises the relationship between institutions and individuals in broader cultural terms. It views individuals as “satisfiers rather than utility maximisers” (Pai & Sharma, 2005: 9). The core argument of historical institutionalism (HI) is that policy outcomes and “structural choices made at the inception of institutions will have a persistent influence over its behaviour for the remainder of its existence” (Peters, 2000: 3; Steinmo et al., 1992; Steinmo, 2001; Deeg, 2001; Greif & Laitin, 2004). Some configurations are “conducive to certain political outcomes, whereas others will lead to rather different policy directions” (O’Riordan and Jordan, 1999: 84). This idea of “path dependency” has been the central explanatory principle for historical institutionalism (Pai & Sharma, 2005).

Historical institutionalists argue that new institutions develop in a world full up with existing institutions and that institutions normally stabilise politics. It is therefore expected to find governance systems bearing the stamp of theories, discourses, ideologies or patterns of thought that were influential at the time of their formation. Hall and Taylor (1996: 940) outline the distinctive characteristics of HI in relation to the other two institutionalisms: namely, (i) it underlines “the asymmetries of power associated with the operation and development of institutions”, (ii) it is “concerned to integrate institutional analysis with the contribution that other kinds of factors, such as ideas, can make to political outcomes” and, (iii) it takes a view on “institutional dynamics that emphasise path dependence and unintended consequences”.

This leaning however creates a static conception of institutionalism. This can be seen as contradicting the views of those who argue that environmental regimes reflect the preferences of actors or interest groups who are able to exercise power during processes of regime formation. But Young (2004: 215) disputes this and demonstrates that even “powerful actors are limited by their understanding of the institutional options available to them, a fact that highlights the role of knowledge in the growth of institutions”. In summary HI believe that institutions have lives of their own; they are independent variables; institutional structures shape and are shaped by strategy of individual actors.
Rational Choice Institutionalism (RCI) is much closer to neo-classical economics in its conception of institutions (O’Riordan and Jordan, 1999: 84; Bevir and Rhodes, 2001; North, 1990a). The central goal of Rational Choice Institutionalism is to uncover the laws of political behaviour and action (Steinmo, 2001). RCI believe that institutions are created to serve the interests of members in a group and see change as quite easy (change incentives and behaviour will almost immediately change). This explains why rational choice theorists exhibit great interest in institutional design (see Weimer, 1995; Kerman, 1996).

In contrast to HI, RCI regard institutions as having the capacity to affect individual choices but are not capable of determining them. The assumption being that individuals behave rationally and strategically, using whatever resources they command to maximize their utility. Thus institutional structures are shaped by the strategy of individual actors; when preferences shift, the institutions shift accordingly in order to restore equilibrium; and that they are independent variables. However, because RCI tends to take a functionalist view of institutions it deduces the preferences of actors from the structure of existing institutions, though they may embody past choices that no longer reflect current concerns (O’Riordan and Jordan, 1999).

Institutions are thus conceptualised as exogenous to the values of individuals who function within them (Peters, 2000). These ideas based on rationality are however found to be too simplistic and weak in explaining change (O’Riordan and Jordan, 1999: 85). For example, there is the need to find out whether institutions persist only because they are efficient. RCI concerns itself with knowing how people go about getting what they know or want, without giving attention to why people want what they want in the first place (Wildavsky, 1997).

From the perspective of sociological institutionalism the influence of institutions is seen in almost every aspect of human life. They can be habits and social protocols, cultural templates and frames of meaning. From this perspective institutional forms and procedures are seen to be adopted not on grounds of rationality but because of “embeddedness” in culture, society and organisational identity (Pai & Sharma, 2005). Following from this, institutions are defined as culturally constructed and as moral templates that provide the “frames and meaning” guiding human action (Scott et al., 1994; Pai & Sharma, 2005). Individuals are thus viewed as socialised into particular roles and they internalise the norms associated with it. This is the way institutions affect behaviour. The rationality of an individual’s behaviour is therefore socially determined. From this perspective institutions may be seen as being responsible in shaping world-views but are not efficient at matching outcomes to exogenous factors.

This approach argues that change may take place not solely because of increase efficiency of institutions but because it enhances the social legitimacy of the organisation and its participants. These are aspects which may be significant in the study of local informal and formal institutions in water resources management.

Institutionalism invokes different meanings to different scholars to the extent that some are contradictory to others (Peters, 2000; Hall & Taylor, 1996). The absence of agreement on how these institutionalism influence behaviour led to the search for further theories. This brought about the cultural theory\(^7\) into the debate but the discussion of this is beyond this context.

\(^7\) For a discussion of how cultural theory examines the role of institutions through the triple structure of market, hierarchy, and community see Timothy O’Riordan & Andrew Jordan (1999), Institutions, Climate Change and Cultural theory: Towards a Common Analytical Framework, *Global Environmental Change* pp85-92

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New Institutionalism (NI) shows that the study of institutions will always be confronted with the absence of agreement on the core topic being studied (see Young, 2006). Thompson and Rayner (1998: 303) refer to this phenomenon as an example of “contradictory certitudes”. The argument is that each of the frameworks (historical, rational choice, sociological or normative approaches) cannot be reconciled because each position defines itself in distinction to all the others. No one of these strands is the best in explaining institutional changes but together they help in the understanding of these developments.

4.3 Role of Institutions

The definitions discussed above show that institutions are humanly devised “constraints” to shape human action. However, institutions inherently have dual functions to both constrain and liberate individuals and group action (Bromley, 1987; Bromley, 1989b; Achesen, 1994b). These dual functions of institutions are of particular importance in water management (Bandaragoda, 2000).

Institutions, in addition to indicating what individuals must or must not do shape the vision of the world and define the identity of the actors themselves (March & Olsen, 1989; Coriat & Dosi, 1998; Saleth & Dinar, 2004).

Centrally imposed or externally mandated institutions are particularly meant to bring about stability. The stabilizing effects of institutions do not mean that institutions themselves are not subject to change (Saleth, 2006). As society and its priorities change, institutions (conventions, codes of conduct, and norms of behaviour, laws, and contracts) seem to evolve and continually change the choices available to the individual.

Institutions have the role of facilitating coordination among people by helping them form expectations, which each person can reasonably hold in dealings with others. They reflect the conventions that have evolved in different societies regarding the behaviour of individuals and groups relative to their own behaviour and the behaviour of others (Ruttan and Hayami, 1984: 204). Institutions determine the incentive structure for human exchanges and reduce uncertainty through the provision of structure to everyday life (North, 1990a: 3-4). Institutions also play a role as instruments for interpreting and transforming information into knowledge (Saleth & Dinar, 2004).

From the historical institutionalism (HI) perspective institutions play a determinant role (O’Riordan and Jordan, 1999: 84). Institutions shape the actions of individuals, and sometimes are affected by collective and individual choices (Saleth & Dinar, 2004: 25). They act as intervening variables between preferences and power of actors on the one hand and ultimate policy outcomes on the other (March and Olsen, 1989).

Institutions are created because they “reduce the transaction costs of undertaking the same activity over and over; because they help stabilize expectations by transferring information; and because they promote compliance by building trust and creating enforcement mechanisms in circumstances where trust is weak or absent” (O’Riordan and Jordan, 1999: 84). For sociological institutionalism (SI) institutions help to shape the very preferences that rational choice theorists regard as “fixed and unbending” (O’Riordan and Jordan, 1999: 85).

According to Bandaragoda (2000) most water related rules are meant to constrain the socially undesirable behaviour of individuals and groups in the distribution and use of water. At the same time some water related institutions, such as those governing water user associations, are designed to promote organised behaviour and equity and provide various opportunities for individuals and group advancement, thereby serving to liberate human action.
4.4 Institutional Arrangements

The institutions and institutional arrangements guiding water use have become very important due to the fact that there is growing demands for water resources and concerns about declining water quality. The “one size fits all” solutions do not exist (Barrett et al., 2005: 193; see also 4.8) and scholars and practitioners are increasingly accepting that “getting institutions right” is as important as getting incentives right (Barrett et al., 2005: 194; Saleth & Dinar, 2004).

Institutions involve the rules of the game (section 4.1) but institutional arrangements encompass the governance structure i.e. the organisations and contractual arrangements (Easter, 2004:1; Saleth & Dinar, 2004: 34). I shall return to water governance and elaborate later on this in section 4.9. Institutional arrangements establish the rules for the use and protection of (water) resources (Livingston, 1995). The ability to achieve the expected outcome depends to a large extent on the institutional arrangements that shape the incentives and constrain human action (Alaerts, 1997; Barrett et al., 2005). But because the institutional environment around a sub-sector keeps changing the institutional arrangement within the sector is expected to adjust continuously (Alaerts, 1997: 4).

Institutions and institutional arrangements for water include at least three key components: water laws, water policy and water administration (Saleth and Dinar, 2004; Bandaragoda, 2000:10). Also important are other laws, policies or programmes that have impact on water use (see 4.7). In developing new institutions and institutional arrangements, history matters (Easter, 2004: 1; Saleth & Dinar, 2004: 27; see also 4.2.1). That is, possible changes will depend on past institutions and institutional arrangements. For example, the type of property rights system that is in place will strongly influence the effectiveness of institutional arrangements designed to resolve conflicts.

Fundamental policy changes can reduce the transaction cost of institutional change (Easter, 2004; North, 1990a). Consequently it will be wrong for one to expect that the same institutions and institutional arrangements will be as important and as effective in all countries or even within all regions in one country. No one institutional arrangement is found to be best, and what is likely to be needed is a combination of arrangements (Orr and Colby, 2004; Alaerts, 1997) depending on the particular period of a country’s development and local characteristics (e.g. the hydrogeology and topography, industrialisation, culture, economy and the natural environment).

There are a number of basic set of institutions that must be examined in an attempt to change or strengthen water institutional arrangements. Firstly, the one that establishes the rules for water diversions from streams, rivers, lakes and even ground water. The second has to deal with those set of rules or policies that set the conditions for allocating and reallocating water among different users (Easter, 2004:1). For example, it is important to establish who has the first priority on the limited water supply in times of drought? Many countries are known to give first priority to domestic water use. Agriculture receives first priority in a few countries. Priorities are needed within sectors so that critical uses are maintained. Generally, top priority is given to human consumption and livestock water use.

The third set of institutions that are important are the laws establishing water use rights (see 4.7.3). In the face of rapid growth in demand for domestic and industrial water uses the critical question is how to develop institutions and institutional arrangements that shift water to domestic and industrial uses without damaging agriculture. This will require careful analysis and assessment of institutional arrangement.
There are also some features that demonstrate the effectiveness of institutional arrangement. Three of such features are identified by Blomquist (1995: 57): (1) water users pay for the management costs, (2) information on water supply conditions and water use is made readily available to users, and (3) water allocations to users are specific in terms of quantities drawn and are transferable within most of the basins. In addition Easter (2004) shows that the process of developing the institutions and institutional arrangements is important in making them (the institutions) effective. Effective institutions then ensure the behaviour of others (North, 1990a). The process is to include all affected stakeholders—i.e. allow water users to participate in shaping the rules. Getting the institutional arrangements right is found to be much more important than charging the right price for underground water by Livingston and Garrido (2004) in the U.S. However, they find that to be effective, water extraction rights need to be quantified for all users. Pricing turns out to be a rather minor issue when compared to who has access to water.

4.5 Institutional Changes

The use of different definitions of institutions naturally influences the views of institutional change. The cyclic phenomenon related to institutions, (where institutions are basically determined by human action, and once established, in turn, determine the scope and character of subsequent human action (see 4.1.2)) need a considerable attention when analyzing institutional changes.

Some authors treat institutional change as a centralized, collective-choice process (Kingston and Caballero, 2008; Alston, 1996; Kantor, 1998; Kaufman 2007). In this process, they argue that “rules are explicitly specified by a collective political entity, such as the community or the state, and individuals and organisations engage in collective action, conflict and bargaining to try to change these rules for their own benefit” (Kingston and Caballero, 2008: 6; Kaufman 2007: 16). Ostrom (2005) introduces the approach that involves a multi-layer nested hierarchy of rules. She distinguishes between “operational rules” which govern day-to-day interactions, “collective-choice rules” which are rules for choosing operational rules, and “constitutional rules” which are rules for choosing collective-choice rules (Kingston and Caballero, 2008)\(^8\).

Others see institutional change as a “path-dependent” process (Libecap, 1989; Thelen 1999; Pierson (2000a)\(^9\). In other words institutions lend policy a path-dependent character in the face of new information about the nature and cause of policy problems and changes in actor preferences. Thus, endogenous developments are capable of disrupting an institutional path and lead to a new one (Deeg, 2001). This does not follow the assertion of the theory of path dependence that only exogenous change can move actors off a current path. This position of path dependence arises from the belief that in a self-enforcing institution each player's behaviour is a best response and that changes in self-enforcing institutions must have an exogenous origin (Deeg, 2001:10; Hall & Taylor, 1996: 952; Greif & Laitin, 2004). Yet the relative durability and stability properties of institutions, makes institutional change gradual, continuous and incremental (Saleth, 2006; Libecap 1989; Ostrom 2005).

In outlining a general framework for institutional change Alston (1996: 26-7) concludes that “institutional change can be thought of as the result of supply and demand forces in a society”. The demand for institutional change comes from “the latent gains emerging from disequilibria

\(^8\)For detail description of the various forms of collective-choice and how they affect different categories of informal institutions see Kingston and Caballero, 2008

\(^9\) For a discussion on the 3 phases of path-dependency see Deeg (2001) pp. 8-11
induced by changing resource endowments, product prices, and technical change” (Saleth and Dinar, 2004: 42; North, 1990a; Ruttan, 1999). The other motivation for and sources of institutional change come from (i) the conventional view that changes are to enhance efficiency or improve equity (Ruttan and Hayami, 1984; North, 1981); (ii) the reallocation of economic opportunity and the redistribution of economic advantage (Bromley, 1989b); (iii) the state and international donors/funding agencies (suppliers of institutional change) (Alston, 1996: 27; North, 1990a; Saleth and Dinar, 2004); (iv) power and ideology (North, 1990a; Huntington, 1991).

The arguments advanced for institutional changes converge on the fact that two main factors are responsible for institutional change (Ostrom, 2005; Herrfahrdt-Pahle, 2008; Peters, 2000; Saleth & Dinar, 2004 Nelson, 2005; Deeg, 2001). These are the exogenous causes and endogenous causes. Libecap (1989: 16) regards “exogenous parameter shifts as the basic source of impetus for institutional change”. Libecap explains that in such shifts a change in property-rights rules will depend on whether the distribution of benefits accruing from both the existing and proposed new systems, and on whether groups who expect to be losers from a change are able to block it under the rules which frame the political (rule-making) contest.

Institutional change can occur due to changes in endogenous factors (including learning) i.e. structural features within institutions (Saleth, 2006; see also 4.5). The endogenous factors in the case of water resources include water scarcity, water conflicts, and financial and physical deterioration of water infrastructure and operational inefficiencies of water institutions.

There are a wide range of theories put forward to explain institutional changes from different perspectives and contexts (Goodman & Jinks, 2003; Saleth & Dinar 2004; Kingston and Caballero, 2008; Peters, 2000). These theories are categorised into: (1) evolutionary theories explaining the emergence of social conventions; (2) market-based theories emphasizing institutional selection through competition, and (3) bargaining theories explaining institutions in terms of asymmetries of power (Saleth, 2006).

The evolutionary theories explain institutional change and survival in terms of social, cultural (Nelson, 2005), and economic factors. Rules of conduct are considered as having evolved because the groups who practiced them were more successful and displaced others. As a result, the thinking and actions of such people are governed by rules which have evolved in the society in which they live- the product of the experience of generations. The idea of evolutionary pressure eliminating undesirable institutions is opposed to attempts to design institutions being guided by consistent ideological principles.

In the evolutionary theories, there is no mechanism (such as legislation) causing a coordinated shift in the rules perceived by all the players, or in their behaviour or beliefs (Kingston and Caballero, 2008). Instead, new rules, whether randomly or deliberately generated, undergo some kind of decentralised selection process, by which some institutions persist, while other (unsuccessful) institutions die out (Young 1996; Knight, 1995). Thus, new rules and the associated patterns of behaviour emerge from the uncoordinated choices of many individuals rather than a single, collective choice process (Kingston and Caballero, 2008).

The market-based theories (e.g. public choice theory and transaction cost theory) consider institutional change as endogenous to the economic process itself. It predicts that institutional changes occur whenever their benefits exceed costs (Saleth and Dinar, 2004). As long as the beneficiaries of institutional change cannot commit to compensate the losers, those with a vested interest in maintaining the status quo may be able to block beneficial change.
Three conditions are to be met in explaining institutional changes using the market-based theories: (i) avoiding equating property rights with institutional arrangements (property rights are just one of many components of institutional arrangement); (ii) incorporating the institutional implications of the distribution of both benefits and costs of institutional change across various groups; (iii) accounting for the effects of exogenous and nonmarket forces like natural disasters and ideologies (Saleth and Dinar, 2004).

The bargaining theories focus on distributional consequences of institutions relying heavily on the role of political and social bargaining as a mechanism of institutional change. Different actors may favour the emergence of different rules. People bargain over which rule to adopt in their individual interactions even before the rules which will govern some interaction have become firmly established. This bargaining takes place at the level of the individual transaction rather than through a centralised political process; but over time, out of this decentralised process, a common convention may emerge (Kingston and Caballero, 2008: 16). Therefore, if some kinds of actors have greater bargaining power than others, Knight (1995) argues that this may systematically affect the kind of rule that ultimately becomes widely-used by the society.

Levi (1990: 407) is of the view that formal rules can give “power” to certain groups, and that disadvantaged groups may try to force institutional change by “withdrawing their consent” from existing institutional arrangements. This withdrawal of consent could take the form of organized collective action, but it might also occur through the decentralised actions of many individuals. There are also theories based on ‘intentional institutional design’, which explains institutional change as a product of free and voluntary exchange in the political market, and those based on ‘induced institutional innovation’ which emphasise on exogenous factors. The theory of institutions based on collective action (Ostrom, 1990) falls in between these two categories of theories (Saleth, 2006).

Each of these theories is relevant in explaining some aspects of institutional change. The intentional design approach, for example is useful to “describe design of water policy, and creation of or change in water administration, but it cannot explain why and how these changes are brought about” (Saleth, 2006: 9). Saleth observes that the transaction costs approach can explain these aspects but it cannot explain the distributional consequences of the change process and how these consequences are handled through the process of political bargaining. A combination of some of these theories may help to better explain institutional change.

Theories which present institutional change as the outcome of a deliberate, collective-choice process of rule-creation also leave several important questions unanswered. In particular, they have difficulty explaining why, in many cases, formal rules are ignored, or fail to produce their intended outcome. For example, Ostrom (1992: 138) distinguishes between rules-in-form and rules-in-use, but is not able to tell what rules will actually become rules-in-use. Williamson (2000) treats informal rules as providing the background within which formal institutions are “embedded”. He distinguishes four levels of institutions, according to how quickly they change.

At the highest level are the “institutions of embeddedness”, including informal institutions, culture and norms. At the second level, constrained by the institutions of embeddedness, are the high level formal rules: constitutions, laws, and property rights. The third level is that of the “institutions of governance”, at which the sets of rules (“Governance structures”) which govern day-to-day interactions are assumed to adjust so as to minimize transaction costs. Finally, at the lowest level, the prices and quantities specified in individual contracts adjust continuously. Williamson (2000) recognises the possibility of long-run feedback from lower to higher levels.
Thus, informal rules are effectively taken as exogenous and excluded from the scope of the analysis but North (1990a) gives informal rules a central role in institutional change.

4.6 Factors that Determine the Performance of Institutions

The linkage between institutions and performance is well known (Bandaragoda, 2000; North, 1990a; Bromley, 1989; Earne and Easter, 1997; Dinar and Latey, 1991; Saleth, 1996) though some scholars argue that “institutional performance” is a misnomer (Bandaragoda, 2000: 8). However, how institutions contribute to, or affect, performance is important to identify in order to be able to assess the effectiveness of institutions.

From an economist’s view point, basically, institutions affect the performance of an individual, group or organisation, a country or its economy, through the effect of institutions on the costs of exchange and production. In terms of transaction cost theory, the functioning of institutions depends on the costliness of enforcement (North, 1990:4). Therefore in a comparative evaluation of two different set of institutions; performance can be expected to be better in the institutional framework, in which transaction costs are less.

Another factor that matters in assessing institutional performance is to establish how well set rules are monitored and enforced (Barrett, Lee and McPeak, 2000: 195; North, 1990a; Baland & Platteau 1996; Ostrom 1990; see also 4.7.2). The existence of credible mechanisms for establishing, monitoring and enforcing priorities and rules, and the distribution of financial and human resources are necessary to get institutions right for sustainable development (Barrett, Lee and McPeak 2000). In many developing societies, informal rules have a tendency to override formal rules, making the enforcement of formal rules very difficult and thereby affecting performance (Bandaragoda, 2000:4).

Post-institutionalism perspective suggests the need to move beyond a functional focus on institutional design (Cleaver and Toner, 2006: 209; Ostrom, 2005). In doing so, there is an essential need to conceptually differentiate the rules from the players (North 1990:4). For the players, a combination of extra-institutional factors, such as knowledge, skills, strategies and coordination are essential for good performance. These factors are related to management functions, which account for performance to a larger extent than the institutions (Bandaragoda 2000: 8).

The other factors have to do with institutional interplay, fit and scales (see 4.8). The hierarchic, nested and complementary features of institutions suggest that structural and functional linkages among institutional components influence performance (Saleth, 2006). An institutional arrangement that may perform well today may not function in two years later. To have a better understanding of how endogenous features and exogenous factors influence the performance, impact and change process of water institutions it is better to conceptualize their internal structure and external context (Saleth, 2006:6; Deeg, 2001).

The strength of structural and functional linkages among the individual institutional components is among the factors that determine the performance of institutions (Bandargoda, 2000:35). In terms of analysis each of the legal and policy elements can be evaluated separately. For example, water law usually empowers water policy, and water policy, in turn, could initiate a process for a new water law. The interlinkages among the three institutional components in terms of resources, social capacities, and overall economic objectives are shown in figure 4.1 put forward by Saleth and Dinar (2004).
These institutional components are examined further in the next section.

### 4.7 Water Law, Water Policy and Administration

Water laws provide the framework for water governance systems and are the pillars for achieving better governance system (Barreira, 2006:80). Water law exists in diverse context and as a result differs from state to state, yet water laws in different parts of the world appear quite similar (Gupta, 2004: 2). Gupta is of the view that water managers everywhere “choose from the same menu of choices”. This includes the “concepts of ownership, rights and responsibilities, non-compliance mechanisms and liability at national level; and principles of restricted territorial sovereignty as well as equitable and reasonable utilization” (Gupta, 2004:2). Governments design new laws in order to exercise effective control over their water resources but the concept of private sector involvement and management at the river basin level (one of the cardinal features of IWRM) has the capacity of eroding the “functional sovereignty” of these governments over water (ibid).
Water laws are multi-layered. Therefore a proper understanding of the complexity, diversity and dynamism of existing water institutions is essential for the design of effective water laws and policies for the management of the resource. In essence, water laws are expected to have institutions, and the legal capacity and powers to enforce them. For water sources that cross a number of jurisdictions, inter-governmental coordination becomes necessary for accountability by clarifying the responsibilities of each jurisdiction for better outcomes (including conflict resolution). The policies of an upstream jurisdiction then affect economic and environmental outcomes in downstream jurisdictions (Australian Productivity Commission, 2003: 82).

Water law refers to many issues including the legal status of water, water rights, conflict resolution mechanisms, and possible contradiction between laws, legal pluralism, administrative regulations, and implementation mechanisms (Saleth and Dinar, 1999:4).

A national water policy entails a national water vision. The vision tells where the state wants to be by a specified period. It determines how the nation wants to deal with water, address competing goals and objectives (social, environmental, and economic) and establish broad priorities for resource expenditures (Galloway, 2003). The water policy actually translates the vision into action. The policy defines the shared responsibilities at each level (region, state, local governments) for dealing with water or the lack of it. It “covers usage priorities, water tariffs, decentralisation or centralisation of competencies, participation, and coordination with other policies” (Saleth and Dinar, 1999: 5).

Water administration involves organisations at policy level for resources management and organisations at implementation level for delivery management. Thus formal organisations, organisational procedures, pricing, finance and accountability mechanisms are the preoccupation of water administration. It does also concern itself with information, research and extension systems. The next section takes a look at some details of the administration.

4.7.1 Separation of Functions

Conflicts of interest can arise when organisations perform more than one role. Organisations may trade-off the performance of one function against another function because of convenience or perhaps bias towards particular stakeholders. If such a trade-off occurs, it may result in a less than optimal outcome in the way that water resources are managed. Conflicts can arise under the following situations:

- Organisations responsible for both the development of policy and its administration may have an incentive to develop policy that conforms to the organisation’s current structures or core competencies, rather than policy that is in the community’s best interest.

- The role of water distributors may conflict with other organisation roles such as water allocation and policy development. Water distributors are generally infrastructure service providers that operate under primarily commercial objectives and therefore they may have an incentive to encourage water use in order to increase revenues. This may be inconsistent with other roles such as water allocation and policy development, where the protection of a public resource may be the primary objective.

- The role of monitoring and enforcement can conflict with policy formulation, allocation and distribution. If a water distributor is responsible for monitoring its own right or the flows allocated for environmental protection, the enforcement effort may be
compromised and appropriate sanctions not applied. (Australian Productivity Commission, 2003).

However, the separation of functions has to be weighed against any cost. These costs include transaction costs (North, 1990), dilution of expertise or the loss of economies of scale in administration (Productivity Commission, 2003).

4.7.2 Monitoring and Enforcement

There are two types of monitoring in relation to water resource management and each gives rise to potential conflicts of interest with other functions. The first involves monitoring and enforcing environmental allocations and flows. The other is the periodic evaluation of the achievement of outcomes, through the review of water acquisition programmes or resource plans. Associated to this is reporting requirements which are necessary for transparency. To be effective, reporting should cover:

- Internal governance arrangements, including community participation and consultation mechanisms; and
- Performance towards stated objectives and targets, including financial performance (Productivity Commission, 2003:87).

4.7.3 Water Rights

A water right is a legal authority to take water from a water source. This may include licences, permits, allocations or entitlements. It can be conditional based on location of extraction and use, the nature of the use, the rate of extraction and time of use and so on (Productivity Commission, 2003:94). Water rights law determines the extent to which an individual can use the water which runs across, underlies, or moves through his property (Libecap, 1989; Templer, 1991). Templer describes two major water right doctrines: the riparian and the prior appropriation systems. The riparian water rights are largely unregulated and not quantified but are tied to riparian land ownership. On the other hand the prior appropriation system is administered by a state agency and appropriative rights are specifically quantified as to purpose, quantity, place, and sometimes time of water use. According to Matthews (2003) water rights are usufruct (or use) rights and that applying the term “ownership” to it is a misconception. The literature distinguishes between six broad classes of rights based on their specified use, the source of the water, or in some cases the potential users. These rights are termed:

- Stock and domestic
- Surface water rights (including in-stream use for hydroelectric generation);
- Harvest rights for overland flows;
- Groundwater rights;
- Indigenous; and
- Environmental flow or allocation requirements.
Water rights include a priority of access that a right-holder has relative to other right-holders (Holland, and Moore, 2003). It creates a preference right to use water based on temporal priority-first in time, first in right (Matthews, 2003). Water rights also impose liabilities on their holders not to injure other right-holders. These liabilities are generally intended to protect third parties-such as other right-holders or the environment (Matthews, 2003) - but their scope of application varies across jurisdictions. Clear and unambiguous specification of water rights contributes to the efficient use of the resource (Saliba and Bush, 1987; 56; Productivity Commission, 2003). Attributes of efficient rights capable of yielding efficient water utilisation include:

- universality- all available water resources are covered by the system of rights;
- predictability of volume- users have a reasonable expectation of the volume of water that they can extract from a source;
- enforceability- the right can be protected from encroachment by others;
- certainty of title- there is legal recognition and protection of rights;
- duration- the time period that users possess the title to a right is specified;
- exclusivity- at the margin, the benefits and costs of possessing and exercising a water right accrue to the owner;
- detached from land title and use restrictions- the right is separate and free of any requirements to hold land or restrictions on how the right may be exercised; and
- divisibility and transferability- the right may be subdivided and is freely tradable to others (see Easter, 2004).

4.7.4 Administering Water Rights

The administration of water rights involves issuing new rights, modifying existing rights and approving the temporary and permanent transfer of water rights. The Productivity Commission (2003:183) identified the processes associated with these functions as:

- “Consultation- giving public notice of applications and advertising for submissions.
- Assessment- consideration of the application, any submissions received and any administrative guidelines or rules in place. It also includes the collection of any further information required for assessment.
- Decision notification- making the decision and announcing it to all relevant parties.
- Hearing appeals- hearing and determining outcome of any appeals made regarding an administrative decision.
- Registration- maintaining the register and any other administrative records, including updating records of any approvals made.”

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Many of the outcomes that are sought for through water resource management cannot be achieved in isolation from the management of other natural resources because the different resources are interrelated. For successful achievement of outcomes, both horizontal and vertical coordination is required. Vertical coordination involves different layers of government, community and private sector organisations. Horizontal coordination involves different resource management agencies within one level of government. This brings to bear the issue of institutional interplay, scale and fit.

4.8 The Problems of Fit, Interplay, and Scale

Institutional interplay is the relationship (of an institution) to and interactions with one or more other institutions (Young and Underdal, 1997: 32). These interactions between or among institutional arrangements exist at the local level, the national or societal level, (see 4.6) and the international level (Young, 1992: 2). Institutional interplay is concerned with the variety of linkages and interactions that exist among institutions either at the same level (horizontal linkage) or at different societal levels (vertical linkage) (King, 1997: 2). However, “all institutional linkages involve politically significant connections between or among institutional arrangements that are differentiable in the sense that they have distinct creation stories and ongoing lives of their own” Young (1992: 2). Consequently, for a better understanding of institutions these connections need proper examination or investigation.

Vertical interplay turns on distinctions among levels of social settings but horizontal interplay emphasizes the importance of differentiating between or among institutions operating at the same level. It is difficult to determine where one institution ends and another begins because institutional arrangements often run into each other. Two types or dimensions of institutional interplay: functional and political are identified. The functional links “exist whenever the establishment or the operation of one institution directly affects effectiveness and robustness or another through some kind of inescapable interconnectedness” (King, 1997:2). This description indicates that functional linkage between institutions actually shows (inter) dependence relationships existing in a social setting.

The political linkage is defined as politically constructed links that “exist whenever actors decide to consider two or more institutions as part of a larger complex or package” (Ostrom, 1990). In other words they arise as a result of politics of institutional design and management. King (1997: 2) refers to this type of linkage as structural linkage. There is therefore the need to examine the existence or otherwise of both horizontal and vertical linkages and their nature at the national, basin and the local/community levels.

Scale has to do with the levels at which phenomena occur in the dimensions of space and time (Young, 2002: 26). The problem of scale unlike interplay is not a matter of interactions or linkages among distinct institutions. Instead it centres on the extent to which the dynamics of systems that differ from each other in terms of spatial or temporal scales are similar so that we can scale up and down in seeking to understand how they work (Young, 2003). Thus, a comparison could be made at the local, national and international subfields. Scale matters in the sense that important differences exist between local and national entities. Temporal scale deals with institutional arrangements over time e.g. periods of innovations and period of consolidation.

The problem of fit concerns itself with the argument that an institutional arrangement that performs well in dealing with one problem may be a failure in solving other problems. Thus the problem of fit deals with compatibility between ecosystems and institutional arrangements created to manage human activities affecting these systems. The general assumption is that the
closer the fit between ecosystems and institutional systems, the better the relevant institutions will perform. This point to the fact that to think that one size fits all may be disastrous (see 4.6).

The administrative level best suited for managing water and its services is a complex matter. This is as a result of the fact that the resource is not limited by administrative or by institutional boundaries. As a service it is subject to economies of scale and scope (Pena & Solanes, 2003). Water also has a direct impact on commercial activities and on services such as electricity and transport, which are managed at the national scale.

4.9 Water Governance

Institutional arrangements are basically the governance structures for water management. The term “governance” is a concept with two meanings: the first is a broad meaning in which governance refers to “any mode of coordination of interdependent activities”; the second meaning is ‘self-organisation’ (Jessop, 1998: 8). Governance in the sense of self-organisation can be found at three different levels - interpersonal, inter-organisational, and inter-systemic (Bene and Neiland, 2006: 5). The broader meaning of government refers to the mode of conduct of specific institutions and organisations with multiple stakeholders. The other definition shows that governance refers to relationships that involve a number of different actors having different objectives. It includes the roles and responsibilities of government, decision-making processes, management actions, institutional structures and settings, legal and statutory instruments and processes of participation or collaboration (Ashton et al., 2006).

Some scholars simply define governance as “who gets what, when, where and how”? (Gupta, 2004: 1). This definition draws attention to broader political concerns and core concepts like democracy, rights, participation, legitimacy, transparency and accountability (Slaymaker, 2005). Governance is defined as the exercise of economic, political and administrative authority to manage the affairs of a country (UNDP, 2001; World Bank, 1992). It borders on social systems of governing reflecting how power and authority are exercised and distributed. It is all about how institutions rule and how regulations affect political actions.

Despite the different definitions given from different perspectives there are two fundamental components that are emphasized: a) the “multi-actors dimension” stemming from the belief that government is not the only actor involved in the governance process and b) the belief that governance makes room for the interests and expectations of the majority (Bene and Neiland, 2006: 6).

Water governance has evolved from ideas of “managing water wisely”. It came about as a result of a perceived change in the role and power of the state, which necessitated the need to think beyond government (the distinction between governance and government are discussed later) into how society organises itself (Franks, 2005). In this vein Pena and Solanes (2003: 3) explain the concept of governance as applied to water to imply “the capacity of a country to coherently organise the sustainable development of water resources”. This definition embraces both the capacity to design socially acceptable public policy that promotes the sustainable development of water resources and with water institutions, to implement them. Governance thus implies the capacity to generate and implement appropriate policies.

Hooper’s (2006: 1) definition of governance lays a lot of emphasis on procedures and processes. He defines water governance as a “suite of procedures that use the decision making processes at different levels among different sectors, stakeholders, and jurisdictions to enact water resources management”. From yet a different perspective the GWP (2003: 5) refers to water governance as
being the range of political, social, economic and administrative systems that are in place to regulate the development and management of water resources and provision of water services at different levels of society. The definition given by Rogers and Hall (2004) is similar to that of the GWP and it tends to move the focus of water management away from government to the more general network of arrangements that impact on citizens’ lives (see also Franks, 2006). Thus, water governance is seen as the framework of political, social, economic and legal structures within which societies choose and accept to manage their water-related affairs.

Perret (2006) identifies that key principles and policy options have emerged with water governance. These include:

- Decentralisation and the development of new forms of local governance;
- Participation and the desire for greater equity;
- Liberalisation and the need for financial viability and economic soundness;
- State/public withdrawal in technical and financial terms and the need for new private-public partnerships; and
- Sustainability, especially the need for meeting environmental needs and concerns.

There are a number of actors (government, civil society, private sector, etc.) involved with water governance (Pierre, 2000). Governance suggests that institutions should be perceived as arising from social interactions and processes (see section 4.4).

Governments play an important role in ensuring equitable and sustainable water resources management but there is the need to distinguish between government and governance and show clearly the linkages and subsequently demonstrate how government influences governance. Governance is not the same as government, though some writers tend to use them as synonyms. Government is seen as an agency that controls territory and raises taxes, creates and enforces laws, through a bureaucratic structure (Franks, 2007). At the national level government is preoccupied with policy-making and implementation, but at the local level concentrates on service delivery for individuals.

By contrast, governance works through networks and partnerships at different levels. Public choice analysts indicate that decentralisation brings governance to the people by shifting from centralised policy approaches to decentralised approaches (Ayres, 2000; GWP, 2003; Rogers and Hall, 2004; Mitchel, 2005; Alaets, 1997). This is vital in order to improve the efficiency of government administration and delivery of public services (Ayres, 2000; Goldman, 1998; Esmail, 1997). When a large number of local actors are involved than the central government in the provision of public goods there is economic efficiency, good governance and the empowerment of the poor (Kooiman, 1997; Rhodes, 1997; Pierre, 2000; Hajer and Wagenaar, 2003; Hanf and Sharpf, 1978, Blatter, 2003; Arts and Van Tatenhove, 2005).

The core argument is that participation and decentralisation are instruments which enable the inclusion of the greatest number of citizens especially the most marginalized and poorest in terms of decision-making and access to socio-economic resources. But in the event where governments fail to transfer power to accountable and representative local agencies, decentralisation may not achieve the effectiveness it seeks. Involving a greater number of the citizenry has its own cost implications. It takes a strong government to enforce the water laws through the established
structures. If the central government is weak some of the social actors like the NGOs may not be operating within the water laws hence making governance difficult.

Figure 4.2: Conceptual diagram illustrating the linkages among the central government, regional and local governments, and social actors in water governance.

Figure 4.1 is a conceptual diagram illustrating the linkages and interfaces between the Central government, regional and local governments, and social actors to bring about an improved governance system. This is similar to a “Trialogue” model of governance proposed by Ashton et al. (2006). In this model the linkages and interfaces between central government, and the public and their collective partnerships and contributions to “good governance” are shown.

“Government” comprises those individuals and institutions that society has selected to provide leadership and direction on its behalf. The social actors comprise individuals, groups and organisations that perform specific actions on behalf of society. The groups are inter-dependent and their interactions are based on agreed sets of principles and values. These interactions support shared understanding, decision-making, and collective responsibility for water resource management.

From the functionality perspective governance is seen as comprising the core elements of water policy, water laws, water-pricing mechanisms, international and intra-national (cross-jurisdiction, cross-boundary) agreements (Hooper, 2006; Bene and Neiland, 2006; Bandaragoda, 2000).
4.10 Attributes of ‘Good’ Water Governance

The shift from government to governance is said to be a political process (Bene and Neiland, 2006). The shift was partly influenced in developing countries by concentration of donor assistance being tied to good governance indicators (Anders, 2005). What is the appropriate level of water governance—national, regional or local? The IWRM approach requires that decision-making processes is devolved to the lowest appropriate level capable of handling management tasks, normally to local government and community-based institutions (GWP, 2003; Franks, 2007; Thomas and Durham, 2003; Jonch-Clausen, 2004; Giupponi et al, 2006). But does devolution alone amount to good governance?

The main principles for effective governance are identified as: openness, transparency, inclusion, communication, coherence, integration, equity and ethics (Barrera, 2006). This does not differ, in essence from those put forward by the EU (2001), which includes openness, participation, accountability, effectiveness, and coherence. No single model for effective governance exist but basic attributes, which are known to represent its features, include citizen participation, transparency (free flow of information), equity, accountability, coherency, responsiveness, and ethical considerations (Cleaver and Toner 2006: 208).

Ashton et al. (2006) think that good governance should be based on, and incorporate, the attitudes, values, and practices of society as well as giving meaning to society’s aspirations and objectives. In their view these will ensure that a governance system within a particular context is effective, efficient and socially relevant. This implies that each of the principles needs to be included and integrated into a coherent system. This stems from the belief of Ashton et al. that the effectiveness of a given governance system depends on the degree to which each principle can be customized to suit local circumstances and then integrated into a coherent whole. These arguments support the thinking that the dimensions of governance are influenced by social, cultural and political context, together with the historical setting within which these are found.

Cleaver et al. (2005) put forward an analytical framework to help in understanding the complex linkages of factors in water governance. In that framework they suggest four key resources from which the mechanisms of good water governance are drawn. These are:

- Institutional resources
- Social resources/structures
- Rights and entitlements, and
- Financial resources

They describe the institutional resources to include a variety of mechanisms varying from formalised water users associations to more socially embedded norms and water-use practices. These shape the human-water interface (see fig. 4.1). An important point here is that institutions and individuals are involved in an on-going process of interaction that produces change in existing institutions. Cleaver et al. (2005) refer to the arrangements to access water through family relations, kinship groups or gendered identities as the social resource or structures. Mechanisms for legislated minimum quantities of water, property rights, and quotas for representation as well as entitlements that are socially understood by citizens in communities to claim access to water are tagged resources of rights and entitlements. Water access arrangements through mechanisms
like tariffs and subsidies constitute the financial resources. How these affect water governance and the best acceptable practices are already dealt with in sections (4.7 and 4.8).

Establishing the “enabling environment” for development, management and use of water resources, involves the creation of the right policy frameworks to appropriately allocate and manage water among competing uses and for regulating legislation on water rights and benefits (GWP, 2003). This becomes very essential if we are to pursue strategies for integrated water resources development and management that takes into account the needs of all in society. However, representation participation in itself is not enough to ensure that the needs of all are met (Cleaver and Toner, 2006:208).

4.11 Inferences

Institutions are simply a set of regularised practices. They may range from formal regulations backed by the force of law or organisational procedure to informal practices that have a conventional character. In some cases, institutions are composed of many components practices that are themselves institutions. Without institutions and institutional arrangement there could be no organised water management or governance. The laws consist of established rules, norms, and practices. The administration involves organisations that provide a structure to human actions related to water management. How these function and interact is important to study to arrive at any conclusions on how water resources are managed.

Institutions do not function in a vacuum and therefore their linkages (both horizontal and vertical) are to be investigated as well as how they fit the systems within which they are created to perform. Water governance which involves introducing and developing institutional arrangements to manage water in a sustainable manner is a complex issue and very variable. A combination of the various theories on institutional change (evolutionary, market based, and bargaining theories) may be of great help in explaining what changes might have occurred within the institutions both at the basin and at the national level and to explore how the existing institutions interact with the new institutions created as a result of the introduction of IWRM in the basin. These may offer the necessary explanation to the use of market-oriented approaches (through cost-recovery, less state interference) in water supply and the use of democratic means (through decentralisation, user participation) to enhance efficiency.

The chapter has come up with the key elements that need to be investigated in this study. These include institutional arrangements, the institutional environment, the interactions among the existing institutions and the interactions between new and existing ones. The appropriateness of water laws and allocation arrangements are revealed to be of utmost consideration as well as the processes of change experienced.
5. Ghana Water Management at the National Level

5.1 Introduction
Water management has been a major challenge for most countries and each has responded differently (see 3.2). The variation in the response has historically been based on different water geographies, the economic dependence on water, the history and hydro-politics of the region and the importance to ecosystems. It has also depended on the dominant ideologies and the influence of epistemic communities, on the one hand, and on the existing management structure and culture on the other hand.

This chapter examines how water policy in Ghana has been formulated over time. What developments necessitated the shift in paradigm to IWRM approaches in the management of water resources? In what ways are the current IWRM interpreted and operationalised and to what extent have the national institutions for water resources management facilitated or hindered the management process or efforts?

In addressing these questions, this chapter draws on the hypotheses that emerge from a historical review of water law and policy (Gupta and Dellapenna, 2009). A historical examination shows that, throughout history, water policy in domestic contexts have been influenced by eight different forces. Water governance principles have been spread through the spread of civilizations (e.g. Indus, Mesopotamia), religion (e.g. Hinduism, Islam, and Judaism), conquests (e.g. Roman, Colonial), the advent of communism, international codification, the spread of environmentalism, the development of the epistemic community and the forces of globalization. These forces have led to the development and adoption of similar ideas in different parts of the world. However, although similar ideas spread everywhere, the adoption and incorporation of these ideas into existing societies differed from place to place. Especially in Africa and other developing countries, a form of legal pluralism emerged in which there was a major dichotomy between the formal laws and the actual de facto legal practices in a particular area. Against this background, this chapter undertakes a historical evolutionary perspective to understanding how Ghanaian water policy has evolved. The methods employed for answering these questions are a combination of interviews, focus group discussions and analysis of policy documents, rules and laws.

5.2 Water Situation in Ghana
In Ghana the water resources potential consists of surface and groundwater resources. The surface water resources are mainly from 3 river systems: the Volta, South Western and Coastal Rivers. These river systems make up Ghana’s total land area of about 240,000km². The Volta Rivers System comprises the White, Black and Red Volta and Oti Rivers. The White and Black Volta as well as the Oti are transboundary basins. The South-western Rivers System comprises the Bia, Tano, Ankobra and Pra Rivers. The Coastal Rivers System comprises the Kakum/Bruku, Ochi-Nakwa, Ayensu, Densu, Odaw and Tordzie/Aka Rivers. Ghana shares the Volta River basin with Burkina Faso, Togo, Cote d’Ivoire and Mali. She also shares the Bia and Tano River basins with Cote d’Ivoire (MWH, 1998). The total annual runoff for Ghana is about 54.4 billion m³. Out of this the Volta, South-western and Coastal Rivers Systems contribute a total of 38.3 billion m³ in the proportions of 64.7%, 29.2% and 6.1% respectively.

The quality of naturally occurring surface waters in Ghana is generally good except for some cases of localised pollution resulting from the discharge of untreated waste material into water.
bodies from domestic and industrial activities. Surface water is mainly used for domestic water supply, irrigation, industrial, transportation and recreation purposes. For domestic water supply, surface water is impounded and pumped to a conventional treatment plant. The treated water is stored in water reservoirs before distributing through the distribution networks to various homes and public pipe stands. For agricultural irrigation purposes the method is either by impounding surface water and using pumps and irrigation facilities to distribute water to farm lands or pumping water direct from the river. In the case of industries both potable water and raw water from streams and rivers are utilised.

Wetland ecosystems in Ghana constitute about 10% of the country’s total land surface. Based on the criteria of the Ramsar Convention on Wetlands (1971), three major types of wetlands are identified in Ghana. These are marine/coastal; inland; and man-made (Dorm-Adzobu et al., 2004). Water is thus regarded as having particular economic significance for industrial activities, ecological maintenance, livelihoods and poverty reduction.

Groundwater is the main source of water supply for domestic purposes among the rural communities in Ghana where about 60% of the population resides. Groundwater development and exploitation takes place mostly within such rural settlements and occasionally in some urban settlements. The quality of groundwater resources in Ghana is generally good though there are instances of localised cases of high levels of iron and fluoride mainly from natural sources. High fluoride cases are common in the northern part of the country while high iron levels are common along the coastal belt. There is also high mineralisation with increased total dissolved solids especially in some coastal aquifers (CWSA, 2004).

There are three categories of ground water supply: rural water, small town and commercial water supplies (see Chapter 7). In rural water supply, after boreholes are constructed and developed hand pumps are fitted to boreholes. Water from the aquifers is pumped out manually. Small town water supplies involve mechanisation of the boreholes. This requires the provision of service lines from the boreholes to a storage tank and from the tank to the various houses and public stand pipes. Commercial water supply is not different from small town water supply except that the water is delivered for commercial purposes.

Although rainwater harvesting has great potential to increase water availability rainfall decreases from the southwest of the country (2,000mm/year) towards the north (950mm/year) and the south-east (800mm/year). Despite the availability of these water supplies for the main consumptive uses of water in Ghana (i.e. potable water supply, irrigation and livestock watering) there are deficits of coverage. While the urban water coverage was 56% in 2006, the rural coverage stood at 53% (CWSA, 2008). The distribution of boreholes sources are shown in Table 5.1

**Table 5.1 Borehole distribution and flow characteristics**

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of Boreholes</th>
<th>Average Flow (m³/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashanti</td>
<td>3,343</td>
<td>1.5-32.0</td>
</tr>
<tr>
<td>Brong Ahafo</td>
<td>1,886</td>
<td>1.5-32.0</td>
</tr>
<tr>
<td>Central</td>
<td>1,293</td>
<td>1.5-32.0</td>
</tr>
<tr>
<td>Eastern</td>
<td>2,241</td>
<td>1.5-32.0</td>
</tr>
<tr>
<td>Greater Accra</td>
<td>226</td>
<td>1.5-32.0</td>
</tr>
</tbody>
</table>
The consumptive water demand for 2020 is projected to be 5 billion m³ or about 12% of total surface water resources (National Water Policy, 2007). The projected demand for irrigation by 2020 is about 400,000 m³ to cover a projected area of 100,000 hectares. Though there is enough surface water to meet demand until 2020, the country experiences water shortages from drought and under supply from time to time. In 2000 there was a shortfall in demand of 655 million m³. In year 2020 the expected shortfall is 4,649 million m³ (WRC, 2007; See Table 5.2).

Table 5.2 Urban water demand by source

<table>
<thead>
<tr>
<th>Source</th>
<th>2000 (million m³)</th>
<th>2020 (million m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater</td>
<td>37.55 (11.6%)</td>
<td>69.60 (12.7%)</td>
</tr>
<tr>
<td>Surface Water</td>
<td>283.10 (88.4%)</td>
<td>546.40 (87.3%)</td>
</tr>
</tbody>
</table>

Source: WRC, 2007

The main non-consumptive uses are inland fisheries, water transport and hydropower generation. The projected demand for hydropower generation by 2020 is 378,430 x 10⁶ m³ as against a projected supply of 1,733,380 x 10⁶ m³. On the Volta Lake, river navigation is undertaken on a 415 kilometres stretch, from Akosombo to Buipe.

The non-consumptive demand can also be met from the surface water available. Water, in its various occurrences, management and uses, is an essential component of human development and is a crosscutting factor in current development priorities driving Ghana’s goal of achieving sustainable development. Placing emphasis on water development and management therefore becomes imperative.

5.3 International Developments

Chapter 2 established that IWRM has gained in popularity in scientific circles and UN and other international agencies. Gupta and DellaPenna (2009) argue that in recent centuries, the water policy in developing countries have been influenced by (a) colonization processes; (b) international codification processes; (c) the environmental movement; (d) epistemic communities; and (e) the forces of globalization. This chapter thus first examines the role of colonization in influencing and shaping Ghana’s water law.
The international codification process was mostly relevant for international river basins, and since that is not the direct focus of this thesis, it is not covered here. Environmental movements have increased the awareness of the importance of the environment and ecosystems that must be taken into account in the management of water resources. This has led to the adoption of a number of principles – sustainable development, the precautionary approach; the polluter pays principle; decentralization; and the development of a number of specific instruments – e.g. environmental impact assessments, standards and market based instruments.

The water epistemic communities first pushed the notion of the hydraulic paradigm – managing water through engineering works, and subsequently focused heavily on integrated water resources management. The water law epistemic communities have focused on notions of ownership, human rights, conflict resolution, and avoidance of harm. Globalization and its forces have marketed the ideology of neo-liberalism and the need for small governments, a large role for the private sector, the adoption of market mechanisms and the commodification of water resources.

While colonization processes influenced national water policy directly as the colonial ruler changed the formal law, the other international forces are more subtle. They influence countries through many ways – (a) either through their voluntary participation in international conference and their acceptance of the latest ideas; (b) their own intellectual acceptance of such ideas since they seem to make sense mostly through the influence that epistemic communities have on Ghana’s epistemic communities; and (c) as these ideas are marketed as part of aid or loan packages provided by international agencies.

At the World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002, the international community stressed the call for all countries to develop IWRM and water efficiency plans by 2005 (WSSD Plan of Implementation). These developments have been influenced by events such as the International Drinking Water and Sanitation Decade 1981-90, the international Conference on Water and the Environment, Dublin 1992, and the UN Conference on Environment and Development in Rio, 1992. This chapter explores briefly Ghana’s participation in all these meetings and events and how it has thus accepted a number of the ideas emerging from these processes (see Table 5.3 for other international conferences Ghana participated and agreements and protocols that have affected its water management).

Table 5.3 Ghana’s participation in international conferences/agreements

<table>
<thead>
<tr>
<th>Year</th>
<th>Conferences/Protocols/Laws/Agreements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>Convention on Wetlands of International Importance Especially as Waterfowl Habitats: Ramsar Convention</td>
</tr>
<tr>
<td>1972</td>
<td>UN Conference on Human Environment, Stockholm</td>
</tr>
<tr>
<td>1977</td>
<td>UN Water Conference, Mar Del Plata in Argentina</td>
</tr>
<tr>
<td>1981</td>
<td>Convention on the Elimination of All Forms of Discriminations against Women (CEDAW)</td>
</tr>
<tr>
<td>1992</td>
<td>International Conference on Water and Environment, Dublin</td>
</tr>
<tr>
<td>1992</td>
<td>UN Conference on Environment and Development, Rio de Janeiro</td>
</tr>
</tbody>
</table>
In addition to these protocols and agreements within the framework of international cooperation on water resources, the Ghana government has initiated and concluded protocols and agreements eventually resulting in the establishment of formal River Basin Organisations between Ghana and the other five riparian countries of the Volta; Ghana and Cote d’Ivoire in respect of the Bia and Tano rivers.

Scientific and policy influences have also led the UN-Water/Africa Secretariat and the Global Water Partnership to promote the management of water resources for the benefit of riparian countries, on the basis of IWRM principles. The World Bank/UNDP Sub-Saharan Africa Hydrological Assessment Project and the World Bank Sub-Saharan Water Resources Management Strategy have contributed to the integrated management principles in Africa.

Another key mode of influencing national policy is through the lending and aid policy of international and national agencies. The World Bank’s Water Resources Policy has adopted many of these concepts and loans are often given for projects and programmes that comply. Development aid has also been increasingly conditioned on the acceptance and practices based on IWRM principles: good governance - participatory management, equity, transparency, legitimacy, accountability etc) in partner countries (see 4.9). This was as a result of perception that aid money was spent better where the governance system was effective (Anders, 2005; Acemoglu et al., 2005). It has also led actively to the marketing of concepts such as IWRM and water as an economic good. Scheumann et al. (2008) explore the role of development cooperation in influencing policies in the developing world.

In the West African sub region, the push to adopt IWRM principles has been intensified by the international community culminating in the formation of an IWRM joint commission to facilitate its implementation among member countries. The urge to adopt IWRM principle was intensified after the member countries were made to commit themselves to the challenge of "Water Security" after the World Water Commission endorsed it (GWP, 2002) and there is a move to have a harmonised West African Regional Water Policy that specifies government measures and involvement of all the West African countries concerning water from the perspective of regional integration. These developments have had great influence in informing water management decisions in Ghana. But there are peculiarities that need to inform the focus of the management
efforts. Understanding the past management practices and the influences of exogenous and endogenous forces then will serve a good purpose.

5.4 Historical Perspective of Ghana Water Laws and Policies

This section surveys the water regimes in Ghana from the pre-colonial period and shows how the colonial system that was established brought changes in the water regime of the country. The section divides Ghanaian water regimes into four periods: pre-colonial customary law period, colonial, post-colonial, and modern periods.

5.4.1 Pre-colonial Customary Law Period (till 1874)

In pre-colonial Ghana (till 1874), customary laws and practices covered the areas of water conservation, pollution control, protection of catchments and protection of fisheries. For example, there were rules that prohibited (a) people from farming close to river banks which were considered the abode of river gods and (b) human activities in certain sacred forest and groves (interviews 2008:15, 17, 26, 58, 69, 86). The peculiar nature of the traditional institutions or the indigenous culture on environmental protection and water resource management emanated from the reverence that the people had for ancestors and their belief in the power of the earth and water bodies (Adjewodah and Beier, 2004; Opoku-Ankoma et al., 2006).

The belief of the people was that the earth and the water bodies have spirits of their own and that the ancestors were the immediate spiritual custodians of the land, water and their resources (interviews 2008:15, 26, 30, 32, 58, 86, 99; Opoku-Agyemang, 2001; Odame-Ababio, 2003). Trees regarded as housing spirits are not felled without rituals (Hens, 2006). These deities of the earth, rivers, trees and sacred groves were revered and worshipped. The priests of these deities perform specific rituals and sacrifices as part of arrangements to ensure that natural resources are used responsibly (Opoku-Agyemang, 2005). These traditional or customary institutions, which were put in place to manage water resources, were not codified or written down.

Water in all its forms including the sea, rivers and lakes was regarded in pre-colonial Ghana as common property not subject to an individual claim or ownership under the customary law (Sarpong, 2008). Thus private ownership of water resources was not allowed; hence an individual use or appropriation of water, however long, could not translate into ownership. The individual had only usufructuary rights to water. Ownership of water was vested in stools (paramountcy), communities and families. Thus, under customary law water was a free common good - everyone was entitled to its use as a community good.

A member of a community was free to utilise a stream or a pond which is naturally on his land without interference from the community or the public. It is, however, not clear as to whether or not customary law treats ground water as part of land so as to render the same capable of being placed under the control of an individual who owns the land under which it is situated (Ofori-Boateng, 1997).

The laws for managing water were enforced through various rules usually dictated by the chief, the fetish priests or the tindana who were considered the custodians of the environment. Violation of the rules was considered an offence against the gods punishable by fines payable to the local chief or the priests/priestesses/tindana who undertake sacrifices to pacify the gods on behalf of the offender. This was to avert the wrath of the ancestors and the river goddess or the earth-goddess from punishing the entire society for violations. Every community member therefore was conscious of making sure that his neighbour did not bring upon him any calamity and this became the driving force for people to ensure compliance. The pronouncements of the priests/tindana or the chief, as part of customary beliefs, were to be adhered to without questioning. They wielded
potent powers of enforcement, including the power to ostracise a person from the community for non-compliance. This contributed to the strict compliance state.

There were also rules that evolved under the customary regime for equitable use of water resources among communities through which a river or stream flows. Communities could easily come together to agree on the spots they allowed for animal watering, for drinking purposes or for washing and bathing (interviews 2008: 17, 58, 86, 99; Hauck & Youkhana, 2008). Often a community fetched water upstream for drinking and animal watering or bathing activities were undertaken downstream. These arrangements were religiously adhered to. However, one community’s upstream is another’s downstream which had its associated water quality problems and health implications.

Chieftaincy and tindanas (or head of families) were the two local institutions responsible for conflict resolution in the communities ranging from social, business and even spiritual issues. This role can be traced back to pre-colonial times. Before colonial rule, two main types of indigenous political systems existed in Ghana: (a) centralized authority systems, and (b) those without centralized authority systems. The centralized authority system was common among the Akans ethnic groups (i.e. groups who come from the Ashanti, Central, Eastern, Brong-Ahafo, &Western regions) and parts of the Northern Regions.

The Upper East Region (the study area) is typical of the traditionally non-centralized authority system (Arhin, 2001). The result is variations in the way people and natural resources are governed by the traditional systems. Conflicts arising as a result of water use arrangements in this pre-colonial regime were resolved by the chiefs and elders or tindanas. These practices were not homogenous throughout the country. Variations such as the mode of sacrifices, arbitration procedures and enforcement procedures exist based on the different ethnic groupings but the beliefs were similar. The tools used for water resource management under customary laws include taboos and prohibition, respect for traditional ancestors and common belief. In general there was strict adherence to water conservation and protection rules.

5.4.2 Colonial Water Regime (1874 – 1957)

With the advent of colonisation and Christian beliefs the potency of customary rules and norms as tools for enforcing traditional water laws started to diminish but did not disappear (interviews 2008: 1, 12, 16, 17, 26, 42). But it should be stated that it will be difficult to give clear-cut boundaries between these two regimes because even during the colonial period traditional systems continued to function and even flourish.

In 1874 the British Crown Colony of the Gold Coast was established and since 1897 English common law has formed part of the laws of Ghana. This development not only affected the political structure of Ghana but also led to a number of social and cultural changes (e.g. the dominance of chiefs/tindanas in water issues was countered by the power of the Governor).

In the early 1900s the government deemed it appropriate to have the control of water use to be in the public interest. Thus, a different water regime was introduced - written or codified laws though the un-codified customary laws operated alongside (Sarpong, 2008). Ghana started experiencing a plural legislative framework for water management from the early 1900s; even though perhaps only one system was seen as “legal” at the time.

The enactment of the Rivers Ordinance (CAP 226 of 1903) was the first attempt at regulating water use for other purposes apart from domestic use (Odame-Ababio, 2003). A section of this
ordinance states that it “shall be unlawful to pump, divert or by any means cause water to flow from any river, for purposes of irrigation, mines or factories or to generate power, without a licence from the Minister” (section 10, CAP 226). Part III of the same ordinance (which is still operative) also placed the licensing for dredging, steam vessels and the power to issue regulations to protect and improve navigability and fishing in the domain of central government. This ordinance did not have any regulations to make it operational and was overtaken in time by other enactments. The subsequent enactments were agent specific and empowered specific agencies to perform specific functions. These included the Forestry Ordinance of 1927, which provided for catchment protection and control of water abstraction in forest reserves. Similarly, the Land Planning and Soil Conservation Ordinance of 1953 had sections for checking soil erosion and for the control of watercourses. Other developments in the water sector under colonial administration are presented in Table 5.4 below.

Generally, the colonial water laws and the customary law were applied to different instances. Thus, the customary laws were supplemented (but at times supplanted) by statutory norms in response to socio-economic and political changes.

5.4.3 Post-Colonial Era (Pre-IWRM) Water Policy (1957-1998)

In the post-independence era (1957-1998) the effort at water development and management by government was centred on the establishment of agencies with specific roles for water supply, irrigation and environmental management. Key legal enactments related to water development and management during this period are shown chronologically in Table 5.4.

Table 5.4 Ghana: Establishment of departments and enacted laws (1928-2008)

<table>
<thead>
<tr>
<th>Era</th>
<th>Year</th>
<th>Department Established or Law Passed</th>
<th>Responsible for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colonial</td>
<td>1928</td>
<td>Public Works Department (development began with a piped system in Cape Coast)</td>
<td>Urban and rural water supply</td>
</tr>
<tr>
<td></td>
<td>1945</td>
<td>Department of Town and Country Planning</td>
<td>Designing plans and controlling settlements.</td>
</tr>
<tr>
<td></td>
<td>1948</td>
<td>Rural Water Development Department</td>
<td>Rural water supply</td>
</tr>
<tr>
<td></td>
<td>1949</td>
<td>Forest Ordinance - Cap 157 of 1949</td>
<td>Conservation and management of forest areas</td>
</tr>
<tr>
<td>Post-colonial</td>
<td>1957</td>
<td>Meteorological Services Department (MSD)</td>
<td>Atmospheric water resources assessment</td>
</tr>
<tr>
<td></td>
<td>1958</td>
<td>Water Supply Division of Public Works Department</td>
<td>Drinking Water supply - urban &amp; rural</td>
</tr>
<tr>
<td></td>
<td>1961</td>
<td>Volta River Authority; Act 46 of 1961</td>
<td>Electricity supply: industrial, commercial, domestic</td>
</tr>
<tr>
<td></td>
<td>1965</td>
<td>Water supply division under PWD transformed into Ghana Water and Sewage Corporation; Act 310</td>
<td>Drinking water supply and sewage management/services</td>
</tr>
<tr>
<td></td>
<td>1969</td>
<td>Water Resources Research; NLCD 293 of 1969</td>
<td>Research in water resources</td>
</tr>
<tr>
<td></td>
<td>1969</td>
<td>Institute of Aquatic Biology; NLCD 293 of 1969</td>
<td>Research in water resources</td>
</tr>
<tr>
<td></td>
<td>1970</td>
<td>Volta Lake Transport Company; Registered under Company Code of 1970</td>
<td>Transportation on the Volta lake</td>
</tr>
<tr>
<td></td>
<td>1974</td>
<td>Forestry Commission; NRCD 239 of 1974</td>
<td>Regulation of Forest Resources</td>
</tr>
<tr>
<td></td>
<td>1977</td>
<td>Irrigation Development Authority Supreme Military Council Decree 85</td>
<td>Development and Management of Irrigated Agriculture</td>
</tr>
</tbody>
</table>
In 1959 there was a severe water shortage in Ghana. The World Health Organization (WHO) recommended to the government to create the Ghana Water and Sewage Corporation (GWSC). Consequently, the water supply division under the Public Works Department (PWD) was transformed into the Ghana Water and Sewage Corporation in 1965. Table 5.4 indicates that the various agencies or department/ministries managed regulated and controlled water as it related to their mandates and sector activities with little or no coordination and control from a central unit. In other words the fragmentation in the water sector gave rise to discrete institutions, which emerged to promote sub-sector development in isolation. There was therefore no single coherent home for the water sector, neither was there one ministry responsible for water in Ghana.

The Ghana Water Company, the CWSA, and a Hydrological Services Department (dealing with drainage and surface water flow issues) were under the responsibility of the Ministry of Works and Housing. Beyond this, there are the Water Research Institute (WRI) which is under the CSIR and the EPA, both of which the Ministry of Education, Science and Sports has oversight responsibility. The Irrigation Development Authority (IDA) is under the Ministry of Food and Agriculture. In addition, there are other major users of water, such as the Volta River Authority (VRA), under the Ministry of Energy; the Forestry Commission and the Mines Commission under the Ministry of Mines, Lands and Forestry. The various legislations vest powers in corresponding ministries, departments and agencies of state, for the varied and contemporary uses...
of water including irrigation, power generation, and transportation and industrial uses. However, these enactments did not affect pre-existing customary rights; in fact they sought to “regulate water uses in areas that had hitherto not been addressed by customary law” (Sarpong, 2008: 4).

However, much of the activities undertaken by the Ministries and different government bodies have been heavily financed by aid and lending agencies as will be explored in subsequent chapters of this book. As a result emphasis was laid on the areas in which donors wished to subsidise. The consequence of the dispersion of organisational responsibilities for the water sector has been one of “absence of strong leadership to advocate for sustained development of water resources, weak integration of diverse facets of water resources development, investment driven by what donors are prepared to finance rather than what has been determined to be strategic directions of government” (DANIDA, 2002: 28) and the absence of a focal point in any ministry with responsibility for parts of the sector adversely affected the chances of the sub-sector’s development. These necessitated the call for reforms in the water sector to facilitate development and management of the resources.

5.4.4 The Modern Era (1998-2010)

5.4.4.1 Period of Structural Changes

The modern era (1998-date) was preceded by a period of structural changes. Since the early 1990s, the water sector in Ghana has undergone various reviews related to the functioning of the water sector and responsibilities of agencies and organisations. In 1987 the then Ministry of Works and Housing sponsored a water and sanitation conference on behalf of GWSC, which eventually culminated in the water sector rehabilitation project (WSRP) in 1995 (Fuest et al., undated). The Community Water and Sanitation Programme-1 (CWSP-1) was adopted in 1991 as part of the restructuring of the water sector and by 1993 the National Community Water and Sanitation Programme had been designed. Incidentally, the Danish International Development Agency (DANIDA) started activities in water supply and sanitation sector in Ghana the same year.

Before this, the fourth republican constitution of Ghana came into effect in 1992 but the 1992 Constitution, the fundamental law of the land, does not explicitly provide for the establishment of an institutional basis for the regulation of water as it does for the related resources (Sarpong, 2008). These related resources, land, fisheries and forestry were regulated through the establishment of the Lands, Minerals and Fisheries Commissions respectively charged with the responsibility for the management and coordination of policy in relation to these resources. The activities of these Commissions, however, impacted on the water sector. Though the Commissions were successful in regulating the specific resources they were to deal with, their impact on water resources was negative. The priority was given to the respective resources and water was considered as a secondary resource in importance.

In 1994 the National Community Water and Sanitation Programme (NCWSP) was launched as part of the water sector restructuring and strategies development in accordance with the government’s decentralisation policy. This was after the introduction of the concept of Water Resources Management of the World Bank to the Ghanaian rural water sector through CWSP-1 in 1991. As part of the sector reform, an Act of Parliament established the Water Resources Commission (WRC) in 1996 but it was not operational immediately.

For example GWCL developed, managed and controlled drinking-water supply and, to a very limited extent, sewerage services; GIDA develops and manages irrigation and associated land use for agricultural production; and the EPA concerns itself primarily with the environmental implications of water treatment and usage.
A major event towards reforming water resources management was the Water Resources Management (WARM) study, which started in 1999. The study was carried out through consultative workshops with the participation of a broad spectrum of stakeholders in the public and private sectors, women’s representatives, researchers, media personnel and the general public. The major donors who supported the WARM studies include CIDA, DANIDA, DFID, GTZ, UNDP and the World Bank. Between 1998-2003 the Water and Sanitation Sector Programme Support (WSSPS I) was carried out and in 2004 WSSPS II began.

The various programmes, studies and reviews brought to the fore some issues that informed the government’s decision to adopt new measures in the sector. The measures include: (1) a rural water and sanitation strategy based on community ownership and management; (2) the restructuring of the urban water sector to bring in private sector participation in urban water delivery (see Chapter 7); (3) preparation of a national environmental action plan; and (4) strengthening of water resources information agencies - Meteorological Services Department, the Hydrological Services Department and the Water Research Institute initiated by DANIDA from 1997-2003 (GoG, 2003).

The WARM study in particular gives an overview of the major water resources issues. The recommendations that were presented in “building blocks” reports take a cross-sectoral perspective, identifying common issues and strategies that promote an integrated approach to water resources management. The reviews also identified institutional gaps regarding the coordination and integration of the various sector policies for water use in the country. It was as a result of the WARM studies that the discourse on the need to coordinate Ghana’s water resources in a more holistic way was generated (DANIDA, 2002; WRC, 2002).

The outcomes of the restructuring efforts are diverse. In the rural water delivery sub-sector, the Community Water and Sanitation Agency Act 564 established the CWSA in 1998 with the mandate to facilitate and oversee the delivery of potable water and sanitation facilities and hygiene education to rural communities (see Chapter 7). A capacity building project that targeted the Community Water and Sanitation Agency nationwide was also started in 1998. The Ghana Water and Sewerage Corporation (GWSC) was transformed into a limited liability company: Ghana Water Company Limited (GWCL) in 1999, to facilitate partnership with the private sector in urban water supply.

However, these reforms remained sector specific with each sector agency planning, controlling and regulating its own activities with respect to water management with little effort being exercised towards coordination under one body. Subsequent reviews identified the institutional shortfalls, which to a large extent impeded proper coordination and integration of the various sector policies for water use in the country. Thus, water was centrally managed but without a body charged with the responsibility for the overall control, regulation and management of Ghana’s water resources until the enactment of the WRC Act 522 of 1996. With these transformations it became necessary for local water users to work with new institutions that were crafted to facilitate the attainment of the new objectives alongside the local custom water regimes.

5.4.4.2 The Water Resources Commission

The Water Resources Commission, (see 5.4.4.1) was established in 1996 by an Act of Parliament (Act 522 of 1996) to address the diffused state of functions and authority in water resources management. The Act entrusted the regulation and management of the utilization of water resources and coordination of any policy in relation to them in the Commission. The WRC Act clearly provides for the functions for which it was established to undertake. These are stated, inter alia, under section 2 (2):
i. Initiate, control and coordinate activities connected with the development and utilization of water resources;
ii. Grant water rights;
iii. Collect, collate, store and disseminate data or information on water resource in Ghana;
iv. Require water user agencies to undertake scientific investigations, experiments or research into water resources in Ghana;
v. Monitor and evaluate programmes for the operation and maintenance of water resources;
vi. Advise the government on any matter likely to have adverse effect on the water resources of Ghana;
vii. Advise pollution control agencies in Ghana on matters concerning the management and control of pollution of water resources;
viii. Perform such other functions as are incidental to the foregoing12.

This body is expected to deal with functional and sectoral issues. Therefore the Act mandates it to have a wide-ranging composition with representation drawn from all the relevant Ministries, Departments and Agencies (MDAs) of state. These include the Chairman in addition to one person representing each of the following13:

- The Ghana Water and Sewage Corporation (now Ghana Water Company Limited; (GWCL)
- Organisations producing potable water;
- The Hydrology Department of the Ministry of Water Resources, Works and Housing;
- The Volta River Authority; (VRA)
- The Irrigation Development Authority; (IDA)
- The Water Resources Research Institute;
- The Meteorological Service;
- The Environmental Protection Agency;
- The Forestry Commission;
- The Minerals Commission;
- The Executive Secretary (who is responsible for the day to day management and administration of the commission);
- A Chief; and
- Two other persons at least one of whom shall be a woman.

All the members of the Commission are appointed by the President acting in consultation with the Council of State and are eligible for a three-year term14.

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12 WRC ACT 522 Part I section 2 (2) a- i
13 WRC ACT 522 Part II Section 3 subsections 1 a- e
14 ACT 522 Part II, Section 3 subsection 2; section 4 sub-section 1
Box 5.1: Role of Chiefs and Tindanas

The chiefs are the political leaders of the communities. They are recognised as the heads of the community by the local and central governments and they serve as the community representatives in governance. They serve as the link between the communities and the government authorities. They organise the communities for their social welfare. They are thus involved in conflict resolution and traditional arbitration of disputes among community members. The chiefs also have the responsibility of organising the people for communal development projects. Maintenance of peace and harmony among community members is a cardinal role of the chiefs. They seek the economic wellbeing of the subjects and lobby government and development organisation for development projects for their area.

The Tindanas or earth priests are known to be the spiritual leaders of the communities. They are responsible for the earth shrine and groves around water bodies. They are, by tradition, regarded as spiritual land owners, and are therefore responsible for land distribution for farming and for other purposes. Any land use agreements must meet their approval. In smaller communities, the influences of the tindanas seem to be more pronounced than that of the chiefs. The edict of the tindanas concerning the use of water resources are dreaded and absolutely obeyed for the fear of being charged with offences against the gods or the ancestors. Being spiritual leaders the tindanas are responsible for the performance of sacrifices on behalf of the communities in times of calamities befalling them. The chief may even go to the Tindanas for spiritual consultation and that is the next line of action to be taken in distressed situations such as in a period of prolonged draught. They are responsible for confirming and empowering a nominated chief to his the skin (stool). They play a key role in irrigation using small reservoirs because they influence the redistribution of land at the beginning of every dry season farming period.

Of interest are the following. There is only one representation for Chiefs who played a key role in the customary law regime in Ghana (see Box 5.1). This points to the diminishing control and the roles of traditional authorities in water management shift.

The organisational representation approach adopted for the membership of the Commission is to ensure compliance with the policies of the WRC by member institutions and agencies. These bodies turn out to be the key stakeholders in water management at the national level. However, conspicuously missing from the list is the Community Water and Sanitation Agency, which is responsible for providing water and sanitation facilities to the majority rural communities. Is it because it is not considered a key player or their activities do not fall under the ambit of WRC? Conversations with the WRC executive Secretary on the issue revealed that the CWSA presently serves on the board as a representative of “organisations producing potable water” but agreed to the fact that their position can be taken over by an NGO or a private company producing water. Thus, their representation is not permanent and yet it is the main organisation that deals with rural water supply. Another observation is that the stakeholders tend to be government agencies biased. This is likely to tilt discussions in favour of the government and to the disadvantage of communities.

The regulations covering the use of water resources are provided for under Part III of the WRC Act 522 of 1996. The Act vested ownership of the water bodies in the President to hold it in trust and on behalf of the people of Ghana. In the spirit of this Act, the claim of ownership of water bodies by traditional authorities is legally non-existent anymore. Local communities seem to be ignorant of this (see Box 5.1); even the youth groups still regard the traditional authorities as owners of land and water resources (interviews 2008: 18, 23, 35, 52, 57, 60, 101, 113, 132). This situation occurred because the notice requesting those likely to be affected by the change in ownership to send written petitions was not read by illiterate local communities; as a result no compensation was paid to these ‘owners’ before the change in legal ownership (see 6.2.3; interviews 2008: 1, 7, 17, 26, 39, 51, 55, 69, 85, 88, 114, 117).
No person is allowed to divert, dam, store, abstract or use water resources, construct or maintain any works for the use of water resources except with the permission of the WRC, and in accordance with the provisions of the WRC Act. The only permissible use of water resources without recourse to the WRC is for the purpose of fighting fires. The Act, however, recognises the rights of persons with lawful access to water resources to abstract and use it for domestic purposes. The foregoing provisions point to the ending of customary water holding rights by stools, families and communities.

In addition to divesting stools, communities and families of their customary ownership of rights to water, the WRC Act 1996 vests in the state, the right to grant water rights. In that regard, any person may apply to the WRC in writing for the grant of water rights. Upon receipt of such an application, the WRC is enjoined to conduct such investigations, as it considers necessary, including consultations with the inhabitants of the area of the water resources concerned, prior to arriving at its decisions. As part of the process, any person who claims that his or her interests will be affected by the grant may notify the WRC within three months and such objections may be considered in determining whether or not the water rights should be granted.

This function does not meet the support of traditional authorities and their members. The contention is that the existing 1992 Constitution of Ghana provides (article 11) that the laws of Ghana shall comprise: the Constitution; enactments made by or under the authority of the parliament established by the Constitution; orders, Rules and Regulations made by any person or authority under a power conferred under the Constitution; the existing law; and the common law (which includes the English common law as well as customary law). Therefore if customary rules governing water usage is in anyway supplanted by legislation then their rights have been taken away from them. This may also suggest diminution in the role customary rules play in the management of water.

The WRC and its Secretariat is based at the head office in Accra. To accomplish its role of coordination in the water sector the WRC established five committees namely: Water Technical Committee (WTC), Water Users Committee (WUC), International Waters Committee (IWC), Public Awareness and Education Committee (PAEC), and Policy, Finance and Administration Committee (PFAC). The WTC has representation from the Water Resources Institute (WRI), Hydrological Services Department (HSD), Meteorological Service Department (MSD) and Environmental Protection Agency (EPA) and had focus on three main objectives: (a) to put in place a Decision Support System to be used for water allocation; (b) a comprehensive data bank including information on water resources, water use and socio-economic data; and (c) formulating together with the data agencies and water use agencies a joint approach to data collection and design of an appropriate and sufficient network of data collection points.

The four major water use agencies (IDA, MOFA, GWCL, and VRA) together with chamber of mines, CWSA and the National Development Planning Commission (NDPC) constitute the WUC committee. The responsibilities are to: determine water use categories for the purpose of instituting water use charges; collate data on water use for water conservation education; seek donor support for the sector in a coordinated manner. The IWC is responsible for transboundary water resources management (see Chapter 9). It is supposed to identify the various cases of shared water resources in Ghana and ensure the preparation of appropriate bilateral agreements to cover each case.

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15 Part III Section 14, subsection 1.
16 Part III Section 16, subsections 4—5
The PAEC’s responsibility centred on design of a public awareness programme to explain the role of water to the different segments of society and the need for managing the resources which are becoming scarce in quantity and diminishing in quality. PFAC is concerned with the preparation of water policy, water use regulations and, from time to time, makes recommendations of the level of water use charges. It is also responsible for the review of the annual budgets of the WRC Secretariat and the preparation of a long-term budget for the WRC secretariat. In addition it is responsible for the establishment of a Water Management Fund (now in operation) into which all charges, fees, and penalties relating to the work of the commission are paid. The outcomes of the various committees’ activities are discussed under the IWRM process (Section 5.5.2).

5.4.5 Legislative Framework for Water Governance

Institutional arrangements are basically the governance structures for water management (see 4.9). The governance institutions in Ghana comprise statutory laws and regulations, a national policy framework, byelaws of the District Assemblies and self-regulation by both explicit and implicit rules and norms (see 5.3.1). The legislative framework is first examined. Whereas Act 522 sections 2(c) mandates the WRC to grant water rights, section 12-23 vest water resources in the president and sets out the framework for acquiring water permits. Section 13 clarifies the activities for which it is mandatory to acquire a water permit. The water use regulation of 2001 L.I.1692 issued by the WRC spells out the main categories of water uses in Ghana for which permits are required. The modalities of administrative fees as well as water charges are provided for in this law. In addition exemptions from the duties to obtain permits are spelt out. These include water abstracted by manual or by mechanical means where abstraction levels do not exceed 5 litres per second, subsistence water use for agricultural land areas not exceeding one hectare. But the limits of exemptions to commercial water uses are not clear (interviews, 2007: 42).

The law sets out the procedures (application, investigation, decision, etc.) and conditions for the acquisition of water use permits as well as procedures for conflict resolution (Act 522, 1996; water user regulations L.I 1692, 2001; Environmental Assessment Regulation L.I. 1652, 1999 law on arbitration). An Environment Impact Assessment (EIA) requirement is one of the key conditions. The Water Users Committee of the WRC is mandated to carry out the resolution of conflicts. The involvement of stakeholders such as EPA, traditional and local authorities, and other relevant government institutions and agencies is provided for. There is no separate legislation for water quality but it has been provided for in Act 522, and EPA Act 490, LI 1652 of 1999.

The Act 490 turned the Environmental Protection Council into an Agency having, inter alia, regulatory and enforcement roles. The LI 1652 define the procedures (under the EPA Act 490) for acquiring environmental permits and conducting environmental impact assessments. Under this regulation a wide range of undertakings that have or are likely to have adverse effects on the environment are provided for. These include agriculture, fishing, logging and forestry, drainage and irrigation, housing industry, mining, power generation and transmission, waste treatment and disposal water supply, etc.

There are separate regulatory instruments on groundwater and on water services. Drilling licence and groundwater development regulations, LI 1827 of 2006 is the main instrument as far as groundwater is concerned. Part one provides for the processes for licensing drilling companies and the procedure for licensing organisations that have the requisite equipment and personnel to drill water to ensure that they develop them in an environmentally sustainable manner. The other part deals with giving notice to the Water Resources Commission on the intention to construct a well and observe environmental requirements.
The regulatory instruments on water services include PURC, LI 1651 of 1999 which regulates mainly urban utilities; Water and Sewage Regulations LI 1233 of 1979; IDA LI 1350 of 1987 which provides for the management of irrigation projects; and CWSA policy guidelines 2005 covering water facilities, management, service provision tariff and quality in rural communities.

The Public Utilities Regulatory Commission (PURC) Act 538, 1997 set up the PURC and conferred on it the mandate to regulate standards of utility services including the tariffs set by the Ghana Water Company Limited (GWCL) for urban water supply, the quality of drinking water provided by the company, ensure proper water industry practices, and protect the interests of consumers. The public water utilities are legally required to maintain the Drinking Water Quality Standards set by the Ghana Standards Board (GSB). The PURC has the mandate to monitor standards performance and to protect consumers from poor water quality by taking the regulatory actions, which are provided for under Act 538.

The EPA defines procedures for acquiring environmental permits in line with its Environmental Assessment Regulations, 1999 (L.I. 1652). Whereas the EPA conducts or ensures that Environmental Impacts Assessments (EIA) for development projects that have or are likely to have adverse effects on the environment including water resources are done, pollution and effluent discharges into water bodies are regulated by both the WRC and the EPA.

5.4.6 National Water Policy

The National Water Policy came into effect in 2007. It aims to: “Achieve sustainable development, management and use of Ghana’s water resources to improve health and livelihoods, reduce vulnerability while assuring good governance for present and future generations” (p.12).

The policy covers 3 sections: section one introduces the policy context and shows how the policy fits into the Ghana Growth and Poverty Reduction Strategy (GPRS II; 2006-2009). The GPRS is the strategy that drives Ghana’s development agenda, which in itself is influenced by the Millennium Development Goals (MDGs), and the New Partnership for Africa’s Development (NEPAD). The provision of water is a focus of both GPRS I & II. The GPRS II states this - “Improving access to potable water and sanitation… which in turn facilitates economic growth and sustained poverty reduction” (p. 112).

The strategic policy actions are addressed under section two. The water Directorate of the Ministry of Water Resources, Works and Housing is responsible for developing the implementation plan for the whole policy. Sector agencies responsible for specific areas then develop implementation strategies and plans for delivering the relevant policy actions. Here the key policy issues related to the basic principles and challenges confronting water resources management, development and use are elaborated. To achieve these strategic policy actions, the policy seeks to address relevant issues under three categories: water resource management, urban water supply and community water and sanitation. Under each of the three, the focus area is described together with the way it is to be carried out.

The third section is devoted to policy implementation arrangements including organisational roles and responsibilities, standards, regulations definitions and references. The general policy objective is to ensure:

- Availability of water in adequate quantities and quality to sustain nature, biodiversity and the aquatic ecosystem;
- Access to safe drinking water and sanitation facilities for the entire population, both rural and urban;
• Availability of water in sufficient quantities for cultivation of food crops, watering of livestock and sustainable freshwater fisheries to ensure sustainable food security for the country;
• Availability of water for hydropower generation, industrial use, water transport, and recreation; and
• An effective management system for sustainable use of water and fully integrated into the socio-economic development of the country and national development planning (Ghana National Water Policy, 2007).

The National Water Policy provides a general guide for the process of implementing the policy actions. These include: sector-wide approach to implementation to ensure effective harmonisation in implementation and monitoring approaches, and reduce the overall cost of delivery of plans and programmes. The approach aims to strengthen linkages between sector programmes and the countrywide planning at all levels - communities, districts and the central agencies. The National Water Policy emphasises effective inter-organisational coordination and collaboration. How these have been performing is examined in Chapters 7, 8 and 9.

The policy also recognises that the availability of timely and adequate funding is paramount in achieving its objectives. It anticipates funding sources to include water charges, tariffs, cost sharing with vulnerable communities and government. The policy outlines key principles that direct the development and use of water in Ghana. These are:

i. the principle of fundamental rights of all people without discrimination to safe and adequate water to meet basic human needs;
ii. the principle of recognising water as a finite and vulnerable resource, given its multiple uses;
iii. the principle of improving equity and gender sensitivity;
iv. the principle of integrating water resources management and development with environmental management in order to ensure the sustainability of water resources in both quantity and quality;
v. the precautionary principle that seeks to minimise activities that have the potential to negatively affect the integrity of all water resources;
v. the principle of coordinating water resources planning with land use planning;
vi. the principle of adopting the river basin (or sub-basin) as a planning unit;
vii. the principle of polluter pays, to serve as a disincentive to uncontrolled discharge of pollutants into the environment;
viii. the principle of subsidiarity in order to ensure participatory decision-making at the lowest appropriate level in society;
ix. the principle of solidarity, expressing profound human companionship for common problems related to water;
x. the principle of meeting the social needs for water as a priority, while recognising the economic value of water and the goods and services it provides;
xii. the principle that international cooperation is essential for sustainable development of shared basins;
the principle of integrating river basin management with management of the coastal zones and wetlands; and

the principle of the greatest common good to society in prioritising conflicting uses of water (National Water Policy, 2007).

The policy document divides agencies responsible for different water uses and services into “principal sector agencies” that deal with direct facilitation and implementation and “allied sector agencies” that play supporting roles including regulation and over-sight. The regulatory agencies are:

- Water Resources Commission (WRC) – the main agency in charge of water resources regulation, coordination and management;
- Environmental Protection Agency (EPA);
- Forestry Commission (FC);
- Minerals Commission (MC);
- Energy Commission (EC);
- Public Utilities Regulatory Commission (PURC); and
- Lands Commission (LC).

The water resources data and information collection agencies comprise the Ghana Meteorological Agency (GMA), the Hydrological Services Department (HSD) and the Water Research Institute (WRI) of CSIR. Five agencies constitute the water usage and development agencies. These are the Ghana Water Company Limited (GWCL) – in charge of urban water supply (see 7.4), Community Water and Sanitation Agency (CWSA) – facilitates delivery of water to rural and small towns (see 7.3), Irrigation Development Authority (IDA) (see chap. 8.), Volta River Authority (VRA), and Volta Lake Transport Company (VLTC).

The Ministry with responsibility over water resources is the Ministry of Water Resources, Works and Housing. It has a Water Directorate which advises the Minister on sector policy issues, facilitates monitoring of sector development, and serves as the focal point for coordination of the water and sanitation sector. The directorate concerns itself with fund sourcing, working with donors and when there are crosscutting issues those agencies involved are coordinated to arrive at the desired objective. The ministry processes issues that need to go to parliament.

The National Development Planning Commission (NDPC) is the Central Economic Planning Authority in Ghana responsible for the preparation of the country’s Poverty Reduction Strategy (GPRS). It coordinates the development plans of all Districts, Municipal and Metropolitan Assemblies in Ghana.

The self-governing structure is made up of the District Assemblies, NGOs/Community Based Organisations (CBOs), and other civil society groupings, working together in a river basin focused framework. All these agencies and actors are represented in the institutional framework in Figure 5.1 below.

5.5 The Transition

This section looks at the experience of IWRM from the initial stages when the IWRM concept of water resources management was adopted. A “Letter of Sector Policy” developed by the World Bank as part of its lending programme to Ghana started off the series of institutional reforms that
Figure 5.1 Institutional framework for IWRM in Ghana

- **NDPC/MFEP**
  - Coordination of National Development

- **Water Resources Commission**
  - Water resources planning and management
  - Water policy implementation
  - Water allocation

- **MWRWH**
  - National Water Policy Formulation

- **Water Resources Planning Inputs Providers**
  - HSD (MWRWH): Assessment of Surface Water Resources
  - WRI (MES): Assessment of Groundwater Resources
  - MSD (MRT): Assessment of Atmospheric Water Resources

- **Water Users**
  - IDA (MOFA): Agriculture, Livestock
  - GWCL (MWRWH): Domestic/industrial water supply (urban)
  - CWSA (MWRWH): Domestic Water Supply (Rural)
  - VRA/VLTC (ME): Hydropower and River Transport
  - Minerals Commission (MC): Mining

- **EPA (MES):** Environmental Protection, Monitoring and Enforcement
- **FC (MLF):** Forests and Catchments Protection
- **MC (MM):** Granting of mining Rights

- **Civil Society Representatives**
  - NGOs: Water Conservation and Poverty Alleviation Issues
  - Women's Representative: Gender and poverty alleviation issues
  - Chiefs' Representative: Enforcement of Traditional laws

separated the CWSA as an autonomous agency from the Ghana Water and Sewage Corporation. This was the earliest effort at developing policy for the water sector. The subsequent establishment of the WRC made a National Water Policy an imperative. Hitherto, there had been no common national water policy for Ghana. This section covers the interpretation given to IWRM by Ghana, and the implementation processes as well as challenges encountered.

5.5.1 The IWRM Concept in Water Resources Management in Ghana

The water policy document recognises IWRM as a concept based on the perception of water as an “integral part of the ecosystem and other natural resources, and as a social and economic good, whose quantity and quality determine the nature of its utilisation” (p. 17). Ghana has thus accepted IWRM to mean: (a) managing surface and underground water with attention being given to the environment from a multidisciplinary and participatory perspective; (b) Further, the process involves the devolution of power and competencies to the local level to organise and implement executive functions; (c) Water management is based on hydrological boundaries.

IWRM is interpreted as including harmonizing water for human consumption, agricultural and industrial production, energy supply and taking into account the corresponding environmental implications of these in terms of sanitation, drainage, and conservation of water resources and the sustainability of sources of supply. The WRC aims to promote a change from unsustainable to sustainable water resource management by inviting all stakeholders to participate in the management of the resource and by that widen the analytical framework for water resources management (interviews, 2007: 42).

Water Resources is defined under Act 522 to encompass “all water flowing over the surface of the ground or contained in or flowing from any river, spring, stream or natural lake or part of a swamp or in or beneath a watercourse and all underground water but excluding any stagnant pan or swamp wholly contained within the boundaries of any private land”. The Water Resource Commission thinks that an important aspect of its work is to devolve certain of the IWRM functions to a decentralised level with the river basin as the geographical area of focus. The intention is to start a process of decentralised IWRM and develop a Basin Management Plan for each of the 5 prioritized basins (Densu, The White Volta, Ankobra, Tano and Fra), which will then feed into the development of a comprehensive National Water Plan expected in 2011.

The philosophy guiding this approach is that the bottom-up planning process ensures participation of stakeholders in defining what their priorities are in the utilizations of the resource. This is meant to move the decision-making process from central to district level. It is also argued that the process makes the plans and programmes more acceptable and easy to implement. Consequently, the principles of IWRM are being piloted at three river basins in Ghana (Densu, 2004; the White Volta, 2006; and Ankobra, 2008). The other two basins are yet to experience the implementation of the IWRM processes.

Coordination is interpreted to mean working in close relation to avoid duplication of efforts and competition for scarce resources and to prevent the conflicting effects of one entity on the other. This has been a basic principle that is being upheld in the management activities of the WRC.

5.5.2 IWRM Implementation Processes

After its establishment in 1996, the WRC developed a strategy and a plan of action based on Act 522 and the recommendations of the WARM study. The strategy, which covered the period 1999-2003, had 8 components, namely: (1) Institutional development and capacity building, (2)
Development of a national water policy, (3) Coordination of the water sector, (4) Participation of stakeholders, (5) Regulation of water use, (6) Water use charges, (7) Allocation of water resources, and (8) Management of international water resources.

These were later found to be too ambitious for the time period for the commission to accomplish (WRC, 2003). The initial obstacle was unreliable government funding for WRC activities. The augmentation of release from government’s consolidated fund came from external support prominently provided by DANIDA. DANIDA’s first assistance was in the form of a project entitled “Support to Water Resources Commission, Phase I” (2001-2003). This was in support of strengthening the institutional framework of WRC and the operationalisation of the planning tools to carry out the various tasks that underpin the IWRM concept.

A Water Resources Information Services (WRIS) project was implemented during the same period 1998-2003, particularly targeting the capacity of data providers and research institutions for improved data collection networks and assessment techniques. These institutions are the Hydrological Services Department, the Water Research Institute under CSIR and the Ghana Meteorological Agency. This has resulted in the establishment of standing collaborative arrangements (service agreements) between the WRC and the “data providers”, i.e. the WRIS institutions (see 5.4.3). The linkage is that WRC depends on these data collecting institutions by outsourcing specific technical tasks to these institutions or the private sector and the universities to make decisions on allocation of water resources.

The second phase of the DANIDA support (2004-2008) which was entitled “Support to Integrated Water Resources Management” focused on establishing appropriate decentralised structures for IWRM activities through the creation of river basin-based water management structures (“basin boards”), and capacity building and awareness raising at the District Assembly level. The key to the success of such a management approach is that stakeholders fully understand and accept the concept of IWRM, and that they are capacitated to implement the concept. This, in turn, calls for the development of tools that guide and support the relevant authorities at different levels of the decision-making process with emphasis on the District Assemblies. A public awareness and education programme with different focus areas according to the segments of the public and District Assemblies’ staff to be addressed has been developed by PAEC of WRC (see 5.4.3) and are being implemented.

The main aim is to transfer knowledge to the local level concerning introduction of regulative measures (raw water permits and charges), and to start targeted initiatives towards conservation and management of the catchment area using the river basin as a unit. There is also the promotion and facilitation of water education in schools and IWRM awareness at the district engaging the appropriate implementing agencies as well as the use of radio. The WRC Communication Strategy prepared in 2004 is guiding these activities. The general strategy adopted for IWRM implementation is based on activities leading to the achievements shown in the Figure 5.2.

In its effort to promote decentralized IWRM, the WRC receives support from other developmental partners such as the Canadian International Development Agency (CIDA) and the World Bank (WB). IWRM funding has been heavily from external sources but the funding of the major contributor, DANIDA ended at the end of 2008 but new funding arrangements are being negotiated. The Commission claims measures are in place for continuity (Government budgetary allocation and internally generated fund by the commission through charges, fees, and penalties). A financial instrument has been created – the Water Resources Management Account – in which the proceeds from raw water abstraction charges and other related fees are lodged. These funds are being used for water resource management activities and to support the operations of the WRC. The past few years have seen a marked improvement in the revenue thus collected and
spent with a reduced dependence on external funding as a result (WRC Executive secretary, 2008).

The decentralisation implementation activities started with the selection of the Densu River Basin as the first pilot basin to test capacity building, participation and public awareness strategies and water resources planning within a decentralised administrative framework with the river basin as the unit for planning. A Densu Basin Board was established and officially inaugurated in Koforidua in March 2004. An IWRM Plan for the Densu River Basin has been elaborated, which is now a “blue print” for further water resource management activities in the basin. During the process of preparing the IWRM Plan, “tools” for introducing Strategic Environmental Assessment (SEA) principles were applied. The preparation of similar IWRM plans for the White Volta and Ankobra river basins is ongoing.

The White Volta Basin Pilot (WVBP), inaugurated in Bolgatanga in June 2006 is the second of the 5 priority River Basin Pilots to be run by the WRC to initiate IWRM in Ghana. The intention

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**Figure 5.2 IWRM processes**

- Socio-economic profiling and trend studies carried out for selected basins
- IWRM plans for each of the selected basins developed
- National IWRM plan prepared
- Ghana’s international interest protected concerning utilization and safeguarding its rightful share of transboundary water resources

The other outcomes of the support have been landmarks in the implementation process. A system for water use regulations and procedures for the issuance of rights to water abstractions by means of permits (licenses) was developed by the WRC and enacted by Parliament in 2001 (LI 1692). A Water Resources Policy was developed in 2002, which focused on an integrated approach to water resources management. It was this policy which consolidated other key water sector policies into a comprehensive National Water Policy, which was approved by Cabinet in July 2007. Regulations governing drilling operations and groundwater development were prepared and enacted as LI 1827 of 2006. Monitoring of major water abstractors is routinely done by WRC, and modalities to involve institutions at Basin Board/District Assembly level in compliance with monitoring have been put in place. Furthermore, a register of permit holders (major water users) is regularly updated and made public in the print media. A decision support tool (based on the WEAP modelling system) has been developed for water resources assessment and water allocation planning at river basin level.
is to start a process of decentralised IWRM and develop a Basin Management Plan for the White Volta Basin, which is to feed into the development of a National Water Plan. Similar activities have been spearheaded in another priority basin, the Ankobra River Basin office that was established at Tarkwa in 2008.

A Buffer Zone Policy to enhance the conservation of river catchments by introducing potential land strips/areas along the open water bodies (rivers and lakes) is under preparation, which will be followed by the introduction of legislative regulations in support of the policy. This is to replace the existing ones for forestry, mines, EPA, and agriculture to take care of the various contradictions. The draft has been completed and it is being reviewed.

To facilitate the process of IWRM implementation the WRC seeks to establish the institutional and administrative framework for participatory IWRM through:

- Stakeholder process involving government agencies, district authorities, water organisations, traditional authorities, NGOs and actual water users;
- Identification, registration, permitting and billing of water users; and
- Strengthening of stakeholder’s capacities for IWRM and planning.

To pursue the principle of using the river basin as the unit of management the international dimension of waters, which flows, through more than one country becomes an issue in the IWRM processes. The special unit of WRC (IWC) addresses this issue. Through such initiatives the Volta Basin Authority with headquarters in Ouagadougou was formed in 2007 after several years of preparation to participate in transboundary basin dialogue. Ghana is at the downstream section of the international basin. The WRC consequently attaches great importance to negotiations and prioritized participation in international initiatives at the basin.

The implementation processes show that Ghana’s experience with IWRM is still evolving, and the interpretation of the concept and application of the principles in practice are being introduced in various sector-related policies, plans and programmes.

5.5.3 Collaboration of WRC with other Organisations

The implementation process is characterized by collaboration with research organisations, which undertake research for and on behalf of the WRC. These include "Identification of Major Trends in the Socio-Economic Development in the Densu Basin of Relevance for IWRM", by the Institute of Statistical, Social and Economic Research (ISSER), University of Ghana, Legon (February 2002). There is also the "Compilation of Participatory Methods of relevance for IWRM in the Densu Basin", by the Institute of African Studies (IAS), University of Ghana, Legon (February 2003). The Water Research Institute of CSIR undertook the “Groundwater Assessment: an Element of Integrated Water Resources Management – the Case of Densu River Basin” in 2003. The Water Research Institute has a good collaboration with the WRC. This is echoed through these statements by the head of the institute: “We have done the inventory of water sources throughout Ghana on behalf of the WRC. We have been doing quantity and quality (adequacy and status of quality) analysis and sedimentation studies as well as carrying out the prioritization of water bodies study which informed the WRC’s selection of water basins for the implementation of IWRM.”

The International Water Management Institute has some working relationship with WRC and has consequently influenced their policies. “We have carried out work on who are the water users in the country to feed into their policy decisions. We have on the other hand requested them to feed us with the legal basis for water usage. So you see we are working together” (IWMI country
representative). These statements are a demonstration of the strong functional relations with the research establishments at the national level.

The WRC recognises some obstacles in carrying out its coordination functions. Basically this has to do with the problems concerning decentralisation of decisions to the district or other local level in the pilot basins, where the IWRM concept is tested. This is basically caused by “the complexity inherent in the IWRM concept, administrative traditions and lack of capacity/resources in the administrative system. This lack of capacity initiates reactions from central level as well as create hesitancy at local level to accept a higher degree of authority and take on responsibilities” (WRC Executive secretary, 2008).

5.6 Inferences

The information in this chapter can lead to the following tentative conclusions. First, Ghana’s water policy has evolved from pre-colonial times. While water policy in pre-colonial times was primarily through a diversity of taboos and prohibitions in different water communities and enforced through social control, in colonial times water legislation developed in a fragmented manner to deal with different government needs and systematically tried to undermine the importance given to the role of the Tindanas. In post-colonial times, the government has taken over the ownership of the water from the Tindanas/chiefs; but has not been able to replace this with a new and effective enforcement mechanism; instead the new policies probably compete with the local authority of the Tindanas/chiefs. They also developed a sectoral policy and no single ministry was encharged with water management issues until 1996 when by an act of parliament (Act 522 Water Resource Commission Act, 1996) the water resources commission was established. The Act entrusted the regulation and management of the utilization of water resources and coordination of any policy in relation to them to the commission. Before then various ministries and commissions managed and protected water resource as they relate to their operation and interest with some contradicting others. It was a sectoral approach era. Since 2007, there is a comprehensive water policy. The national water policy has been formulated through a participatory process which involved nation-wide stakeholder consultations and inter-ministerial collaboration. Is this capable of changing the management trend in the sectors? This is treated further in Chapters 7, 8 and 9.

Second, the transition has been managed in a gradual, incremental basis and not in a sporadic manner. A number of restructuring efforts have taken place to arrive at the IWRM approach which were mostly donor funded but the major donor, DANIDA brought its funding to an end in 2008. The Commission having established the Water Management fund thinks it is in the position to shed off some of its foreign dependence. The next few years will be a test case to see if the government can finance its grand integration strategies. A number of reviews and restructuring led to the identification of institutional gaps regarding the coordination and integration of the various sector policies for water use in the country. However, these changes have not always taken into account the existing customary law situation or the practices of the people. Although there is a comprehensive policy, the question that remains is – Is there also de facto one law or are pluralist legal systems still operating?

Third, many studies on Ghana’s water situation have ignited the discourse on the need to coordinate Ghana’s water resources in a more holistic way. This led to the shift in paradigm. However, the shift has been propelled ideologically and driven by the resurgence of neo-liberalism at the global level. The reform has tended to impose the neo-liberal development theory and policy, which rely so much on the “marketisation” of the economy. The ensuing strategies have the elements of private led provision and management of water resources, which is a sequel to the adoption of the IWRM philosophy. A question that emerges is – can this
marketisation help ensure the delivery of potable water for human needs and agricultural needs; can it improve the livelihoods of the poor? These questions are treated in Chapters 7, and 8.

Fourth, Ghana’s interpretation of IWRM has been quite limited. It focuses on managing surface and underground water with attention being given to the environment from a multidisciplinary and participatory perspective. However, much of the interpretation has been driven more by donors than stakeholders – e.g. that water management should be based on hydrological boundaries. Furthermore, water is not just seen as an economic good but as an economic and social good. The implementation processes show that Ghana’s experience with IWRM is still evolving. The process demands the devolution of power and competencies to the local level to organise and implement executive functions. How well or otherwise has this been carried through is examined in the subsequent chapters.

The intentional design approach is what brought about the drafting of water laws, design of the water policy, and creation of or change in water organisations at the national level. However this change is also based on ‘induced institutional innovation’ that is as a result of exogenous factors such as the IWRM philosophy from the western world and its associated foreign funding.
6. Water Management at the White Volta Basin

6.1 Introduction

The concept of integrated water resources management (IWRM) adopted by the WRC requires the decentralisation and devolution of decision making to lower administrative levels (Alaerts, 1997; GWP, 2003; Rogers and Hall, 2004; Mitchel, 2005). This is anticipated to improve governance by enhancing efficiency, equity, accountability, and improving responsiveness of government (Smoke, 2003; Crook, 2003; Turner & Hulme, 1997). It aims at a holistic approach to managing water resources at the basin or sub-basin level. In this approach a close coordination between various governmental and non-governmental organisations involved in water resources development and management and linkages between water institutions is anticipated. This calls for the creation of a multi-stakeholder governance structure, which influences the coordination among these actors.

This chapter therefore focuses on examining the institutions and organisations that exist at the basin level for the management of water resources. It seeks answers to the questions: What interactions/linkages exist among these institutions and organisations and what are their implications for water resources management in the basin? How is the IWRM process experienced at the basin in the context of these institutional arrangements? Are there new institutions that are crafted or organisations that are formed because of the adoption of IWRM approach? How well are they positioned to function? The approach used to address the issues raised included review of official documents, interviews with heads of organisations/agencies and some key stakeholders.

6.2 The White Volta Basin: Facts

The White Volta Basin is one of the Volta Rivers System (see 5.2) which occupies over 106,000 km². The basin is shared by six riparian nations: Ghana, Burkina Faso, Togo, Mali, Ivory Coast and Benin Republic (see Figure 6.1).

However, a greater part of the basin lies within Ghana (40%) and Burkina Faso (43%). In Ghana the basin area has a single rainy season from May/June to August/September and an annual rainfall range of 1.0 mm in January and 265.5 mm in August. Peak rainfall occurs in August/September. Rainfall is erratic and unreliable, a situation likely to be worsened because of global climate change. Mean monthly temperatures are in the range of 19.2°C in December and 38.9°C in March with extremes of 11.5 °C and 43.9 °C. The basin experiences an extended dry season from November to April (Ghana Meteorological Agency, 2005).

The basin lies within the sub-humid to semi-arid West African savannah ecological zone. The savannah zone consists of short drought and fire resistant deciduous trees interspersed with open savannah grassland. Grass cover is very sparse and in most areas the land is bare and severely eroded. Toward the south is the Guinea savannah zone which has vegetation typical of open grassland with widely spaced shorter trees and/or a ground cover of grasses of varying heights interspersed with fire resistant, deciduous, broad-leaved trees.

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17 This chapter benefited from data from the project “Integrating Governance and Modeling”, Challenge Program on Water and Food, 2005
The inhabitants of the basin are largely rural and poor, with per capita incomes falling well below Sub-Saharan African standards, and only 37% (Burkina Faso) to 62% (Ghana) have access to improved sources of drinking water. Basin population is expanding and the demand for water for domestic and production purposes is increasing (WRC, 2007). Economic development at the basin depends on agriculture because there are limited opportunities in other sectors (interviews, 2008:1, 2, 8, 11, 13, 20, 53, 85). Staple crops are sorghum, millet, and corn, grown under rain fed conditions.

The major drinking water facilities used in the rural areas of the White Volta basin are hand-dug wells and bore holes. In regions where the water table is high, the communities themselves
sometimes construct hand-dug wells. These wells may or may not be lined and fitted with pumps. Another water source is shallow wells (up to about 3 meters deep), which are dug in low lying areas of river banks in the dry season. Shallow wells are often associated with pollution problems from free disposal of human and animal waste, and household refuse. Often, they also dry up, especially during the dry season. The major infrastructure investments for drinking water services are boreholes, which are drilled by machines and can be up to 50 meters in depth. Among the water sources in the rural communities, borehole water appears to be the safest. The management of these involve the GWCL, CWSA, the District Assemblies, WATSANS and water boards. The management of these are dealt with in Chapter 7.

Irrigation is the dominant consumptive use of water in the northern and central basin. This has resulted in the multiplication of dams which translates into increased withdrawals and the alteration of flow regimes as a result of the fragmentation of river courses. Large volumes of water are also withdrawn directly from river bodies for irrigation purposes (see Chapter 8). These activities upstream compete directly with hydro-power generation downstream for available water resources, and the demand for water to serve these and other uses brings about increasing pressure on water resources in the basin. This demand is projected to increase dramatically over the next two decades as the population increases (WRC, 2005). These developments affect water availability but the impact is difficult to quantify given the diffuse nature of the irrigation development (IWMI, 2008).

6.3 Water Management Institutions and Organisations/Actors

Water resources management at the river basin level is confronted with complexities emanating from different interactions at that level. There are the environmental and economic interactions (which eventually affect water availability and quality) and household decisions on land and water use. The stakeholders are socio-economically and culturally diverse and often have competing interests and power relations. Consequently, the outcomes of social interactions among such stakeholders are expected to be complex. In addition, the macro-environment is constantly changing as a result of population pressures and climate change. It is therefore appropriate to distinguish between the various institutions and actors/organisations at different levels so as to make the analysis clearer. Institutions are treated as the rules, laws, constitutions, procedures, conventions, norms of behaviour, and self-imposed codes of conduct (North, 1990; see section 4.2) whereas organizations are treated as material entities, which have offices, personnel, equipment, budgets, and ‘legal personality’ (Young, 2002).

6.3.1 Government Organisations/Actors

This section explores the government agencies that are involved in water resources management at the basin level. There is the need to distinguish between the general area of administration and the sector-specific departments and agencies in order to answer the questions raised under section 6.1 adequately. This section distinguishes between district and regional level players to put the activities of all agencies and actors in perspective.

6.3.1.1 Ghana’s Local Governance System

Under the Local Government Act, 1993 Act 462, the President of the Republic is mandated to declare an area to be a district and assign a name to the district. The Act also empowers the Minister for Local Government by legislative instrument, to establish an Assembly for each district, municipality and metropolis which, in accordance with Article 241 (3) of the 1992 Constitution, constitutes the highest political authority to exercise political and administrative authority in the district. The Minister is also empowered by legislative instrument, and with the prior approval in writing of Cabinet, to establish within the area of authority of the District Assembly, sub-metropolitan district councils, urban or zonal councils, town or area councils and
unit committees. They are also mandated to monitor the execution of projects under approved
development plans and assess and evaluate their impact on the local, district and national
economy as well as people’s development.

This is a decentralisation of administration and development programmes meant to encourage a
greater degree of autonomy at the local level, which is believed to make district administration
and development more efficient. The decentralised government system consists of 10 regions,
which are governed by Regional Coordinating units. There are 170 districts, which are governed
by 124 District, 40 Municipal and 6 Metropolitan Assemblies. The urban, zonal, town or area
council constitute the sub-districts. The unit committee constitutes the lowest government level.
This is meant to bring development planning and decision making authority to the assemblies
which are established by the Local Government Act, Act 462 of 1993 with the objective of
empowering the citizenry to participate in the development process. Figure 6.2 illustrates the
local government structure.

6.3.1.2 District Assemblies

The District Assembly (DA) is the body that constitutes the local government, basic unit of
government as well as statutory, deliberative and legislative body for the development of broad
policy objectives and critical assessment of development in a district (Act 462). Membership is
made up of 70% elected and 30% appointed members and the District Chief Executive (DCE),
members of Parliament whose constituencies fall within the DA’s area of authority. The DCE is
the political head of the DA whilst the District Coordinating Director is the administrative head
(Acts as a secretary to the DA).

The DCE is a Presidential appointee of the DA who chairs the Executive Committee of the DA.
He/she is appointed by the president with the prior approval of two thirds of the DA and can be
removed by two thirds of the DA passing a vote of no confidence. In theory, this is to ensure that
the DCE is accountable to the DA. The General Assembly consists of a number of Committees
and Sub-committees, taking into consideration the key sectors such as agriculture, health and
education and general affairs such as administration and finance. There are eight District
Assemblies within the basin area that was studied.

The DAs are responsible for planning and development in line with guidelines issued by the
National Development Planning Commission (NDPC). The sub-district government structure (see
figure 6.2) provides the avenues for citizen participation in the planning and priority setting
process. The DAs have the authority to raise their own revenues. With respect to water resources
management the DAs perform four functions. First, the DAs are responsible for taking the
investment decisions for the infrastructure required for drinking water supply (bore holes) and to
some extent for irrigation (small dams, dugouts). These have to be part of the District
Development Plans. The situation demands close coordination with the line agencies in charge
(Community Water and Sanitation Agency (CWSA), Ministry of Food and Agriculture (MOFA)),
as well as the funding organizations.
Figure 6.2: Structure of the local government system

Ministry of Local Government and Rural Development
- establishes Assemblies, Metropolitan/District Councils, Urban/Zonal Councils, Town/Area Councils, Unit committees
- monitor, co-ordinate and evaluate the performance of the DAs,
- conducts management audits for RCCs & DAs
- designs and co-ordinates management systems and processes for RCCs &

Regional Coordinating Council
- co-ordinates, integrates and harmonizes execution of approved programmes
- exercises political & administrative authority in the Region
- assists DAs/Municipal/Metropolitan Assemblies in performance of functions

Metropolitan Assemblies
- (Pop. of over 250,000)
- Same as District Assemblies
- provision of metropolitan works and services

Municipal Assemblies
- (Assemblies with pop. over 95,000)
- One-town assemblies
- Same as District Assemblies
- provision of municipal works and services

District Assemblies
- (Pop. of between 15,000 & 250,000)
- exercise political & administrative authority in the District
- promote and support productive activity and social development
- initiate programmes for development of basic infrastructure
- security & public safety
- prepare, formulate and implement annual development plans, budgets and

Sub-Metro District Councils
- Part of metropolitan assembly
- provision of sub-metropolitan works and services

Zonal Councils
- (Settlements with pop. of about 3,000)
- Parts of one town
- Mobilisation
- Enforcement

Town Councils
- (Settlement pop. between 5,000 & 15,000)
- execute approved development plans
- support local communities to perform in executing approved development plans
- initiate & encourage joint participation to execute approved development plans;
- effective mobilization of resources

Urban Councils
- (Population above 15,000)
- Same as Town Council

Area Councils
- (Pop. of up to 5,000)
- Group of villages and small towns, geographically contiguous
- Same as Town Council

Unit Committees
- lowest level of government
- consult people, collate views, opinions, and proposals
- present the views to the District Assembly
- active participation in communal and development activities.
Second, the DAs provide the needed management support to the local communities in managing the infrastructure for domestic water supply and for irrigation systems. In the case of domestic water supply, three member Water and Sanitation Teams have been established (within the assembly) to assist communities in the management of domestic water supply. As part of their functions these teams process the applications of communities for bore holes, and supervise the work of the consultants who are contracted to conduct community training. In the case of agricultural water supply the administrative staff of the District Offices of MOFA provide management support through the implementation of LACOSREP I&II\textsuperscript{18} projects and beyond. This, notwithstanding the provision of guidance for important aspects of the management of the small reservoirs, is done by the District Assemblies. They also mediate in conflicts regarding land use related to small dams.

Third, the DAs play a crucial role in regulating water resource use through the passage of bye-laws. These bye-laws usually cover areas that regulations made at the national level do not address. These include bye-laws on sanitation, land uses, tree planting, bushfires and protection of river courses.

Fourth, DAs have to pay 5% of capital cost contribution for community water and sanitation projects, to select beneficiary communities and to contract the private sector to provide the goods and services for the implementation of water programmes.

The Water and Sanitation teams approach fits well into the decentralisation policy and into the policy of implementing a demand-driven community-based rural drinking water supply, which is one of the principles of IWRM. The committees or sub-committees in charge of agriculture and domestic water supply at the DAs serve as good avenues for discussing the demands of community members. For example, the District Director of MOFA is the Secretary of the District Assembly Committee in charge of agriculture. As a result the District Assembly members have the opportunity to discuss suggestions or complaints of their constituents with the respective line agency representative. However, the perception of the local people shows that the unit committees and the area councils do not play any major roles in the management system. The elected Assembly members are seen to be more active in settling disputes among community members than in water management issues.

6.3.1.3 Ministry of Food and Agriculture (MOFA)

A Regional Directorate and eight District Offices represent MOFA as a ministry in the study area. It is headed by a regional director. There are 10 regional agriculture officers who work directly under the director. These officers are head of the various units (Crops, Monitoring & Evaluation, Extension services, Plant Protection and Regulatory Services, Engineering services, Women in Agriculture, Veterinary Services, Animal Production and Husbandry, Special Programme officer and Regional Accountant).

\textsuperscript{18} LACOSREP (Land Conservation and Smallholder Rehabilitation Project) is an IFAD funded project to promote a wide range of agricultural support activities in the Upper East Region of Ghana. This includes training, agricultural extension, gender mainstreaming, agricultural credit, water resources development and rural infrastructure development (see, MOFA/IFAD, 2003). The first phase (1991-1997) and second phase (2000-2006) were implemented through a Project Coordination Unit located within MOFA. During the first phase 36 small dams and 8 dugouts were constructed or rehabilitated and 36 dams were targeted for the second phase. The second phase was extended to end in 2008. During the first phase, dams were mostly constructed using labour-intensive techniques, based on community labour and a food-for-work scheme. During the second phase, machinery has been used to construct the dams. The planning of the dams is conducted in collaboration with the respective District Assemblies, who are also expected to become the authority in charge of these dams.
The main function of the directorate is to support agricultural development (both crops and livestock) in the basin by providing agricultural and veterinary extension services. The extension agents serve as the major channel for information flows between MOFA and the farmers. The activities of MOFA depend on water resources and, in turn, affect the same resources. MOFA, by implementing the IFAD-funded LACOSREP projects (since 1992) which supported the construction and rehabilitation of small dams and promoted irrigated vegetable cultivation, played (and continues to play) a major role in water resources management. MOFA also promotes crop diversification, supports the adoption of soil conservation and water harvesting techniques, and explores new approaches to irrigation in order to increase crop production.

The statement below made by the deputy regional Director of MOFA demonstrates how the ministry is involved in water development in the basin. “The ministry concerns itself with management of soil and water for agricultural production purposes specifically nurturing plants and animals for the benefit of man. Rain fed agriculture is practiced from May to September. This means about 8 months of inactivity among farmers. During these months, wherever water is found we ‘chase’ it and use it for production. We also believe that valleys and rivers are reservoirs for water and this may explain why development started around great rivers. We obstruct rivers and build dams in valleys, ponds, wells and dug outs to aid agricultural production.”

Water User Associations (WUAs) were formed as the water resources management component of the LACOSREP (see Chapter 8 for details). These are working groups at the dam sites and are responsible for the day-to-day management of the dams/dug outs. The MOFA extension department monitors them. The department of Cooperatives and Community Development is involved in the organisational issues of WUAs of small dams. This department facilitated the formalisation of the WUAs as cooperative societies and provides training to their members. The focus is placed on issues such as group dynamics and financial management.

The regional directorate has been effective in mobilising farmers for adopting innovation transfer and the application of new technology for crop and animal production. However, its activities are seen as contributing negatively to the protection of water bodies and also as a factor in the destruction of natural vegetation. MOFA has not got the capabilities and capacity to monitor the amount of water pumped from rivers and dug outs for irrigational purposes, and hence, this makes it difficult to even estimate the water requirement for production in a subsequent farming period.

6.3.1.4 Ghana Irrigation Development Authority (GIDA)

The Ghana Irrigation Development Authority (GIDA), an agency under MOFA is the government authority in charge of irrigation (see Chapter 8). In the basin area it has a regional office in Bolgatanga. The regional office is not autonomous and therefore takes instructions directly from the capital, Accra.

GIDA carries out consultancy work on water structures: dams, boreholes, dugouts for the organisations that are constructing the facilities. Until 1991, GIDA was involved in the construction of dams themselves but now they only act as consultants providing the technical expertise for the construction of small reservoirs, which includes both the design of the reservoirs, and the supervision of the contractors in charge of constructing or rehabilitating them. Nationwide GIDA manages only 22 dams. These are built and managed by GIDA referred to as Project Managed schemes. There is only one of such schemes in the basin - Bolgatanga. Basically, GIDA now renders irrigation services to all agencies and bodies that provide those facilities (see 8.3.1).

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19 Interviews with the Acting Regional Director of MOFA on 15th April 2008 at Bolgatanga
The present arrangement of taking directions from the centre in the capital retards progress and affects efficiency. There is no formal link with the EPA and MOFA at the regional level. This also has its operational problems.

6.3.1.5 Environmental Protection Agency (EPA)

Another agency involved in water resources management at the basin is the Environmental Protection Agency (EPA). The EPA has a regional office in the Upper East. This agency is under the Ministry of Environment, Science and Technology and was established by the Environmental Protection Agency Act 1994 (ACT 490). The regional EPA office has only one vehicle, two project officers, a director and 4 supporting staffs.

The agency is responsible for maintaining and enforcing standards for wastewater discharge into water bodies among other functions. The EPA is also charged with the duty of prescribing standards and guidelines relating to environmental protection and pollution. Under the Environmental Assessment Regulations 1999, the Agency may require development agencies or organisations to undertake an Environmental Impact Assessment process, outlining impacts and mitigation strategies, before clearance for construction or rehabilitation of small dams can be carried out.

The organisation proposing a project has to submit a form, in which it describes the potential environmental impacts and the measures to deal with them. Officers of the EPA then visit the site to verify the information. If a permit is granted, they also monitor whether the enterprise acts according to the provisions of the permit but this function, according to the regional director, is not properly complied with due to limited staff and logistics. The EPA also includes a social assessment (overall benefit of the project) as a requirement before a project is approved. An EIA may involve a public hearing, but for small-scale projects such as small dams, no public hearings are held.

The EPA has undertakings in the domains of agriculture, fishing and trapping, logging and forestry, drainage and irrigation, housing, industry, mining, crude oil and natural gas, quarries and sand pits, manufacturing, rubber and plastic products, leather and textile products, construction, power generation and transmission, waste treatment and disposal, water supply, etc. which have or are likely to have adverse effects on the environment of public health (L.I. 1652 of 1999).

The broad nature of its undertakings in comparison with its staff strength and available logistics makes the EPA not capable to adequately handle its mandate. The EPA takes the approval of the chief and the approval of the District Assembly as an indication of the public opinion. But the youth organisations interviewed, disagree with this procedure. They contend that an approval by the chief may not necessarily represent the opinion of the villagers (interviews, 2008: 18, 81, 92, 101, 131).

6.3.1.6 Community Water and Sanitation Agency (CWSA)

CWSA is the core government agency at the regional level concerned with the provision of portable water to rural communities and small towns (see Chapter 7 for structure and operations). CWSA is in charge of the National Community Water and Sanitation Programme, which was launched in 1994. The Programme aims at sustainable supply of drinking water, following the principles of community ownership, beneficiary capital cost contribution, private sector participation and cost-recovery water tariffs.

The core donor for this program is the World Bank. Their major partner in the Districts is the District Assembly and their District Water and Sanitation Teams. CWSA supervises the provision of boreholes to communities, following a demand-driven approach. The project cycle of providing drinking water to communities starts with the sensitisation of District Assemblies,
NGOs and other stakeholders like chiefs, local opinion leaders, unit committees and area councils. The performance of the agency is assessed in Chapter 7.

6.3.1.7 Ministry of Fisheries

The Ministry of Fisheries is a new organisational player. It used to be a department under the MOFA. Its establishment as a ministry became necessary when the government decided to attach great importance to fish production as a means of improving food security and income generation in 2005. Though fishing in the basin is not as pronounced as in the Volta Lake in the South of the country there is a tradition of fishing in the rivers and dams in the Upper East Region.

Basically, the ministry is involved in educating fishermen against the use of poisonous chemicals in fishing and its effects as well as sensitizing them against the use of inappropriate mesh size nets and assisting them to adopt proper fishing methods. The district officer does this through the fishermen associations meetings. But in smaller dams and dugouts, there are migrant fishermen, which make control very difficult. They at times pollute the water body and leave. “What we are doing is to identify and mobilise these migrant fishermen into groups so that proper interaction can be carried out”20.

They also monitor fish growth rates in dams that they have stocked. There is a monitoring team that will seize fishing nets if any of the rules are flouted. Fishing is not allowed in the ponds, dams and dugouts between June and August since this is known to be the spawning period for the fishes. In enforcing the rules the police are sometimes brought in to assist the fisheries ministry in dealing with difficult fishing communities. Nonetheless it has been difficult to carry out these monitoring exercises on river bodies.

6.3.1.8 Hydrology Department and Meteorological Service

The Hydrology Department of the Ministry of Water Resources, Works and Housing located in Bolgatanga is engaged in taking records on river flows (White and Red Volta). The department has set up stations where manual gauges are mounted. Community/village members are engaged to read the water levels in the river. The department monitors water levels, convert them into flows and volume and forwards it to the head office in Accra. The series of data collected could be used to predict flooding in the basin. They also design and supervise storm drains within the region. The department does not collect data on groundwater and is not involved in the testing of water quality.

The Meteorological Service maintains a network of meteorological measurement stations in the region. The Service cooperates with MOFA, which also maintains measurement stations and collects data on rainfall. These are useful for farming purposes in determining when to start land preparation and subsequent planting.

6.3.1.9 Volta River Authority

The Volta River Authority (VRA) was formally established in 1961, under the Volta River Development Act 46. It is responsible for the generation and transmission of electricity for industrial, commercial and domestic use and management of the Volta Reservoir. The VRA’s initial role was development of the hydroelectric potential of the Volta River and construction and maintenance of a nation-wide grid transmission system. It has now assumed responsibility for the development of other energy services in Ghana.

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20 Interview with the director, Regional office of Ministry of Fisheries on 20th April 2008
Because of the water need for Akosombo the VRA is critical against all activities that extract large amounts of water from the upper river bodies. For this reason though the major activities of the Volta River Authority are found downstream where Akosombo is located, it concerns itself with the whole catchment area of the Volta River and has an office in the regional capital of the Upper East Region. The authority provides funding and support for environmental projects focusing on the river and its banks and still focuses on protection of the rivers that feed into the lake.

6.3.1.10 Research bodies

The Council for Scientific and Industrial Research (CSIR), under the Ministry of Education, Science and Sports, operates several research institutes. But the Water Research Institute\(^\text{21}\) (WRI) and the Savannah Agricultural Research Institute\(^\text{22}\) (SARI) are the two which are relevant to water resources management.

WRI has a mandate to conduct research into water and related resources. Research topics of WRI that are important for the Upper East Region (though not necessarily conducted in that region) include research on groundwater resources (availability, quality, quantity), on hydro-meteorological and hydrological data for planning and research, on irrigation technology, rainwater harvesting, and water management in valley bottoms for rice production.

The Savannah Agricultural Research Institute conducts research on various themes of water resources management, such as rain fed and irrigated crop production, on innovations for water harvesting, and on strategies to improve the productivity of water use in agriculture. SARI is running the GLOWA\(^\text{23}\) Volta project which adopts an interdisciplinary team approach to ensure meaningful exchange of data information on the basin instead of trying to forge links at the final stage of the project. The project seeks to develop a scientifically sound decision support system for the assessment, sustainable use and development of water resources in the whole of the Volta Basin.

The activities of these bodies feed into the planning processes. The interdisciplinary approach of SARI in essence adopts the IWRM approach to managing water resources. WRI has been instrumental in providing accurate water information for the WRC.

6.3.2 Other Bodies (Commissions)

There are four water related commissions in the Upper East Region. I have treated these separately from the above because they are not line departments or sector specific departments/organisations.

6.3.2.1 Water Resources Commission

The Water Resources Commission (WRC) was established in 1996 (section 5.4.4.2). The Water Resources Commission Act does not specify a decentralised governance structure, but it allows for the formation of sub-commissions as seen necessary. The WRC therefore created the Basin Boards which are supposed to implement the functions of the WRC at a lower level. This is a local unit established to make the WRC operational at the basin level.

The Board is organised around four sub-committees. The sub-committee on programmes and budget is responsible for drawing up and facilitating the budget of the other committees and the

\(^{21}\) Water Research Institute (WRI) has its station in Tamale in the Northern Region.

\(^{22}\) The Savannah Agricultural Research Institute (SARI) is also located in Tamale in the Northern Region.

\(^{23}\) More information on GLOWA (Global Change in the Hydrological Cycle) is provided later in the chapter (6.2.5).
preparation of the budgets of the WVBB. It also facilitates the sourcing of funds for the implementation of programmes and carries out other functions as may be determined by the WVBB. The five members of this committee are representatives from Bolga Municipal Assembly, MOFA, Regional Coordinating Council, Regional House of Chiefs and Kasena Nankana District Assembly.

The subcommittee on Land use, Research, Education and Public Awareness is responsible for identifying research needs of the Basin and facilitating education and public awareness programmes of the Board. Membership is made up of representatives from SARI, Bawku-West District Assembly, NGO forum, Bongo District Assembly and the WRC.

The subcommittee on Environment, Utilization and Regulation facilitates the identification and registration of water users, facilitates the licensing and granting of water use permits, ensures compliance of all projects and water users, with water use and environmental regulations. This subcommittee had no record of registered water users and water use permits within the basin. The reason given by the committee is that most users fall within the category of exempt, namely: (i) water abstraction by manual means; (ii) water abstraction by mechanical means but levels of abstraction do not exceed 5 liters per second (i.e. 432 cubic meters in 24 hours); and (iii) abstraction for agriculture not exceeding one hectare of land (see LI 1692 of 2001). Despite the exempt the users are required by law to register. This has also not happened because the committee was yet to begin the exercise. Membership of the subcommittee is made up of representatives from CWSA, EPA, MOFA, West- Mamprusi District and Talensi-Nabdam District Assemblies.

The subcommittee on Transboundary issues is made up of representatives from Bawku Municipal Assembly, Department of Women, Garu-Tempani District Assembly, Regional House of Chiefs and the Regional Coordinating Council. This committee is responsible for facilitating and maintaining a strong collaboration between WVBB and the Ghana-Burkina Faso Transboundary structures (see Chapter 9). In addition it is to facilitate and maintain a strong collaboration between WVBB and the Nakambe Water Agency of Burkina Faso, facilitate the implementation of programmes of the Ghana Country Committee of the local transboundary committee and prepare a budget for its operations.

These decentralized Boards are not tied to any administrative boundaries but integrate water management at a River Basin level. The White Volta Basin is the second pilot project of the WRC after that of Densu. The importance of a coordinating actor is emphasized because of cross-boundary water issues, as the White Volta Basin stretches into Burkina Faso and to a lesser extent, into Togo. The White Volta Basin Office was set up in Bolgatanga in July 2004. The basin officer and two supporting staff members run the office. In 2006, the national office of the commission approved a draft operational guideline. This development was made possible because of the national WRC management policy of using the river basin as the unit in applying IWRM principles in the management of Ghana’s water resources.

The Regional office is responsible for managing fresh water resources in the basin for optimum benefit for the people. They are therefore responsible for the following:

- To propose a comprehensive plan for the conservation, development and utilization of water resources of the basin;
- Initiate, implement and coordinate activities connected with the development of water resources in the Basin;

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24 Nakambe is the name of the White Volta River in Burkina Faso. Nakambe Water Agency is the institution in charge of managing water resources in the Nakambe basin in Burkina Faso.
- Assist in the process of registering water users and granting water rights;
- Assist in monitoring and evaluating programmes for the utilization and management of the water resources of the basin;
- Collaborate with organizations on matters concerning the management and control of pollution of water resources within the basin; and
- Collaborate with organizations in neighbouring riparian countries for the purpose of effective management of water resources in the Basin (WRC, 2006).

The operational area of the Board is that part of the White Volta Basin which covers the following districts: West Mamprusi District; Bolgatanga Municipal; Talensi-Nabdam District; Kasena Nankana District; Bongo District; Bawku Municipal; Bawku West District; and Garu-Tempani District.

6.3.2.2 Minerals Commission

The Minerals Commission was established pursuant to the Minerals Commission Act, Act 450 of 1993. Its functions include the regulation and management of the utilization of mineral resources and the co-ordination of the policies in relation to them. It is also mandated to collect comprehensive data on Ghana’s mineral resources and exploration and exploitation technologies to facilitate government decision making. The Commission is required to report to the Minister for Mines, Lands, and Forestry on the implementation of policies related to minerals and mining. Its regional office is in Bolgatanga.

The Minerals Commission is involved in water-related issues because of the possible adverse effects of mining on both the quality and availability of water. The Commission finds it difficult to deal with the small illegal miners around Tilli and Nagoli areas in the Talensi-Nabdam District whose activities have been polluting the Red Volta (a tributary of the White Volta) with chemicals. These are unregistered illegal gold miners whose activities degrade the Tilli forest reserve and create a dangerous terrain for humans.

The miners, however, do not accept their activities to be illegal. They feel the land belongs to them and that mining is one of the benefits they derive from their land. They argue that the registered small-scale miners are depriving them of the benefits from their land/property.

6.3.2.3 Lands Commission

The Lands Commission is the state agency charged primarily with the management and administration of state and vested lands. It is responsible for advising on a policy framework for the development of particular areas so as to ensure that development of such areas is coordinated.


In general, individual farmers have not registered agricultural land in the Upper East Region. MOFA has pushed for the registration of the land resources to be irrigated by small-scale irrigation schemes in the name of the District Assemblies. Land rights in Ghana are governed by different laws just like water (see 5.4 above). Formal laws and regulations recognise customary land law and the role of customary authority in land management (stool and skin lands) (Ministry of Lands and Forestry, 2003). The Land Administration Project, which is supported by different donors, is since October, 2003 working on a consolidated policy approach towards land management in Ghana. This process, however, has been too slow to achieve desired outcome.

6.3.2.4 Forestry Commission
The Forestry Commission (FC) was established pursuant to the Forestry Commission Act, 1999 (Act 571). The Commission has regional offices to facilitate its operations. The regional office at the White Volta Basin is in Bolgatanga. The Commission is a body corporate, responsible for the regulation of the utilization of forest and wildlife resources, the conservation and management of those resources and the coordination of policies related to them. It is also mandated to manage the nation’s forest reserves and protected areas by proper planning for the protection, harvesting and development of forest and wildlife resources in a sustainable manner. The Act provided for the establishment of other bodies and agencies under the FC to assist the Commission in carrying out its functions.

The FC concerns itself with water resources because of the value of forest belts for erosion control, and because of the micro-climatic and hydrological impact of forests. The approach to protection has relied mainly on forest guards who patrol the boundaries to make sure people do not enter and destroy the vegetation. They arrest offenders and process them for prosecution but as a matter of fact this is not vigorously pursued due to: (i) interference of chiefs and elders in such cases; (ii) fear on the part of guards of being attacked by the inhabitants.

The Commission employs education during community forums to sensitise people to the importance of protecting the water bodies. Despite these, there are a number of factors that militate against their efforts: First, the attitude of the inhabitants: the inhabitants see the forest guards as aliens who intimidate them and prevent them from having access to their own property. Second, the chiefs and/or the tindanas at times do not cooperate with the commission’s staff. They claim ownership of the rivers and allow people to work along the banks of the river which is prohibited by law.

The main challenge here is that the people respect the orders of the chiefs and the tindanas more than the guards who are operating under the laws of the land. Third, the encroachment problem is pronounced in the Upper East Region because of high population density at this portion of the river (104.1 as against a national average of 79.3). Fourth, the pronouncements of some dignitaries have had adverse effects on their efforts. The Regional Director of MOFA is on record to have said on a local radio station that the basin serves as the food basket for the entire country. This statement is said to have motivated and emboldened farmers to move closer to the banks of the river to do more farming, creating some tension between the FC and MOFA. The Forestry Commission is involved in tree planting and the Ministry of Food and Agriculture is concerned with production activities while the district assemblies concern themselves with socio-economic activities.

6.3.3 Traditional Institutions

At the basin level, governance structures based on customary law and those based on modern law coexist. This has happened since colonial times (see Chapter 5). Institutions based on customary law have been formally recognized in the Constitution (see 5.4.4). It has been argued that the inclusion of customary institutions in the modern Constitution is based on the belief that “public affairs would be better managed if public officials were informed by the value systems that underpinned Ghana’s indigenous political institutions” (Arhin, 2002:1). In the local government system (see 6.2.1.1), the traditional authorities have no formal representation at the District and

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25This refers to the buffer zone policy of the Forestry commission. The inconsistency in the buffer zone policies of the Forestry Commission, the Minerals Commission and MOFA has necessitated the drafting of a universal one by the WRC. This at the time of interviews was not completed.


27Interviews with the Bolgatanga Municipal Forest Officer on 9th June 2008.
sub-district levels. They are, however, known to play important roles in managing public affairs at the sub-district level. This role can be traced back to pre-colonial times.

The colonial masters, the British, practiced a system of indirect rule through divide and rule of traditional authorities. The chiefs were accommodated into the management system while the Tindanas (see Box 5.1) were ignored. One of the serious outcomes of this is that what is considered today as customary law and customary institutions is influenced by definitions developed under British colonial rule. The chiefs, who were empowered as political representatives under the British system of colonial rule have maintained this role ever since; but the Tindanas continue to have significant influence.

The interviews (2008: 17, 18, 30, 51, 58, 86, 92, 99, 127,133) indicated that the traditional authorities are also in charge of those parts of the rivers and streams that flow through the land areas in their jurisdiction. They have created imaginary boundaries themselves, which are respected traditionally by adjoining communities.

Though formal law acknowledges the role of the traditional authorities in land management in the basin, their role in the management of water resources is not explicitly stated. In fact in the light of the WRC Act 522 of 1996 their claim to ownership of the water bodies is non-existent anymore because these are vested in the President to hold it in trust and on behalf of the people of Ghana. However, whether this is recognised by the people themselves is not clear.

In Ghana, customary water rights are often rooted in customary land law, i.e., the body of rules and practices which govern access to and tenure of land (see chapter 5). It implies that a customary grant of land generally confers rights on water resources. Hence, customary water rights in Ghana were regarded as part of land rights until the enactment of the Water Resources Commission Act of 1996.

In an attempt to attract customary law and rights within the fold of statutory law, ownership of water resources was vested in the State by the lawmakers, and directed the holders of water rights to stake their claim within twelve months of the coming into force of the Water Resources Commission Act 1996 (see 6.2.3). Many could not read and did not stake their claims resulting in a formal transfer of ownership. However, the Constitution still recognizes customary practices. The result is that customary water law and rights co-exist with and alongside statutory water law and rights, as two separate systems and bodies of law. In reality these two systems do cross each other and interact, in space and time.

6.3.4 Community Level Organisations

There are two major organisations that have active roles in the management of local water resources at the community level. For the management of small dams for the purposes of agricultural production, the Water Users’ Associations (WUAs) have been responsible. The water and Sanitation Development Board (WSDB) or the Water and Sanitation Committees (WATSANs) are responsible for bore holes/small piped systems in towns and small communities respectively (WSDB if in towns or small piped systems and WATSANs if a point source is meant). The formation of these organisations was, and is still, being promoted by the respective state agencies (MOFA for the WUAs and CWSA for WSDB/WATSANs) (see Chapters 7 and 8).

The purpose was to implement the demand-driven community-based approach towards the provision of water infrastructure. MOFA has facilitated the development of Water Users Associations that are supposed to include all users of rehabilitated and new dams: gardeners, livestock owners and fishermen. Consequently, the original organisational structure of WUAs that was designed by MOFA provides for three different associations - gardeners, livestock owners, and fishermen. The interviews (2008: 2, 5, 14, 21, 29, 31, 38, 59, 74, and 127) however,
show that in practice, the gardeners and livestock owners most often turn out to be the same individuals, so only fishermen have their distinct associations. Even here there are still overlaps: gardeners being fishermen.

The Water Users' Association (WUA) in the locality has the responsibility of managing community dams. The users elect a dam site management committee and executives who, serve to mobilize community effort for the maintenance of the dam and irrigation facilities. These include activities for

- The protection of the catchment area of the reservoir to limit siltation;
- Sealing of cracks in the dam embankment;
- Cleaning and maintenance of the irrigation system including valves, canals and drains;
- Collection of levies for maintenance; and
- Conflict resolution.

6.3.5 Donor Funded (International) Programmes/Projects in the Basin

Water-related infrastructure is mostly funded by donor agencies. Such projects are either implemented through the existing administrative structures, or through the special project implementation units. DANIDA is the core funding agency of the Water Resources Commission of Ghana. Apart from the support the National Water Resource Commission receives, DANIDA supports the pilot testing of basin boards (including the WVBD) to allow for a more decentralized approach to IWRM. DANIDA places a strong emphasis on the capacity building of commission members and has one international expert placed in the WRC headquarters. Beyond this there are other international programmes that feed into IWRM at the basin or have influence on the IWRM implementation in the basin. These include the PAGEV28 and the GLOWA-Volta projects29. The GLOWA-Volta project is a nine year, research project aimed at sustainable water use under changing Land Use, Rainfall Reliability and water Demands in the whole Volta Basin. The project started in 2000. There are three scientific core themes:

- Natural variability of precipitation levels and variation caused by human activity and their effect on the hydrological cycle;
- Interactions between the hydrological cycle, the biosphere and land use; and
- Water availability and conflicting water uses.

The GLOWA-Volta project seeks to develop a scientifically sound decision support system for the assessment, sustainable use and development of water resources in the Volta Basin. The research involves a number of PhD students working on water resources in the basin, access to water, cost issues, water quality, taking measurements of the river system and predicting flooding. The project is funded by the German Federal Ministry of Education and Research. It is

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28 PAGEV is the French acronym for “Project for Improving Water Governance in the Volta Basin.
29 GLOWA-Volta project is a research network involving Bonn University (where the Centre for Development Research (ZEF) is the Head Institute, Remote sensing Research group) and the Institute for Land and Water Management) Fraunhofer Institute for Environmental Atmospheric Research (IFU), Coarmisch-Partenkirchen and Institute for Tropical Medicine and Hygiene Heidelberg University. In cooperation with Council for Scientific and Industrial Research: SARI and WRI (Water Research Institute), University of Ghana (Remote Sensing Application Unit, Population Impact Project and Institute de l’Environnement et de Recherche Agricoles (INERA)).
one of the three pilot basin case studies aimed at developing integrated strategies for sustainable and foresighted management of water, lakes and rivers at the West Africa regional level. From mid-2004, the International Union for Conservation of Nature (IUCN) initiated the three-year “Project for Improving Water Governance in the Volta Basin” (commonly referred to as ‘PAGEV’ by its French acronym) in response to the need for transboundary coordination and cooperation regarding the management of the water resources of the Volta Basin (see chapter 9). PAGEV is part of the worldwide Water and Nature Initiative (WANI) of IUCN that seeks to demonstrate how to mainstream the ecosystem approach into river basin planning and management. The project is developed and executed jointly by IUCN-BRAO and GWP-WA and involves two countries in the Volta Basin (Burkina Faso and Ghana). PAGEV aims at improving water governance in the Volta River Basin through a consensus on key water management principles and institutionalised coordination mechanisms. Its objective is to assist Burkina Faso and Ghana to agree on key water management principles and establish a framework for collaboration in the management of their shared water resources. The project implementation started on 1st July 2004. PAGEV aims to deliver on four strategic objectives:

1. Decision-support knowledge base: key decision-support information base compiled and shared to inform constructive dialogues and collaboration on water management between Burkina Faso and Ghana;

2. Pilot IWRM interventions: Burkina Faso and Ghana jointly develop, implement and learn from pilot IWRM interventions in a selected transboundary sub-basin;

3. Policy and institutional change: Existing bilateral consultation mechanisms between Burkina and Ghana on water management broadened and strengthened through the adoption and implementation of a Code of Conduct in the management of shared waters; and

4. Learning and coordination: Project successfully managed and coordinated, structured learning supported and lessons learned made available.

PAGEV initiated joint planning by technical services from different sectors (Agriculture, Forestry and Environment) with NGOs to limit institutional fragmentation that could have adverse effects on the effectiveness of any poverty alleviation and natural resources management interventions. Two main issues are involved: there is the establishment of multi-stakeholder forums for IWRM at the community (see Chapter 9), national and transboundary levels which enhance local participation in decision making in natural resources management of the basin. The other one is the initiation of innovative co-ordination arrangements on transboundary water management from a multi-level perspective backed by new agreements and protocols to promote long-term transboundary cooperation (see 9.2).

6.4 Non-Governmental Organisations (NGOs) at the Basin

Several NGOs are involved in the agricultural and domestic water sector in the basin (especially in the Upper East Region). Some of them operate from the national or international level, while others are regional or even local. The most important NGOs active in the water sector include:

- Rural Aid (major player in the construction of hand-dug wells with more than 500 wells in the Upper East Region with funding from Water Aid and IFAD);

30 Interview with Dr. Fosu of Savannah Agricultural Research Institute, who also serves on the GLOWA Project July 2008
• Action Aid (funding of dam construction) but have now winded up its activities;
• Red Cross Society (funding of dam construction);
• World Vision International (construction of bore holes);
• Adventist Development and Relief Agency (ADRA) (funding of bore holes construction);
• Catholic Secretariat (funding of dam construction); and
• Zovfa implementing IWRM on behalf of WVBB and PAGEV.

All of these are international NGOs except for the last two.

An umbrella organisation - NGO-forum - seeks to bring together about 11 of these NGOs that are involved in the water sector to have a common platform for their operational guidelines and principles. These include Rural Aid, Red Cross, BACH (Binabi Area Community Health Project), World Vision, Catholic Relief Services, ADRA, Community Development Initiative, CODEI (supported by Water Aid), Presbyterian Primary Health Care (PPHC), Islamic Council for Humanitarian and Development Services, East Agoli Community Health, New Apostolic Church and the Bible Church of Africa.

Rural Aid has been in water management since 1986. It was involved in dug outs, streams, wells etc for drinking water but later there were other groups that came into the picture. These were drilling wells without contacting the District Assemblies/regional coordinating council. In addition, wells drilling were carried out without the clearance by the Environmental Protection Agency as stipulated by law. But because communities were in dire need of water they always cooperated with these NGOs without caring about what the Regional Coordinating Council stood for or wanted to be done.

These developments necessitated the invitation of all water providers by the Regional Coordinating Council to a forum to have a common platform in regulating their activities. The idea of forming the NGO-Forum was the outcome of that consultative meeting and Rural Aid was contacted by Community Water Sanitation Agency (CWSA) to spearhead this organisation. Funding was provided by the CWSA.

Rural Aid became the NGO that hosted the secretariat for the group. Each NGO still remains an autonomous entity and reports to its headquarters but this created a platform for basin level links for discussion and/ or coordination of activities. The activities of the NGO-forum extended to all the 9 districts of the White Volta Basin and formed the regional representatives that met for deliberations. This development was to help the Regional Coordinating Council in coordinating their activities, to avoid duplication of events and actions among them and to be able to monitor their activities.

A Water and Sanitation schedule officer was to receive quarterly reports from the various organisations, a copy of which was supposed to be sent to the DWST (District Water and Sanitation Teams). But records from both the NGO-Forum secretariat and the DWSTs show that compliance has been poor. Most of the NGOs were not consistent in sending their reports.

Almost all the NGOs concentrated on water for domestic consumption; few engage in protection of wells and streams by planting trees along the streams and around wells.

The provision of wells by the NGOs followed a participatory process. The felt needs of the community are identified at a community forum before wells are sunk. The communities provide free labour to support the exercise. Water User Associations (WATSANs) are then formed within the community to manage the facility and are made responsible for keeping the water environment clean and carrying out simple repairs on the pump. The WATSANs report to the
particular NGO that facilitated the project in their community. The NGO then reports on it at the NGO Forum and for discussion with CWSA at their quarterly meetings.

The NGO Forum which started operation in 2004 initially proved to be a good arrangement for coordination but is no more as effective as it used to be. Some of the NGOs are no longer active in the water sector. The quarterly meeting with the CWSA to deliberate on their activities has stopped because of lack of funding. The CWSA was funding the activities of the NGO-forum from one of its externally funded projects whose objectives fitted into this activity but the project has ended. Consequently, the local initiative at coordination is grinding to a halt.

6.5 Private Sector

6.5.1 Technical Assistance Consultancies

The private sector takes part in a number of activities in water resources development, which reflects a general policy trend to outsource infrastructure development and related services to the private sector. In Ghana, the World Bank largely promoted this trend (WRC, 2006). Technical Assistance (TA) Teams are contracted by the District Assemblies to assist in the building of community capacity for the management of bore holes. These consultancies tend to be formed by retired civil servants who worked with a similar responsibility for the Ghana Water Company Limited or the Community Water and Sanitation Agency before these services were transferred to the private sector.31 Their responsibilities include community sensitisation, guiding the community to select a committee, to propose locations for boreholes in a mapping exercise, training the committee on health and sanitation, preventive maintenance, record keeping and the development of by-laws. The District Water and Sanitation Teams monitor the work of the TAs. The TA companies do not have an umbrella organisation; nonetheless they do meet informally to exchange ideas and experience.

6.5.2 Ghana Water Company Ltd.

The Ghana Water Company Ltd. (GWCL) is a semi-autonomous company that was transformed from the state-owned Ghana Water and Sewerage Corporation (see 5.4.4.1). It is mainly responsible for urban water supply. Its regional office is in Bolgatanga headed by a Director. In the study area it serves the drinking water needs of Bawku, Zuarungu, Bolgatanga and Navrongo. The water they distribute is either extracted from bore holes (Bawku and Navrongo) or from the Vea large-scale irrigation scheme dam (Zuarungu and Bolgatanga). I will revisit the GWCL operations in chapter 7. I have treated GWCL and ICOUR as a sector simply because both are now operating on private-public partnership principles.

31 Conversation with the Managing Director of one Consultancy, Bolgatanga, August, 2008
Figure 6.3: Map of actors in water management at different levels

Adapted from “Integrating Governance and Modeling”, Challenge Program on Water and Food, 2005
6.5.3 Irrigation Company of the Upper East Region (ICOUR)

There are only two large-scale irrigation schemes in the White Volta basin, which happen to be the largest schemes in the country. These are the Tono dam near Navrongo and the Vea dam near Bolgatanga. Both were initially built by the government with funding from the Social Security Bank, Ghana. ICOUR is the company (a commercial entity) established to manage the two schemes. Tono is managed for agricultural production and fisheries but Vea is for both agricultural purposes and urban water supply. Tono was constructed between 1975 and 1985 and has a potential irrigable area of 3,800 ha, of which 1,500 ha are currently used. About 6,000 farmers in nine villages benefit from the scheme (see 8.3.3).

Vea was constructed in 1965, and has a potential irrigable area of 2,000 ha, of which 1,200 ha are used. About 2,000 farmers in nine villages benefit from this scheme. The main crops are cereals (millet, sorghum) and legumes (soybean, cowpea) on the uplands, and rice on the lowlands. These figures indicate that there is considerable potential to expand the cultivation of irrigated crops within these schemes. The constraints to be overcome to pursue this strategy appear to be a combination of institutional, technical and economic problems (interviews, 2008: 20, 21, 8). The company still receives public funds, but the plan is to reduce the public funding to ICOUR until it can stand on its own.

The farmers cultivating land in the large-scale irrigation schemes are organised in Water User Associations. About 56 of them are registered with ICOUR and some under the Cooperatives Department. They form village committees, which cooperate with the project management, e.g., with regard to land distribution. The WUAs are responsible for cleaning the canals and distributing the water. This decentralised management approach was introduced in early 2000. ICOUR’s operation and its effects on water management are elaborated in Chapter 8.

The map of actors in figure 6.2 depicts the agencies and groups involved in water management at the Basin.

6.6 Organisational Linkages and Interactions in the Basin

For the analysis of organisational linkages and interactions I am drawing on the distinction offered by Uphoff (1986). He distinguishes three sectors: the public sector, the private sector, and a “third sector” which he refers to as a collective action sector (for details, see Chapter 7).

Water governance structures often combine organisations from these different sectors. The term “sector” is also used to refer to subject areas, such as the water sector, the land sector, forest sector, etc. Ministries and line agencies responsible for these areas are referred to as sector agencies/organisations.

6.6.1 Levels of Coordination

With regard to governance structures, it is also useful to distinguish different levels. In the case of water resources management, consideration of the overlapping classification systems is important. The political-administrative system shows the following levels: the level of individuals, the household and firm levels, the community level, the regional level, the national level, and the international level (see Figure 6.3). These levels coincide with the levels one can define according to water use and water management criteria: the level of the individual water users, the household level, the community of individuals or households using a joint infrastructure for drinking water or irrigation, sub-basins of rivers and finally river basins, which may also be internationally shared. A hierarchy of decisions at the various levels consequently results.

Governance structures are important for decision-making and the implementation of decisions (see 4.9). In general two major types of decisions are encountered in water resources
management: (1) decisions on investment and maintenance of infrastructure, and (2) regulatory
decisions regarding water use and water quality. To some extent, water resources can be used
individually without infrastructure investment in Ghana (e.g., fetching water from rivers and
streams either for domestic or irrigation purposes with buckets). The utilisation of water resources
apart from these uses requires investment in infrastructure and subsequent maintenance of the
infrastructure. The infrastructure for irrigation and drinking water is usually used by
groups/communities and may call for state or community investment and maintenance. This is
often associated with issues of collective action.

In cases of shallow wells and hand dug wells management become the concern of individuals or
communities involved, guided by rules put in place by the local community without much of the
local government’s interference. They also depend on individual investment decisions or
collective action.

A variety of institutional arrangements are being applied for the financing, provision and
maintenance of water-related infrastructure, as the current decentralisation, devolution to of
power to user groups, contracting out to NGOs and the private sector shows. Different decision-
problems arise regarding the type of infrastructure to be invested, as well as its distribution and
the institutional arrangements regarding financing, provision and maintenance. Thus decision
making at different levels arise, and hence, coordination at different levels. The analysis of these
institutional arrangements is also an important aspect of analyzing governance structures for
water resources management.

6.6.2 Types of Coordination

An important aspect of analyzing management arrangements (and the governance structures) is to
identify the coordination mechanisms that exist, or could be created, between the stakeholders
from different sectors and at different levels in order to make investment, management and
regulatory decisions and to implement these decisions. Three major coordination mechanisms (or
modes of interaction among stakeholders) can be distinguished (Williamson, 1985):

- Hierarchical coordination;
- Market coordination; and
- Co-operative or collaborative types of coordination.

The hierarchical types of coordination implicitly have power relationship, which may have an
economic, political or legal basis. Organisations in the public sector typically rely on hierarchical
coordination mechanisms. The hierarchy use rewards linked to other measures than output, for
example the obedience of orders and regulations and the kind of inputs that has been put into the
process (i.e. the experience of formal qualifications of stakeholders, time spent by the agents on
the job etc).

Business enterprises and non-profit service organisations usually have an internal hierarchical
structure, but may enter into market types of exchange with each other. Using the price-
mechanism of markets implies that the agents are rewarded in direct connection to the results
that have been created. The market mechanism is hence a coordination mechanism that focuses on
outputs. The direct market mechanisms provide strong incentives, encouraging participants to
create the output needed, whereas the indirect incentives provided by the hierarchy are seen to be
weaker and more oriented to fulfil the requirements of the internal management. ICOUR (in
irrigation), CWSA and the assemblies with the WATSANs and the water boards in potable water
delivery exhibit this in their management processes (see Chapter 7).

In membership organisations and cooperatives, co-operative types of coordination are most
frequent. This is demonstrated in the WUAs in irrigation and fishing (see Chapter 8). The three
types of coordination can be considered as “ideal types”. In reality, combinations of the three
forms play an important role. Identifying the coordination mechanisms established for the interaction between different types of organisations is very important. The type of coordination mechanism considered appropriate for a particular situation depends on various critical characteristics like work-dependencies, technologies, environments (including culture) and on the objectives to be achieved. Possible objectives related to water resources management are discussed in the next sub-section.

6.6.3 Coordination Mechanisms for Water Resources Management

Several coordination mechanisms are identified and discussed within the field of management studies and organisation theory. Edström & Galbraith (1977) summarise them as a choice between co-ordination by centralisation, bureaucratisation and socialisation. Later contributions by Bartlett & Ghoshal (1992) distinguish between centralisation, formalisation and socialisation. In the NI tradition (see 4.2.4) the focus is on the analysis of the choice between the price-mechanism of markets and the unified governance of hierarchies. Extensions of NI has also identified co-ordination by “trust” or “ideology” as another option used in what is referred to as clans, networks or brotherhoods (Powell, 1991; North, 1992).

There are reasons for establishing coordination mechanisms for water resources management. These include: (a) enhancing information flows for better informed decisions, (b) coordinating decision-making and implementation, (c) improving regulation, and (d) promoting democratic governance.

6.6.3.1 Enhancing Information Flows

Enhancing the flow of information in order to enable different actors (see figure 6.3) to make informed decisions on the issues they are responsible for is an important reason for the establishment of coordination mechanism. In the case of water resources management relevant types of information include factual information about the hydrological, ecological and socio-economic aspects of water resources use, as well as information about the needs, interests and views of the different stakeholders regarding interventions in water resources management.

At the basin there exists no coordination mechanisms for hydrological, meteorological as well as water quality information flow among the agencies concerned with data collection on the various parameters. However the WRC has facilitated the establishment of the Water Resources Information unit that collates and coordinates information from the three agencies involved (Hydrological services, Meteorological Department and Water Research Institute) at the national level. This has been a good approach to eliminate conflicting reports and to facilitate readily available information for water resources management at different levels and sectors.

6.6.3.2 Coordination of Decision-making and Implementation

The establishment of coordination mechanisms and improvement in already existing coordination mechanisms are expected to lead to better outcomes of strategies that involve different decision-makers and implementing actors. This can happen if coordination of decision-making takes the form of “harmonisation”, or alignment of decisions that are taken independently by different stakeholders who are from different sectors. A better form of coordination is achieved by joint decision-making (Bartlett & Ghoshal, 1992) but depending on how authority is distributed, joint decision-making processes may take different forms.

If authority is equally shared, the stakeholders negotiate a consensus or practice voting according to defined majority rules (Mitchell, et al., 1997; Rowley & Moldoveanu, 2003). In hierarchical relationships (as in the case of agricultural sector or the GWCL) joint decision-making involves lower-level authorities making decisions that are then approved or changed by higher-level authorities. Different actors are sometimes involved in deciding on different aspects of a joint
decision, for example, a sector agency (CWSA) may decide on technical aspects of a borehole, and a political decision-making body (the Regional Coordinating Council) may give overall approval. Coordination is not only important for decision-making, but also for implementation.

Problems arising during the implementation process may call for a forum where the different stakeholders involved in implementation meet, discuss problems and negotiate joint solutions. An example of this is seen with the implementation of the PAGEV project being facilitated by Zovfa. This involves the nursery of seedlings and the planting of seedlings for the protection of water bodies (dams, wells and rivers) in the basin (see 9.5).

6.6.3.3 Facilitation of Regulation

Regulatory decisions are a type of decisions that often involve challenges of implementation, especially if the organisational capacity for enforcement is low. Enforcing environmental regulations regarding water resources management is a typical case. Involving different stakeholders in regulatory decision-making may be a strategy to improve the prospects for implementing regulatory decisions (even if there is no legal rule requiring such involvement). Collaborative management approaches have shown that stakeholders are often more likely to comply with rules if they have been involved in devising those rules (see 3.3).

6.6.3.4 Promoting Democratic Forms of Governance

Coordination mechanisms that involve citizen participation can be considered as a goal in their own right (in the sense of promoting democratic forms of governance) rather than as instruments for achieving better outcomes. With regard to citizen participation, one can distinguish direct and representative forms of participation. Direct forms of participation involve, for example, meetings in which all citizens or all users or potential users of a particular water infrastructure participate. Representative forms of participation involve representatives of citizens. These representatives may be the leaders of community organisations involved in water resources management, or they may be the representatives elected by the general public, such as local government (district assembly) representatives. Sometimes, traditional authorities are also considered as representatives but in the basin under study they are represented only at the WVBB.

Apart from distinguishing between direct and indirect representation, one can also distinguish different degrees of participation. Typical classifications distinguish the following levels: (1) sharing information, (2) consultation and seeking opinions, (3) sharing of decision-making authority, and (4) devolving decision-making authority (see Amma Anokye, forthcoming) “Stakeholder participation” has become an important concept in water resources management, and more generally in development practice. Currently there is only a loose connection between ICOUR and GIDA, and ICOUR does not report to GIDA.

6.6.4 Existing Coordination Mechanisms

The existing coordination mechanisms for water resources management can be analysed under the three sectors discussed above:

6.6.4.1 Public Sector Organisations

The two major uses of the water resources in the White Volta Basin are agricultural use (including crops, livestock and fishery) and domestic use. Both uses require public investment in infrastructure, and for the management of this infrastructure, community-based management approaches have been implemented since 1998. Due to the decentralisation policy, the District Assemblies have come to play a major role in coordination and decision-making of the infrastructure both for domestic and agricultural water use. The administrative capacity for domestic water supply is supposed to have been developed within the District Administration to
enhance the coordination of the actors involved. The attainment of this status is yet to materialise (see chapter 7).

In case of agricultural water supply, the administrative capacity is located in the agricultural sector agencies of MOFA (Regional Directorate, District Offices, and GIDA). The coordination between the District Administration and these sector agencies is within the legislative framework but the implementation process has not been smooth.

At the District level, the elected District Assembly members are the major citizen representation for participatory decision-making, since they have the mandate to represent the interests of their constituents. The interviews indicate that the Assembly members represent in fact the major channel of information flows between the communities and the District level. The weakness in this mechanism of participation is that the numbers involved limits the scope for participation at that level when one takes into account the population of a District (usually larger than 40,000 inhabitants). The interviews (interviews, 2008: 2, 5, 6, 37, 55) indicated that both the sector agencies (MOFA, CWSA) and the District Assemblies conduct stakeholder consultations as part of their planning procedures. These consultations provide room for NGOs and community-based organisations to express their views and discuss issues.

The Regional Coordinating Council represents the major coordination mechanism beyond the District level. However, since the development planning authority has been devolved to the District level, regional coordination has been reduced to facilitation and oversight of District-level planning.

6.6.4.2 NGOs and the Private Sector

NGOs play an important role in domestic water supply and, to a more limited extent, in providing small dams. To enhance coordination one will expect that their activities are included in the development planning process of the District Assemblies but in practice this does not always occur. Apart from the NGOs working under the umbrella of NGO forum all others in the water sector have no umbrella organisation and this makes coordination very difficult.

Private sector agencies play a major role both in the provision of physical infrastructure and, in case of domestic water supply, in building community capacity. The relation of the private sector agencies to the public sector agencies is governed by contracts with the District Assemblies or with the NGOs sponsoring infrastructure provision. Apart from the companies that build the small dams, the private sector organisations do not have an umbrella organisation that represents them. The promotion of the formation of organisations that unifies such groups in the basin by the WVBB is likely to enhance better coordination within this sector.

6.6.4.3 Community Based Organisations

The major water-related governance structures at the community-level are the water user associations (WUAs, WSDBs and WATSAN committees). The formation of these associations was facilitated by the respective state agencies and NGOs. The sector agencies have made efforts to promote the formation of a regional network of WUAs, and of WATSAN committees, respectively, but this form of higher-level coordination and representation is not well established - it is struggling to survive.

One of the tools employed in Ghana’s IWRM is social mechanisms. This includes: (i) training of the younger generation i.e. organising seminars, ecotourism, role plays on water issues for school children; (ii) involving water users and other stakeholders in water resources management; (iii) training water users and other stakeholders; (iv) public participation; (v) partnership of governmental and community-based organisations; (vi) establishing good relations between stakeholders and water management organisations; (vii) use of traditions and public experience;
(viii) social mobilisation; and (x) guarantees of water supply to the poor. These contributed to building higher human capital as well as social capital to facilitate the efficient management of water resources within the basin.

6.7 Implications for Water Resource Management

CWSA is the government agency for rural water provision. They are therefore in the position of using the minutes from the NGO forum’s meetings to link them up with the assembly. They also fund the NGO forum meetings to enable them to share information on the water and sanitation situation at the basin. The NGO forum used to send a quarterly report to the CWSA and the assembly (see 6.4). That led to, a large extent, the effective coordination of water management issues in the basin. However, this was short-lived. The information sharing component is no longer functioning because CWSA is no longer funding those activities—the CWSA had a donor funded project that fitted into this arrangement. The donor fund is no longer available and the WVBB has not been able to provide the necessary funding to support this initiative. This has affected the CWSA’s ability to support the forum. In addition the CWSA also organises some workshops to build the capacities of the forum members.

The implication is that each NGO is now reverting to the old practice of doing things in isolation unless the WVBB finds a solution to it. The present approach adopted by the WVBB in finding a solution to this development is to give the Forum a representation on the White Volta Basin Board so that their activities are monitored by the WRC. This has helped the members to appreciate the fact that they are working towards the same goal but because each NGO has its own core activities, at times what they decide on does not feed into their activities if that is not considered a priority by the NGO in question. Again, the members that attend the quarterly meetings may not be in management positions in the respective NGOs and therefore are not able to influence management decisions with what is discussed at the Forum meetings.

The concept of coordinating the activities of the stakeholders and making sure that they work towards the same goal to avoid duplication and promote efficient use of scarce resources in developing and managing water resources is still evolving and it is bound to face some problems. Some of these problems identified by the leadership of the NGO forum include:

- The problem of registering the body, the NGO forum, in order to access common funding for collective programmes. “It once happened that there were some funds to access for our activities and the organisation wanted a common bank account to pay it into since that was the only way to access the fund. It was very difficult achieving this.”

- WATSANs are made responsible for the management of the facilities provided by NGOs but it seems there are no incentives for the WATSANs to excel in this. In most communities nobody pays for the management of the water system. They have therefore become facility provider-dependent.

The discussions from the preceding sections indicate that there are many stakeholders involved in the planning, use and management of water resources in the White Volta Basin. They belong to different sectors: (public, private, third sector) and act at different levels – from household and community level to the regional, national and international level. Hence, they have different rights and responsibilities regarding water resources management. These present challenges to the WVBB for stakeholder coordination for integrated water resources management in the White Volta Basin.

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33 Personal conversation with the secretary, NGO forum, 2008
6.8 Implications for the White Volta Basin Office

The White Volta Basin Office is the legal regional representative of the Water Resources Commission. This is the organisation in charge of coordinating the development and management of water resources at the basin level. At the national level, WRC has been established as a coordinating mechanism for joint decision-making among the different line Ministries and agencies concerned with water resources management, with the participation of a representative of the traditional authorities, a women’s representative and an NGO representative (see chapter 5). The WRC entitles each member to a vote (and the majority rule applies) in exercising its functions as a joint decision-making body (Water Resources Commission Act 522).

The White Volta Basin Board represents the governance structure of delegated management at the regional level. The board largely mirrors the composition of the WRC, thus representing a coordination mechanism between government agencies with the participation of a representative of the traditional authorities, civil society and women. The Board also adopt a joint decision-making rule but the law stipulates that the final authority rests with the WRC at the national level, a clear example of the hierarchical type of coordination.

As the above analysis shows, the government sector agencies represented at the WRC at the national level are not the only actors involved in water resources management in the White Volta Basin. The question that arises then is to what extent and how should coordination mechanisms be established with the other actors? As indicated in 6.2.5 different forms of coordination can be pursued. Since the Board has decision-making functions, the decision as to whether participation in decision-making is considered to be appropriate and legitimate, or whether other forms of coordination – such as consultation, are considered to be appropriate or not rests with the WRC. This is the case because the WRC is the organisation that delegates its authority to the White Volta Basin Board. What are some of the considerations that may be useful in informing this decision? The following ideas may be useful.

The WRC, and hence, the White Volta Basin Board have the mandate both for planning and regulation. To date the planning for the infrastructure related to water resources management has been carried out by the District Assemblies in collaboration with the respective sector agencies (e.g. CWSA, MOFA). The WVBB may have to employ tools that enhance information flow among these public sector stakeholders.

The current planning and budgeting system at the District level involves different actors (District Administration, General Assembly, Sector Agencies, stakeholders to be consulted). Coupled with this is the fact that funding for water resources development comes from a variety of sources (District Assembly Common Fund, internally generated funds of the Districts, funds from international donor agencies and from NGOs). The planning is further influenced by the fact that water resources development (both regarding drinking water and agricultural use) has a high political priority in the region. Hence, developing procedures for the planning of water resources development and conservation by the White Volta Basin Board with the planning procedures of the District Assemblies presents a great challenge.

To address this challenge the WVBB gave representation of all Districts on the White Volta Basin Board but the other challenge that confronts it now is whether the executive branch (elected or appointed members of the Assembly) or the legislative branch (members of the District Administration) should represent the Districts. In my opinion the the members of the District Administration should because they, relatively, spend longer period with the assemblies than the elected members. The elected members are voted out at the end of a 4-year term and they leave with their rich experiences.
The WRC at the national level does not include a representative of the private sector. The private sector companies, however, play an important role in water resources development in the region, because they are contracted for the provision of infrastructure. They are also contracted for community capacity building as far as drinking water supply is concerned. Private sector companies do not represent public interests. In this regard they are at variance with public sector agencies and NGOs. It may therefore not be appropriate to have them participate in decision-making processes. The coordination mechanism here comprises consulting private sector enterprises in the form of public hearings.

Considering the specific characteristics of the region, it becomes imperative to coordinate with sector agencies that are not included in the WRC at the national level. These include MOFA (taking into consideration its role in promoting irrigated agriculture), the Ministry of Fishery (in respect of its role in promoting fisheries development), the Health Service (considering the incidence of water-related diseases in the region), and the Minerals Commission (taking cognisance of the pollution problems created by small scale illegal mining at the basin). In as much as consultation meetings with these agencies is considered an option, the extent to which they can contribute to the overall planning of water resources development (both in terms of expertise and capacity) is crucial.

The interests of women can be catered for by inviting a representative of women’s groups to the WVBB, following the pattern of the WRC at the national level. The women’s affairs desk at the Regional Coordinating Council might be a useful contact to help in the identification of a procedure by which this representation can best be achieved. A representative of the traditional authorities is dealt with at the Regional House of Chiefs but this has complicating implications in the Upper East Region in particular where the tindanas, instead of the chiefs, are in charge of land and its associated natural resources. The WVBB needs to be tactful in this area since the Central government gives official recognition to the chiefs only.

A major challenge for the White Volta Board is the coordination with the water users because of large numbers involved. With regard to domestic water, every resident of the region is a water user. Even for agricultural water use, the number is generally very large, especially those interested in getting access to irrigation water. It therefore becomes impossible for the Board to achieve direct participation of water users in some aspects of the decision-making process. At present the representation of the District Assemblies on the Board is considered as the representatives of the water users. But how representative are these? The possibility of organising the WUAs and WATSAN committees at the regional or basin level may have to be explored for better representation. However, this may require continuous funding and support from the WRC or the Board. Such an investment is worth it in order to be able to bring the experience as well as the views and interests of the water users to bear on water resources planning and management in the White Volta Basin. It may be useful to hold community meetings for communities that do not have irrigation infrastructure or bore holes, but have interest in getting access to this infrastructure.

The best platform for coordination with the NGOs may be the “NGO forum model”. The WVBB therefore has to approach the organisation of the forum seriously so as to have an NGO representation on the Board as a member. It becomes important for the Basin Office to organise a meeting with all NGOs involved in water resources development in the area, and promote the effective running of this umbrella organisation of the NGOs. This will enhance information flows between the Board and the NGO community so that they do not rely on informal channels.
6.9 IWRM Processes at the Basin

The issues that necessitated the adoption of the IWRM principles are many. “We recognise rapid population growth, poor planning schemes, outmoded technologies and practices for managing waste, inappropriate land use, inappropriate fishing methods and fragmented and overlapping institutional functions. We also realise that there is little understanding of the relationship between water resources management and the overall development of the community. There is inadequate physiographic data, inadequate socio-economic data and inadequate knowledge about traditional practices in water resources management. All these bring into focus the idea of applying the principles of IWRM so that in utilizing water resources for our development purposes certain sectors do not suffer unnecessarily”.34

The goals of IWRM in the basin include Poverty alleviation, food security and how to achieve the MDGs. The process is influenced by 4 considerations of the programme:

1. Effective organisational collaboration (Assemblies, Data collection and Research bodies, NGOs and Civil Society);
2. Carry out a Water Audit;
3. Facilitate research on the following (traditional systems of managing water resources; socioeconomic issues in the basin; agricultural and other related issues; gender issues); and
4. Enforcement of buffer zone regulations.

The IWRM process in the basin started with the creation of the WVBB and a secretariat. Then followed the sensitisation of the stakeholders; brainstorming on water use problems and possible solutions; stakeholder workshops; putting together of a comprehensive plan for the basin management, and implementation of the plan. The WVBB was established as the local unit to make the WRC operational at the basin level. Before its establishment, a stakeholder workshop was held in 2002 at Bolgatanga. It was in July 2004 that the WRC Regional Office was opened in Bolgatanga. In September 2005, there was a joint WRC/GLOWA/IFPRI stakeholder workshop and nomination of members to the Board was done.

In 2006, a draft operational guideline was approved by the Commission. This development was made possible because of the national WRC management policy of using the river basin as the unit in applying IWRM principles in the management of Ghana’s water resources. The problem areas were then identified for the putting together of the various plans in the diverse areas to address those issues.

The Board is organised around 4 sub-committees on programmes and budget; Land Use, Research, Education and Public Awareness; on the Environment and on Transboundary issues. The composition of the various subcommittees, gives indication of the key players. These committees are not adequately resourced to carry out their entire mandate. Information gaps that exist make it important for research organisations to be actively involved in providing information for decision making. SARI is the organisation that is working closely with the WVBB. SARI hosts the GLOWA Volta Project which undertakes research into water related issues, land, climate change, water availability etc for decision support system in the whole of Volta Basin. International Food Policy Research Institute, IFPRI is also involved in research in socio-economic aspects of water resource within the White Volta. IFPRI supports the challenge programme on water governance and modelling. They also evaluate the performance of dams for irrigation purposes in the basin.

6.10 Inferences

The information and analysis in this chapter leads to the following conclusions: First, at regional level there are a large number of government organisations, non-governmental organisations, research organisations, an irrigation company, water user associations, traditional authorities, and an international organisation involved in IWRM in Ghana.

Second, although these organisations and policies exist, some of these exist in form but not in fact. There is a gap between the mandate and the tasks and the actual execution by these organisations. The basin board, together with its subcommittees do not have adequate resources and are not in readiness to execute all their functions as required by their mandate though it has succeeded in at least bringing the various organisational heads to a common table for consultation on how to work in a coordinated manner. Some of the government organisations also do not have the required personnel for effective performance.

Third, there are very strong vertical links with organisations from the local to the basin level and finally to the national. This is because the links with the national are more of the hierarchical type of coordination with its associated power relationships. And these have a political and legal basis since the organisations involved are in the public sector. On the other hand no formal linkages exist at the basin level among these organisations/agencies. At the local level they typically rely on cooperative types of coordination mechanisms. The horizontal linkages are weak because each line department concerns itself with its own activities and nothing more. This has not performed well in harmonizing decisions that are taken independently by different stakeholders.

Fourth, the changes in some of the basin organisations have resulted from the decentralisation and devolution of decision-making to the lower administrative levels. This shift has put more responsibility at the local levels. The major problem with the DAs is how to coordinate effectively the diverse sub-sectors and the NGOs at the local level due to limited capacity, funds and the enormity of the great numbers involved

Fifth, the change in the DAs and the formation of the WATSANs are explained as institutional changes endogenous to the economic process of decentralisation of development planning. The decentralisation policy to economic development necessitated changes in the management of water resources by forming the WATSANs to support management at the local level. The structure as well as the operations of the DA had to change to meet the demands of local management of the resources. This was to make possible coordination aimed at both operational linkages and organisational linkages

Sixth, the process of IWRM in the basin has been focused on sensitisation of the stakeholders, brainstorming on water use problems and possible solutions, stakeholder workshops, putting together of a comprehensive plan for the basin management, and implementation of the plan. How well these arrangements have worked in potable water provision as well as water for livelihoods are examined in the next two chapters.

Seventh, as resources are limited, much of the funding comes from external agencies and foreign NGOs. Where external agencies stop funding, processes often come to a halt; while foreign NGOs do not feel obliged to coordinate with national policy-making bodies as they have their own agendas and mandates.

Finally, the chapter makes a number of recommendations regarding how the White Volta Basin can improve its functioning.
7. IWRM and Basic Needs: Potable Water Supply in the White Volta Basin

7.1 Introduction

The IWRM concept implies that the application of its philosophy meant the involvement of all actors (individuals, companies, organisations and governments) in all sectors (irrigation, domestic water supply, industry) at all scales (local, provincial, national and even transboundary) (see Merrey et al., 2005). This implies that each issue is addressed at the appropriate level and by the stakeholders most appropriate and able to do so. The previous chapter demonstrates how this is achieved in the basin context in general. The present chapter focuses on how this is achieved in the delivery of potable water at the basin level to meet the basic needs of the people. The questions that are addressed include: What is the extent to which IWRM is implemented/applied within potable water supply? How do the interactions among the institutions that are involved with the provision of potable water play out to ensure water accessibility for all?

Improving water services and uses is essential for enhancing hygiene and sanitation service levels that affect the productive lives of people, enhance enrolment and retention of girls in school and enhance women’s dignity and ability to participate in development (WWAP, 2003; WWDR, 2009). The World Health Organization estimates show that every $1 invested in improved water supply and sanitation yields gains of $4-$12, depending on the type of intervention (Prüss-Üstün et al., 2008).

7.2 Reforms for IWRM Implementation in Potable Water Delivery

Only 41.6% of Ghanaians have access to pipe-borne water, and 81% of the rural population in Ghana has no access to potable water (GPRS, 2003). Even in urban and peri-urban areas, the situation is no better. Table 7.1 shows the drinking water sources for Ghanaians.

Table 7.1: Source of drinking water in Ghana

<table>
<thead>
<tr>
<th>Source of drinking water</th>
<th>Ghana</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe-borne</td>
<td>41.6</td>
<td>80.3</td>
<td>18.8</td>
</tr>
<tr>
<td>Well</td>
<td>33.9</td>
<td>10.8</td>
<td>47.2</td>
</tr>
<tr>
<td>Natural sources</td>
<td>24.6</td>
<td>8.8</td>
<td>33.9</td>
</tr>
</tbody>
</table>


This implies that poor access and reliance on other unhygienic and less reliable sources, including shallow wells, harvested rain and streams/rivers (referred to as natural sources) may increase the risk of health problems (e.g. high incidence of guinea worm infestation in rural communities). With the adoption of the IWRM philosophy, the government has embarked on water policy reforms to increase the coverage for potable water delivery but not as a priority over the other sectors. The reforms took different forms in the various sub-sectors.

7.2.1 Reforms in Rural Water Supply

Reforms in rural water supply in the early 1990s are aimed to increase water and sanitation services to the rural population. In 1998, a national policy was adopted which required that supply of water to rural communities be demand-driven (one of the tenets of IWRM) and community managed. In pursuance of this, an autonomous Community Water and Sanitation
Agency (CWSA) was established by an Act of Parliament\(^{35}\) (see 6.3.1.6). The objective of the Agency is to “facilitate the provision of safe water and related sanitation services in rural communities” (Act 564, Section 2). In order to achieve this objective the agency is to perform several functions including:

(i) Providing support to District Assemblies to enable them promote the sustainability of safe water supply and related sanitation services and to enable the assemblies encourage the active involvement of the communities, especially women, in the design, planning, construction and community management of projects related to safe water supply and related sanitation services. This fitted very well in the general decentralisation policy involving development;

(ii) Formulating strategies for the effective mobilisation of resources for the execution of safe water development;

(iii) Encouraging private sector participation in the provision of safe water supply;

(iv) Providing District Assemblies with technical assistance in the planning and execution of water development and sanitation projects in the districts;

(v) Prescribing standards and guidelines for safe water supply and provision of related sanitation services in rural communities and small towns and support the District Assemblies to ensure compliance by the suppliers of the services; and

(vi) Charging reasonable fees for the services provided (Act 564, section 2).

This reform process was informed by two related World Bank policies on decentralisation and unbundling (Amengo-Etego and Grusky, 2005). Decentralisation (see 6.2.1.1) was meant to devolve certain fiscal, administrative and development responsibilities from the central government to district assemblies. Decentralisation set the stage for devolving the provision of water and sanitation services to the district level. Accompanying it, however, is the fiscal burden that it places on the impoverished rural communities. This is what has been termed downloading of service responsibilities to individuals, communities and nongovernmental organisations (McDonald and Ruiters, 2005) and has been represented in the neoliberal literature as “active citizenship” and “community empowerment” (Wolch and Dear, 1989).

The unbundling involves the separation of a profitable and an unprofitable sector of the production of a good or a service (in this case the provision of potable water). The unbundling process in Ghana had two dimensions (World Bank, 1998): the separation of the profitable urban water sector from the unprofitable rural water sector and the removal of the unprofitable rural sewage services from the water company’s jurisdiction. The result was the dissolution of the Ghana Water and Sewage Corporation (GWSC) which was responsible for the provision, distribution and conservation of both the rural and urban water supply. Two new organisations - Ghana Water Company Ltd. (GWCL) and Community Water and Sanitation Agency (CWSA) - were thus created in 1998.

The Government’s desire to work in line with the UN General Assembly Declaration of the International Drinking Water and Sanitation decade was translated in the CWSA’s goal of facilitating the implementation of the National Community and Sanitation Programme using the decentralised structures at the district and community levels (see Fig. 6.1). Both reforms demonstrate the desire to conform to the order in the global world and not necessarily the desire to accomplish a felt need in society.

\(^{35}\) Community Water and Sanitation Agency Act, Act 564 of 1998.
7.2.2 Reforms in Urban Water Supply

The reforms were not limited only to rural water supply. In the urban water sector the reforms included a Water Sector Rehabilitation Project that started around 1995 followed by further reforms intended to create conditions (through legal, commercial and regulatory interventions), to facilitate a favourable environment for increased private sector participation. The underlying philosophy was that strengthening domestic legal and regulatory structures will provide the mechanism to ensure that privatisation meets social equity goals. However, the argument that privatisation leads to equity has been contested (McDonald and Ruiters, 2005; see 2.6.2).

The reforms intended to improve efficiency in the development and management of the water supply infrastructure and attract more capital investment. This has not happened yet. Despite external assistance, GWCL continued to suffer from enormous financial, managerial and technical problems. The gap between supply and demand widened. As demand for potable water in the urban centres rose, the supply systems deteriorated. This led to the search for efficiency: two options for public-private partnerships (PPP) were developed and contested over a period of 10 years.

Private companies were invited to take over the GWCL by a lease contract but massive anti-privatisation campaign caused a comprehensive revision of the policy and the modification of the PPP programme from lease to a short-term management contract in 2004. This process was to be supported by external donor agencies substantially upgrading the water supply infrastructure but that never happened. The process has ended up in the transfer of the management of urban water supply to a multinational company, Aqua Vitos Rand Limited (AVRL).

The management contract empowers AVRL to manage the water but GWCL maintains ownership of the equipment and systems. This arrangement has faced public resistance with Ghanaian civil society, including women’s groups, religious organisations, trade unions, public health workers, and environmental organisations, openly opposing it. Their concern is that universal access to clean and affordable water is going to be a mirage under such an arrangement because the multinational companies are interested more in the profits made by charging “economic prices” for water services. The inability of the urban poor to pay such charges meant their exclusion from the use of potable water.

As part of the reforms, the mandate to regulate urban water and other services was shifted in 1997 from the government to an independent Public Utilities Regulatory Commission (PURC). The PURC has the mandate of setting utility rates, protecting the interests of consumers, monitoring services, promoting fair competition and working towards full cost recovery and, hence, bringing about efficiency in water allocation/distribution, an IWRM principle.

These reforms were greatly influenced by the IMF and the World Bank. Their loan agreements in the urban water reforms emphasised full cost recovery and expansion of private sector participation in urban water provision e.g. divesting urban water systems to private sector operators. These conditionalities are seen as interference in the regulatory affairs of the PURC.

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7.2.3 The Environmental Sector

In the environmental sector, the reforms targeted the protection of water bodies and the general environment. These reforms were rooted in the Environmental Action Plan (1985) and the Environmental Protection Agency (EPA) Act, (1994). Among other things the EPA is supposed to prescribe standards and guidelines relating to pollution of air, water, land and other forms of environmental pollution including the discharge of wastes and control of toxic substances (Act 490 section 2, sub-section h). In 1999, the EPA developed an Environmental Impact Assessment procedure that must be followed for approval of all development projects in the country based on LI 1652 Environmental Assessment Regulation. The EPA has the mandate to protect what has been classified as environmentally sensitive areas (Schedule 5, Regulation 30(2)). These include water bodies characterised by the following conditions: (i) water tapped for domestic purposes; (ii) water within the controlled and/or protected areas; and (iii) water which supports wildlife and fishing activities. It also became mandatory for the EPA to demand an Environmental Impact Assessment (EIA) report on the construction of dams, impounding reservoirs and groundwater development for industrial, agricultural or urban water supply.

7.3 Institutional Arrangements for Rural/Community Water Delivery

A sector or an agency can manage its programmes properly if appropriate consideration is given to all institutional arrangements in the planning, implementation and operation and maintenance phases (Alaerts, 1997). The right of the citizens to access domestic water is critical in the face of growing competition from other uses and sectors of the economy e.g. water for agricultural purposes. Water resources are scarce and have associated costs; therefore their use must be efficient and appropriate. Again water is an environmental resource with profound impacts on economic activity, environmental quality and on public health calling for a well-balanced arrangement of dynamic organisations and related institutions to ensure a sustainable way of delivering potable water in the right quantity and quality to the various water users.

7.3.1 Organisational Structure and Linkages for Community Water Delivery

An Act of Parliament has mandated CWSA to be responsible for rural water supply. The operational structure of CWSA (see Fig 7.1) shows how it functions at the local level. The Regional CWSA hosts the Regional Water and Sanitation Team (RWST) which liaises with the Regional Coordinating Council (RCC). Under the RWST are the District Water and Sanitation Teams (DWST) located at each district assembly office. These are the full time workers of the District Assemblies but do not have direct correspondence with the CWSA. They communicate through the planning officer of the District Assembly who is the desk officer for Water and Sanitation in the district.

In most districts, the composition of the DWST is made up of members drawn from the Community Development Department, Public Works Department and Environmental Health and Sanitation unit. Others have a representation from NADMO (National Disaster Management Organisation) instead of the Public Works Department. The DWST is actually a loose arrangement of some frontline workers from different department whose allegiance to these line departments is stronger than to water issues in the district.

At the community level there are WATSANs and Water and Sanitation Development Boards (WSDB). The WATSANs manage the point source systems whilst the WSDBs manage piped systems. The WSDB report quarterly to the DWST and copies their reports to CWSA. The DWST then reports to the District assembly. Reports are not regular and because of that the DA and the CWSA do not have good update report of what goes on in the WSDB.
As a new measure to ensure that information flow is improved the Assemblies have decided not to work on the bills (bills for schools, health centres, the police, etc.) brought to them for processing for payment from their respective ministries to the Water Board if the assemblies do not receive reports from the Boards. The Assembly works on the government agency/organisations bills so that payment to the Board is carried out. The amount of bills that pass through the Assembly is of great importance to the Board (in terms of the quantum of money involved). Without it the operations of the Board is negatively affected. This serves as incentive in sending timely reports.
On a quarterly basis the CWSA also gets reports from the DAs. This often happens when there is an on-going project but once the project is completed, no reports are received from the WSDB and hence the DWST. The DWST has an advisory role to the WSDB and the WATSANs. The water facilities provisions are facilitated by CWSA and the management is left with the WSDB and WATSANs. These arrangements are to be understood within the context that the CWSA is under the Ministry of Water Resources, Works and Housing but that ministry does not exist as an entity at the Regional or district levels. It has to operate through the Ministry of Local Government and Rural Development at these levels.

The WSDBs are responsible for the daily distribution of fresh water, managing the tariffs that are set, ensuring that there is good water quality by testing the water quality at least once a year. The WSDBs, however, do not have the capacity/capabilities for ensuring water quality. When reports are made to the RWST as far as water quality matters are concerned, the RWST directs or/and links the WSDB to contract GWCL to do the analysis and remedy the situation at a cost to the WSDB. This collaboration has been working well but often the WSDBs are not able to raise enough funds for such exercises. The other option is for the WSDBs to ignore the quality test function, which affects the quality of water supplied with its associated health implications. The interviews show that this is what often happens (Interview, 2008: 6,16,18,27, 28, 82, 83, 84, 98, and 124). The present arrangement has the potential of compromising the quality of water supplied to communities. The WSDB also acts like a board of a company. They employ the operations and management (O&M) staff who then directly manage the water systems.

The structure (Figure 7.1) does not facilitate regular and efficient information flow from the WSDBs to the DWST and the DAs and the CWSA do not have updated reports of what goes on in the WSDB. Then again because the DWSTs are not directly under the CWSA, the CWSA do not provide logistics for water management. The CWSA channels the available funds through the District Assembly. This shows that the link between the RWST and the Water Boards is very weak. Once the funds are in the Assembly’s coffers it will only be released for water management purposes if the Assembly considers the request from a board or a community as a top priority, else other demands may be met before attending to that of the boards or the community.

Furthermore, the DAs do not see water delivery/management as one of their core functions. They view it as an area reserved for NGOs, the central government and the donor community. Due to this even money meant for water provision and management are used for different projects. For example, since 2004 the IDA and World Bank released various sums of money to the District Assemblies based on the RWST budget for water delivery system (see Table 7.2) but in 2008 (i.e. four years after) at the time of collecting data the Assemblies had diverted these amounts from water to other purposes they considered as of greater importance (interview, 2008: 124, 46, 6).

<table>
<thead>
<tr>
<th>District</th>
<th>Garu-</th>
<th>Bawku</th>
<th>Bolgatanga-</th>
<th>Bawku-</th>
<th>Talensi-</th>
<th>Bongo</th>
<th>Kassena-</th>
<th>Bulisa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tempane</td>
<td>Municipal</td>
<td>Municipal</td>
<td>West</td>
<td>Nabdham</td>
<td></td>
<td>Nankana</td>
<td></td>
</tr>
<tr>
<td>Amount Received (US$)</td>
<td>65,312.50</td>
<td>69,062.50</td>
<td>62,640.58</td>
<td>64,535.42</td>
<td>65823.50</td>
<td>67,016.83</td>
<td>129,383.50</td>
<td>125,398.50</td>
</tr>
</tbody>
</table>

Source: CWSA, Bolgatanga office, 2008

The DAs are able to withdraw such monies for other purposes because the signatories to their accounts are the district coordinating director and the finance officer with approval from the District Chief Executive. Through the present arrangement, the CWSA cannot control or sanction
the Assemblies though the RWST prepares water provision plans for the Assemblies and seeks funds for their implementation. Once the monies are paid into the Assemblies’ fund, the CWSA loses control. The CWSA operates at this level only through persuasion. The desk officer responsible for water issues at the Regional Coordinating Council coordinates many development issues and water is only one of the issues. The inability to spend on water facilities is a result of the existing arrangements which do not give the CWSA any mandate in monitoring the activities of the DAs as far as water provision and management is concerned.

The present arrangement also does not promote the consistent and regular support needed from the Assembly. The Assembly provides ad hoc financial support in times of crisis. That means that there is no O&M (operations and maintenance) budget support to the WSDBs. Consequently, funding has continued to be one of the major problems of the Boards in water management.

7.3.2 Management Processes and Principles

The management of water at the community levels incorporates the IWRM philosophy and principles: e.g. the devolution of authority to the local level, the principle of community ownership and a demand-driven community-based approach towards the provision of infrastructure. Normally it is the community that makes a request for a water facility. But the DWST can also plan for the water facilities to be provided in the district, sensitize the community and educate them on sanitation and health issues. The team also processes applications from the various communities (making request for water facilities) to the Assembly for onward submission to the deputy regional coordinating director’s office for approval.

The District Assemblies have the authority for development planning at the local level. The decisions on the investment for the infrastructure required for drinking water supply (bore holes) therefore have to be part of the District Development Plans. This requires a close coordination with the line agency in charge (Community Water and Sanitation Agency), and with the funding organisations, which include international donors as well as NGOs.

The DAs are the spending authority, though the CWSA is responsible for approving the technical aspects of the facility. However, because the provision of boreholes is very expensive, the contract sum is often more than what the Assemblies are mandated to approve of. As a result it is the RCC that signs contracts on behalf of the DAs for the provision of boreholes. DWST monitors the activities of the water Boards and WATSANs within the district after the facility is provided. They then report to the schedule officer and the deputy coordinating director. The Assembly then takes up the matter with the CWSA.

7.3.2.1 Single Point Systems

Single point systems are deep wells which are often lined with cement walls and covered to reduce pollution and contamination, or boreholes with cemented walls and fitted with hand pumps. These serve smaller communities and are managed by the WATSAN Committees. The WATSAN consists of selected members of the beneficiary community of one borehole. The community requesting a borehole is required to contribute 5% of the capital cost of the facility. The payment of this initial capital cost has not been well received by the communities because they consider it to be too expensive (interviews, 2008: 6, 19, 18, 80, 82, 81, 83, 84, 132). The implication of this arrangement is that poorer communities are denied access to potable water. What this means is that in trying to pursue the IWRM principle of community ownership of water facilities and management to ensure sustainability, the issue of equity is compromised.

The WATSAN Committees organise the community in the process of acquiring a borehole and are responsible for maintenance of the infrastructure. Hence the WATSAN Committees collect regular maintenance fees from the water users. They also organise collective cleaning of the
surroundings of the borehole and are equipped to do minor repairs of the infrastructure. Maintenance requirements that are beyond the capacities of the WATSAN Committee members are reported to the Water and Sanitation Teams of the District Assemblies (interviews, 2008: 97, 98, 131, 84).

Other typical rural communities operate through informal arrangements. Before the provision of the facility, initial contributions are made on either a per household basis or per individual basis. These contributions are put in a bank account or invested for the future maintenance of the system. There are some communities which invest their monies in animal rearing (goats or sheep). The problem and experience of such communities is when there is an outbreak of disease in the animals the community tends to lose its investment. In case there is a household or an individual who fails to pay his/her contribution a panel is established to investigate why the non-payment (interviews, 2008: 127, 133, 74, 75).

If it is realised that it is because of real poverty or ill health the community members overlook it and allows them to benefit from the use of the water facility because of strong social ties among them. In some cases family relations offer to pay on behalf of such people. Apart from these initial contributions, there is no obligation to pay for water as they fetch water. Water then becomes ‘free’ for every member of the community. If an individual is found to be a free rider he gets summoned to the unit committee member or to the village chief and elders for sanctions to be applied. He could be banned from using the facility (but this is seldom applied) or made to do some community work e.g. cleaning around the facility for a number of days (interviews, 2008: 127, 133, 74, 75).

If an individual is found to be a free rider he gets summoned to the unit committee member or to the village chief and elders for sanctions to be applied. He could be banned from using the facility (but this is seldom applied) or made to do some community work e.g. cleaning around the facility for a number of days (interviews, 2008: 127, 133, 74, 75).

In the case of the hand dug wells, there are apparently no formal organisations or committees for their management at the community level. Although many of the hand dug wells in the communities within the basin are privately owned and maintained, they are accessible to the entire community. There are no formal arrangements for their maintenance and there are no fees or levies collected. In most communities the initial cost of providing the facility is provided by NGOs (interviews, 2008: 37, 4, 5, 34, 6, 119, 127, 131, 133).

7.3.2.2 Small Town Pipe System

In the case of small town pipe systems, the Water and Sanitation Development Board (WSDB) is in charge of the management and for the promotion of good sanitation and hygiene in the area or community within its jurisdiction. Figure 7.2 below shows how the WSDB functions.

The Board manages the supply of potable water for various categories of users. These are Pito brewers (local brewery), clinics, ‘chop bar’ operators (local restaurants), and the general citizens for home consumption. Other establishments served by the water systems are the District Assemblies, Ministry of Health, MOFA, Ghana Education Service, Senior High Schools, Fire Service, Ghana Police and CEPS.
The Board members are representatives from sections or zones of the community. In such communities the town is divided into sections (zones). Each zone elects its own representative facilitated by the DWST. One member from the District Assembly, a person from the DWST, a representative from women’s organisations, a person each from the various water user associations including the house owners (landlords) come together to form the Board. The Board is composed of 10 to 15 members; the total number of members is determined by the Assembly depending on the number of constituencies/zones that exist in the Board area.
The bye-laws state that at least 1/3 of the representatives are to be women. In the study communities, this provision is not fulfilled; in some cases only one or two women representatives. This is because the local women are not politically inclined to take up public assignments; and in some cases husbands are not willing to let their wives take up such positions (interviews, 2008: 19, 29, 31, 51, 52, 61, 69, 80). This is aggravated by the cultural practice where women forbear to speak out in a public meeting with men. Though this practice is gradually changing there is need for education and lobbying to let it really take root in the communities surveyed. It must, however, be noted that the current situation puts a limit on the participation of women who happen to be one of the key water users from decision making in its management.

The Board elects one of its members as the Board chairman and one as treasurer. The Secretary’s position is reserved for the Assembly’s representative (as many members may be illiterate). The Assembly’s representative being the secretary may pose a serious constraint if more piped systems are developed within a district. This is because the Assembly will need to have more staff representing it at the different boards. As of 2010 there are a maximum of only two piped systems in an Assembly (interviews, 2008: 6, 55).

The Board members have a 4-year term in office. Notwithstanding, the DWST can change the elected Board members if a community makes a complaint of non-performance or any malfeasance against them. In such cases the communities are notified to elect new representatives for a reconstitution of the board. Individual member may also be changed or replaced before the term of office ends (interviews, 2008: 6, 27, 37, 80, 82, 83, 84).

The Board has the mandate to make appropriate plans for the management of the water system either by hiring staff to manage the system or by contracting a private operator to manage the system for a fee. At the White Volta basin the Boards employ and supervise the operations and maintenance (O&M) staff to manage the few piped systems available. The head of the O&M staff is the technical manager (systems manager). The employment process of the O&M staff starts with an advertisement of the various positions within the locality. People apply and they are invited for interviews and the successful ones are employed.

There are difficulties in keeping qualified staff because the Boards are not able to pay good salaries or provide social security contributions or retirement benefits (interviews, 2008: 80, 82, 83, 84, 28, 27). Hence, they are not able to attract qualified staff. The qualifications of present staff are in the categories of MSLC (Middle School Leaving Certificate), JSS (Junior Secondary School Certificate), SSCE (Senior Secondary Certificate) and RSA III (Royal Society of Arts). By the required standard these are below what is expected for efficiency except for those with RSA III.

The Board receives reports from the O&M staff through the technical manager. The Board then reports on its activities on a quarterly basis to the Assembly and copies it to the regional CWSA and the Association of Water Boards in the Region. In the management of the systems the representatives from the various zones meet their constituents separately on issues relating to water supply and bring feed back to the Board at their meetings. The Board meets quarterly and then organises a community meeting annually. At the annual General Community Meetings the chairman gives his report to the community (see appendix 4 for a copy of such reports).

The report highlights achievements, failures/challenges and the way forward. The financial statement of the operations of the systems is also presented and time is allowed for questions, clarifications and discussions. Views from the general public are collected and these become input into the operating document for the subsequent year. These processes allow for accountability and transparency in the management of the resource. It also gives the community a
sense of ownership and empowers them to monitor the activities of the O&M staff as well as the Board (interviews, 2008: 12, 6, 80, 82, 83, 84, 28, 27).

The public stand pipes are taken care of by vendors (from the community) who are engaged by the Board. These vendors become responsible for the hygiene and sanitation of the stand pipes. These vendors are paid on commission basis - 10% of total sales made in every month. No fixed amount is paid to them. There is a metering exercise to help account properly for water sales made but in some instances there are no meters in place to ensure proper accountability and transparency.

7.3.3 Borehole/Well Provision

The major drinking water facilities used in the rural areas within the White Volta Basin of the Upper East Region are hand-dug wells and boreholes. Hand-dug wells are constructed by the communities themselves in areas where the water table is high. Some of the wells are lined and fitted with pumps. Other water sources are shallow wells (up to about 3 meters deep), which are dug in low lying areas of river banks in the dry season (interviews, 2008: 34, 37, 53, 80, 82, 83, 84). These are constructed without compliance to the EPA’s requirement of an environmental impact assessment.

Table 7.3 shows that the major infrastructure investment for drinking water is boreholes. Hand wells without fitted pumps are not presented in the Table. The estimated coverage though low (52.24%) compares favourably with the Millennium Development Goal of 78% by 2015 and that of the Ghana Poverty Reduction Strategy (GPRS) objective of 85% by 2015. The bore holes are drilled by machines and can be up to 50 meters in depth. Among the water sources in the rural communities, borehole water appears to be the safest. The drilling of boreholes has decreased the dependency on less secure water sources, such as wells, streams, ponds, dugouts and dams and the harvesting of rain water (interviews, 2008: 5, 6, 16, 18, 52, 69, 74, 84).

Providing access to safe drinking water for the entire population in the White Volta Basin requires a considerable expansion of bore holes. This is because records at the Regional office of the CWSA indicate that just a little above half of the population in the Upper East has access to safe drinking water (see Table 7.3). The increase in population has increased demand requiring expansion in the water systems to reach the goal of safe drinking water for the entire population.

Table 7.3 Availability of infrastructure for domestic water supply

<table>
<thead>
<tr>
<th>District</th>
<th>No. of Communities</th>
<th>Total Population</th>
<th>Boreholes (with pumps)</th>
<th>Hand dug wells (with hand pumps)</th>
<th>Pipe Systems</th>
<th>Population Served</th>
<th>% Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bawku Municipal</td>
<td>264</td>
<td>223,319</td>
<td>335</td>
<td>67</td>
<td>1</td>
<td>120,081</td>
<td>53.77%</td>
</tr>
<tr>
<td>Bawku West</td>
<td>305</td>
<td>184,423</td>
<td>337</td>
<td>87</td>
<td>2</td>
<td>79,618</td>
<td>43.17%</td>
</tr>
<tr>
<td>Bolgatanga Municipal</td>
<td>143</td>
<td>58,961</td>
<td>204</td>
<td>15</td>
<td>0</td>
<td>37,551</td>
<td>63.69%</td>
</tr>
<tr>
<td>Bongo</td>
<td>219</td>
<td>104,988</td>
<td>282</td>
<td>199</td>
<td>0</td>
<td>80,705</td>
<td>76.87%</td>
</tr>
<tr>
<td>Bulsa</td>
<td>265</td>
<td>95,940</td>
<td>264</td>
<td>37</td>
<td>2</td>
<td>55,607</td>
<td>57.96%</td>
</tr>
<tr>
<td>Garu-Tempane</td>
<td>258</td>
<td>153,261</td>
<td>264</td>
<td>19</td>
<td>0</td>
<td>57,920</td>
<td>37.79%</td>
</tr>
<tr>
<td>Kassena-Nankana</td>
<td>140</td>
<td>46,886</td>
<td>142</td>
<td>23</td>
<td>0</td>
<td>24,737</td>
<td>52.76%</td>
</tr>
<tr>
<td>Kassena-Nankana West</td>
<td>223</td>
<td>85,393</td>
<td>248</td>
<td>41</td>
<td>2</td>
<td>41,264</td>
<td>48.32%</td>
</tr>
<tr>
<td>Talensi-Nabdam</td>
<td>95</td>
<td>75,154</td>
<td>145</td>
<td>48</td>
<td>2</td>
<td>39,683</td>
<td>52.80%</td>
</tr>
<tr>
<td>Upper East Region (Total)</td>
<td>1912</td>
<td>1,028,325</td>
<td>2,221</td>
<td>536</td>
<td>9</td>
<td>537,166</td>
<td>52.24%</td>
</tr>
</tbody>
</table>

Source: CWSA (2008)
The community visits (interviews, 2008: 122, 125, 129, 72, 73, 62, 63) also reveal that the availability of drinking water is a serious problem during the dry season, even if boreholes have been provided. Many of the hand-dug wells dry up during the dry season. All the rural communities have experienced shortages of drinking water before. They reported that the boreholes were not sufficient, and that women and children had to walk long distances to get to water points. The time that women spend fetching water was described as being substantial to the point of affecting time for cooking and providing food and other household chores (interviews, 2008: 71, 72, 90, 92, 102, 103, 107, 118, 120, 126, 130, 133).

The World Bank is the core donor for rural drinking water provision through CWSA since 1998 during the implementation of the Community Water and Sanitation Project. The project aimed to:

- Implementing demand-responsive and sustainable water and sanitation services in rural communities and small towns;
- Strengthening the capacity of communities to manage such services;
- Strengthening district-level capacity to deliver community water and sanitation services, including the private sector and Non-Governmental Organizations (NGOs) to deliver goods and services and the capacity of District Assemblies to plan and provide support to communities; and
- Strengthening CWSA’s capacity to effectively play the role as facilitator in the implementation of the national-level community water and sanitation program” (World Bank, 2005, p. 32).

The information from the community surveys (interviews, 2008: 60, 132, 128, 123, 101, 91, 81, 103, 108, 120, 126, 130, 133) indicates that the community is familiar with the approach used by the CWSA to establish bore holes. The communities that have already received boreholes through this programme had contributed towards the capital cost (5% of the capital cost). This is supplemented by the District Assemblies who contribute an additional 5% of the capital cost. The applications for the boreholes are sent through their District Assemblies. In some cases, where the communities are not able to contribute the 5% capital cost, the District Assembly has to make provision for the difference to support the very poor communities.

But judging from the costs involved in a single borehole (14,000 Ghana cedis =US$10,000 per borehole), paying 10% by the Assemblies is a colossal sum that affects many other projects. Not all communities have benefited from the project. The explanation given by the Regional Director of CWSA points to the fact that there is a criterion for the prioritizing of communities in need of boreholes or wells. This includes the following:

- Current status of water availability;
- Prevalence of water borne diseases;
- Sanitation situation;
- Accessibility of water; and
- Population density (it is required that a borehole serves not less than 300 people, and not less than 150 for a well).

The stakeholder interviews (interviews, 2008: 6, 18, 19, 52, 60, 74, 75, 131, 97, 98, 92, 80, 82, 83, 84, 85, 132, 127) indicate that the management of the boreholes and pumps by the WATSAN committees and WSDB is functioning well, though there are isolated places with problems. The problems include conflicts and quarrels among women who go to fetch water, and non payment
of fees for maintenance of the system. Communities where there are no central water points rely on many hand-dug shallow wells and streams; these communities face health risks from poor water quality.

7.3.4 Regulation and Controls

Wells/boreholes must meet the environmental standards of the WRC. Before any drilling company is contracted to drill, it is a requirement to obtain a license from the WRC. The WRC also makes it mandatory for the drilling company to obtain a clearance from the EPA which ensures that environmental standards are met. There appear to be no serious problems with this arrangement.

As far as quality is concerned testing the water from boreholes is part of the standard procedure of the companies in charge of the drilling. In addition, NGOs providing boreholes collaborate with the EPA to test the water quality. EPA has also conducted a survey of the water quality of all major water systems in the Upper East (within the basin). Polluting activities (e.g. small scale mining activities near Tilli) close to drinking water resources constitute a problem for drinking water quality. The monitoring and control of these activities has been difficult for the EPA because the miners are ready to attack anyone whose activity they perceive to undermine their livelihoods. In addition, the EPA is under-staffed and therefore not able to effectively monitor such activities (interviews, 2008: 78, 69, 87, 116).

Private Service providers for water quality control and other maintenance work are lacking. Although private sector development is encouraged, in practice it is not really encountered. Even if they are found their service is of lower quality and yet at a higher cost than that of GWCL (interviews, 2008: 124, 55, 6, 9). The WSDB relies mostly on GWCL. However, they utilize the services of private service providers in other areas like plumbing works and mechanical repairs.

7.3.5 Pricing and Financing

The WSDB or the WATSAN proposes new tariffs at the annual general meeting which are subjected to debate and approval or review. The problem here is that the fees agreed upon are often not enough to maintain the system resulting in non-functioning systems some years after commissioning. But because of the access issues, such tariffs are accepted (interviews, 2008: 27, 28, 60). This has implications for the financial sustainability of the systems. The communities then tend to rely on the District Assemblies for financial assistance to maintain the systems (interviews, 2008: 80, 82, 83, 84, 124). This may not be forthcoming in time and therefore raises the question of continuous accessibility.

There exist different tariff structures for the different categories of customers. The tariffs in 2008 in Zebilla, for example, are as follows:

i. Domestic consumption - GH¢0.50 (US$0.36) per M³ of water;
ii. Commercial and government institutions - GH¢0.80 (US$0.57) per M³;
iii. Those that have home connections pay a flat rate of GH¢6.50 (US$4.64) per month (US$ 1 = GH¢1.40).

The Board had demanded GH¢1.00 for the first two categories but the meeting agreed on the above. The community members are very cooperative because of the transparent account presented at the end of the year and because they can cause a change in the Board. They have a sense of ownership. They feel their voices are heard (interviews, 2008: 102, 103, 104, 105, 108, 110, 125, 128, 121, 122). They are thus involved in decision making but that is not contributing positively towards achieving the full cost recovery principle associated with IWRM because they cannot afford to pay.
There is a serious payment problem with the government agencies/organisations (e.g. the Police, health posts/clinics, Ghana Education Service, etc.). Bills are piling up. The Board normally submits the bills to the government through the CWSA. Previously, the agencies/establishments were paying directly to the Board but because of some malpractices the government now pays through the CWSA. But the payment from government is often delayed. This arrangement affects the operation of the Board because it has to depend or rely on the domestic and commercial users for cash to continue in business. Public pipe stands give direct funds because direct sales are made at the stand pipe (instant payment before fetching). But there are lot of abuses in this arrangement and the Boards are planning to meter such systems to solve the problem where it exists (interviews, 2008: 80, 82, 83, 84, 124).

The maintenance fees were not considered to be too high or just too low by the households interviewed because of the poor people in the communities. However, there were instances where people defaulted in payment, but not for poverty reasons. Such people are excluded from using the boreholes. The right of these community members to water (Smets, 2000) is curtailed by this practice. Similarly those who have home connections and default in payment of tariff have their system disconnected but the Boards are not able to enforce the disconnection principle on the government agencies. This hampers their operations but the government claims that it is still a socially shared responsibility. The practice, if not checked, can militate against the sustainability of the systems. Nonetheless, there were no reports relating to infrastructure maintenance problems during the community visits.

The present arrangement poses a problem with the financial support that is received from the Assembly and the CWSA. It takes too long before a request is responded to. Analysis of the income and expenditure of the operations of the systems shows that the Water Boards are making profits but not enough to make replacements. The practice has been that the District Assembly will advance payment of such replacement to the Water Boards/WATSANs who are made to pay on an instalment basis from their monthly profits.

It is not very clear as to when and to what extent retraining will be needed to make the approach sustainable. This is against the backdrop that the attrition rate of O&M staff and the vendors is very high. In sum, the WSDB sets tariffs and application procedures, connection fees, maintains financial records and manage the water delivery facilities in small towns.

7.4 Institutional Arrangement for Urban Water Delivery

The Ghana Water Company Ltd. is responsible for urban water supply (see 6.5.2) and serves the drinking water needs of the urban settlements at the White Volta Basin in the Upper East Region. The services are very limited in the region. The settlements served are Bolgatanga, Bawku, Navrongo and Zuarungu. The water they distribute is either extracted from boreholes (as is the case of Bawku and Navrongo) or from one of the large-scale irrigation scheme in the Region - the Vea irrigation dam (as is the case of Bolgatanga, and Zuarungu). Water supply to GWCL for Bolgatanga Township for domestic consumption is about $3.1 \times 10^6$ m$^3$ per annum.

7.4.1 Organisational Structure and Linkages

Like all other sub-sectors or agencies the performance of GWCL is influenced by the organisational structure with its associated linkages. The structure of GWCL has changed since the takeover of management by AVRL pursuant to the implementation of the private sector participation concept in water delivery in urban water. GWCL is the asset holder of the urban water sector but AVRL manages the systems, equipment and human resources (interviews, 2008: 9, 93, 94). Figure 7.3 below presents the new structure for an easy understanding of their operations.
The development of a new organisational structure and establishment, according to management, (interviews, 2008: 9, 93, 94) came about as a result of a felt need to align the structure of the organisation towards a stronger customer (commercial) focus. This is influenced by the neoliberal argument that privatisation occurs because states fail and that the states fail because they are inefficient, unaccountable and inflexible (McDonald and Ruiters, 2005). Market forces are efficient in allocating resources for sustainable use. The idea of treating water as an ‘economic good’ also supports this line of argument.

GWCL/AVRL argues that the strength of the company has been its strong engineering background and hierarchical power structure. The re-organisation therefore was to build on the strengths and eliminate or minimize the weaknesses to meet the challenges of a modern customer focused business environment. The company treats water as a commodity to ensure efficiency in its management. The implication is that profit making becomes a driving force in water delivery. The re-organisation of the structure at the operating districts is still ongoing but is known to be headed by a Senior Supervisor who controls the activities of the company at the urban communities served within the district. The regional production manager heads the management at the regional level (within the basin). The organisational structure and management arrangements are such that monthly and quarterly reports and at times weekly reports are sent to the head office through the line of reporting shown in figure 7.3.

7.4.2 Operations/Coverage and Beneficiaries

The operations of GWCL/AVRL are limited to Bolgatanga, Navrongo, Bawku and Zuarungu. The sources of supply are the reservoir at Vea created by ICOUR and from ground water. Ideally, ground water is cheaper because, if it is available, the quality is better than raw/surface water. Surface water is relatively difficult to treat. However, there are few boreholes to meet the needs of the growing population in Bawku and Navrongo (interviews, 2008: 9, 10, 93, 94). The systems that supply Navrongo and Bawku are under-developed.

The demand is high but the investment is limited. Provision of more infrastructures is becoming a burden for government. The total investment required to get to the targeted coverage is indicated in Table 7.4. It is anticipated that the private sector can be the source for capital injection into the water sector. This explains why there has been the shift from public managed systems to public-private partnership concept in the management of the systems.

<table>
<thead>
<tr>
<th></th>
<th>1990 Access (%)</th>
<th>2004 Access (%)</th>
<th>2015 Target access %</th>
<th>Total investment Required (m$/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Water</td>
<td>37</td>
<td>52</td>
<td>85</td>
<td>46</td>
</tr>
<tr>
<td>Urban Water</td>
<td>85</td>
<td>61</td>
<td>85</td>
<td>81</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>56</td>
<td>85</td>
<td>125</td>
</tr>
</tbody>
</table>

Source: GoG, 2004; GoG, 2005
Figure 7.3: Aqua Vitens Rand Limited (new reporting lines)
During the dry season, the water level at the Vea dam goes down. However, under the national policy, in cases of scarcity, potable water supply takes precedence over agriculture (see Chapter 5). Therefore a continuous supply is maintained. This is akin to the concept of a drinking water reserve: that is an amount of water held in storage for domestic use (see Smet and van Wijk, 2002: 87). This amount (though not quantitatively determined) can be relied on completely for it is not allowed to be used for non-domestic purposes. Monitoring to help estimate when the limits of the reserve are being approached are said to be a crucial part of implementing community level IWRM (Smet and van Wijk, 2002).

Water is supplied for commercial purposes (i.e. for production in industries; for sachet water production; for bottled water production) and for domestic purposes (i.e. household use). Within the basin, demand management for the different uses is difficult. Those who need water for commercial purposes are mixed up with those who need it for domestic purposes due to the haphazard nature of the planning of the settlement. For purposes of billing and charging correct tariffs the GWCL tries to fish out those who use the water for commercial purposes from among the community. This is because different rates are applied for domestic and commercial users. Again it becomes difficult to ascertain how much water is being used for commercial purposes and how much is being used for domestic purposes.

Table 7.5 Monthly water productions by GWCL/AVRL in the Upper East Region

<table>
<thead>
<tr>
<th>Month</th>
<th>Raw water Production (m³), 2007</th>
<th>Treated Water Production (m³), 2007</th>
<th>Production (daily average m³/day), 2006</th>
<th>Production (daily average m³/day), 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>184,127</td>
<td>164,818</td>
<td>4,861</td>
<td>5,317</td>
</tr>
<tr>
<td>February</td>
<td>158,384</td>
<td>154,940</td>
<td>4,582</td>
<td>5,560</td>
</tr>
<tr>
<td>March</td>
<td>173,616</td>
<td>170,171</td>
<td>4,266</td>
<td>5,489</td>
</tr>
<tr>
<td>April</td>
<td>151,472</td>
<td>135,004</td>
<td>3,867</td>
<td>4,500</td>
</tr>
<tr>
<td>May</td>
<td>143,541</td>
<td>139,320</td>
<td>3,437</td>
<td>4,494</td>
</tr>
<tr>
<td>June</td>
<td>133,548</td>
<td>123,580</td>
<td>3,328</td>
<td>4,192</td>
</tr>
<tr>
<td>July</td>
<td>144,261</td>
<td>143,695</td>
<td>3,762</td>
<td>4,635</td>
</tr>
<tr>
<td>August</td>
<td>108,635</td>
<td>119,547</td>
<td>3,790</td>
<td>3,856</td>
</tr>
<tr>
<td>September</td>
<td>43,083</td>
<td>160,383</td>
<td>3,693</td>
<td>5,346</td>
</tr>
<tr>
<td>October</td>
<td>40,218</td>
<td>166,238</td>
<td>4,156</td>
<td>5,406</td>
</tr>
<tr>
<td>November</td>
<td>40,581</td>
<td>156,461</td>
<td>4,115</td>
<td>5,296</td>
</tr>
<tr>
<td>December</td>
<td>51,225</td>
<td>185,225</td>
<td>4,383</td>
<td>5,975</td>
</tr>
</tbody>
</table>

*Source: AVRL Regional Office, Bolgatanga, 2008*
The production and abstraction of water at the basin by the GWCL together with the quantities (volume) of water that are accounted for through billings are shown in Table 7.5. There are no records on service standard performance. Though the production levels in 2007 have gone up above that of 2006, the production trends remain the same. There has not been any expansion in the infrastructure for urban water provision.

7.4.3 Public-Private Partnership

Many organisations encourage developing countries to privatise water through some form of public–private partnership (PPP) or private sector participation (PSP) (Shiva, 2002). The alternative of a public sector water undertaking (PWU) is ignored, although public sector water undertakings are the providers of water and sanitation services for the great majority of the population in developed countries (Hall, 2001). Once this option is ignored, the implications are that the main competitor to any of the private companies is excluded. There are different options because of the problem of financing investment in water provision. In the Ghanaian situation the sources of funds applied are shown in Table 7.5.

<table>
<thead>
<tr>
<th>Sources of funds</th>
<th>Domestic (inside country)</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal resources</td>
<td>Surplus of undertaking</td>
<td>-</td>
</tr>
<tr>
<td>State</td>
<td>Government, national funds</td>
<td>Aid agencies</td>
</tr>
<tr>
<td>Bank Loans</td>
<td>Domestic Banks</td>
<td>International Banks</td>
</tr>
<tr>
<td>International Finance Institution</td>
<td>-</td>
<td>Development Banks e.g. the World Bank</td>
</tr>
</tbody>
</table>

Public sector water undertakings can raise funds to finance investment from the same range of sources as used by private companies. The simplest way of raising finance is by the water undertaking itself generating enough of a surplus to reinvest in its operation. This rarely happens in the Ghanaian situation.

Hall (2001) and Amenga-Etego and Grusky (2005) provide evidence to show that there are problems with PPPs, and also contend that the public sector can successfully operate PWUs in developing countries. According to Hall (2001) problems associated with privatised management of water systems through all forms of PPPs, whether concessions, leases, management contracts, or build-operate-transfer (BOTs) include:

- a lack of competition, with globally dominant multinational companies;
- higher prices, often caused by privatisations used to make debt reductions;
- difficulty in terminating unsatisfactory concessions;
- poor results from private management;
- private sector reluctance to extend water and sanitation access to the poor;
- multinationals use of water profits to subsidize other global investments; and
- difficulty in regulation, lack of transparency, secrecy and cases of corruption;

All these are experienced in the Ghanaian context except that some are more pronounced than others.
7.4.4 Regulatory Structures and Pricing of Urban Potable Water

As part of the general economic reforms (and, hence, reforms in the water sector) there was the increasing withdrawal of the public sector from the direct production of goods and services. The introduction of private involvement in the provision of services necessitated the setting up of an independent body to ensure fair competition, efficiency, quality of services and fair pricing (Aryeetey, 2001). Consequently, the Public Utilities Regulatory Commission (PURC) was established under the Public Regulatory Act (Act 538) in 1997 to regulate the provision of utility services in Ghana. The Commission was then mandated under Act 568 to enforce regulations concerning utilities (water and electricity). The operations of the Commission are guided by: The Public Utilities Regulation 1999 (which deals with the termination of service); LI 1651 (which sets out the circumstances under which utility services to consumers may be terminated); and Public Utilities Complaints Procedure Regulations 1999, LI 1665 (states the procedure to lodge a complaint with the commission).

The PURC is mandated to reduce or manage the risk associated with market failure, and achieve certain social objectives like the provision of services in remote areas (The Office of Water Regulation, 1999). A regulatory framework is needed for (a) the determination of access and quality improvements of utilities in general (Osei, 2003); (b) A well established regulatory framework gives incentives to investors to improve efficiency. Regulation is regarded as a part of the traditional role of government in which the setting of standards and rules to guide the operation of private business is carried out by public officials (Hood, 1994: 19). In another sense regulation can be used to mean governance and/or control (Minogue, 2001).

The PURC is directly involved in pricing of water and electricity services. The rules regulating its activities require that a proposal is filed at least 60 days prior to the effective date of a new tariff. Water billing rates are thus suggested by GWCL/AVRL but these are regulated and/or approved by PURC. The computations are based on the M³ volume of water consumed. The taps are metered and the readings are used to assess the amount an individual has to pay. There are others that are not metered. In such cases, consumers are given fixed rates. Bills are paid on a monthly basis. Payment is made after consumption. Those who default in payment may have their lines disconnected (interviews, 2008: 102, 107, 108, 109) but the water company might have incurred some cost already. This arrangement does not favour the operations of the water company (interviews, 2008: 93, 94, 9).

The proposed tariffs are supposed to be given wide publicity in the media and the Commission is enjoined to receive reactions (in written form) from representations made at a public hearing for tariff review consideration. The Commission arrives at a decision after consultation with providers and consumers. This decision is then published in the gazette.

The law also requires that certain factors are considered by the PURC during negotiations on tariffs. These include customer interest, investor interest, the cost of production of the service, assurance of the financial integrity of the public utility, economic development of the country, best use of natural resources, uniformity of prices throughout the country, and competition among utility companies. Generally, these are considered fairly standard requirements in utility pricing (Aryeetey, 2001) but competition is virtually absent in Ghana in this sector. Therefore the conditions are not ripe for the market forces to give the real price of the resource. The pricing is uniform contrary to what pertains in the rural water sub-sector.

Full cost recovery philosophy underpins the activities of GWCL/AVRL. Yet the attainment of full cost recovery has been a big problem for the company because the regulatory function of PURC does not allow GWCL/AVRL to charge what the company considers economic prices. To some extent the government also feels that the provision of water is a social service to the citizens so even though they say reasonable prices should be charged, the government always interferes
with the pricing when there is public outcry. Water is thus treated as a “political good” (see Schouten & Schwarz, 2006).

The PURC structures the tariffs taking into account projections of sales volume, the number of customers in each tariff class, and the PURC’s expectation of the overall efficiency of water delivered to water supplied. The consideration given to overall efficiency is desirable because it is supposed to prevent the payment of inefficiencies of the water companies. In addition the PURC takes into account the government of Ghana water policy in balancing tariffs between different classes of customers.

The monitoring and management of raw water quality is the prerogative of the EPA and the WRC. The EPA also ensures that the activities of water operators do not negatively affect the environment as well as the water bodies. GWCL/AVRL concerns itself with the monitoring of treated water. The standards for drinking water quality are set by the Ghana Standard Board. Data available indicates that raw water quality at the White Volta Basin is not deteriorating that fast though there are seasonal variations. During the rainy seasons, there is a lot of runoff which affects the raw water quality negatively but there is no significant deterioration from year to year (interview, 2008: 9, 13, 20, 43, 55, 60, 78, 93, 116, 124).

7.5 Inferences

This chapter concludes that the main agencies involved in potable water delivery are GWCL/AVRL and CWSA, the metropolitan, municipal and the District Assemblies, although there are many NGOs engaged in the sector. IWRM principles are seen to be applied in both community and urban water delivery systems. The neoliberal ideologies that support the use of the market forces for efficient allocation of resources, and demand management seem to underpin the operations in the sector. The principle of cost recovery is more pronounced in urban water management while stakeholder participation is prominent in the rural delivery system.

The urban water provision shows that in the process of treating water as an economic good, private-public partnerships have been introduced, but this has received a lot of opposition from the public. As cost recovery has been the philosophy behind their operations, the water company has not been comfortable with the regulatory functions of PURC. Access is a problem for the urban poor as economic prices have to be paid.

The operation of CWSA is based on the concept of community ownership and participation for potable water management. Accessibility is improved in terms of coverage of communities but still many are not able to afford the fees/contributions for accessing potable water. The concept seems to be working well but there is a problem of institutional fit/interplay here. The CWSA is under the Ministry of Water Resources, Works and Housing (MWRWH) but at the community level the arrangement places its operation under the Ministry of Local Government and Rural Development leading to a lot of operational difficulties. It is also clear that there is no link between GWCL/AVRL and the CWSA at the regional, district or at the local level.

The situation becomes complex because the supervising District Assembly do not have the capabilities to perform the implementation and monitoring functions. The CWSA which could have had a good monitoring and facilitating abilities do not have the legal mandate to control the Assemblies. The strengthening of the link between the regional CWSA and the DWST as well as the Water Boards/WATSANS is likely to yield a better result. A direct link between the CWSA and the DWSTs will be profitable - the funds are likely to be readily available for water related activities instead of going to compete with other sectors project for the common fund of the assembly.
In conclusion the issues of demand management, cost recovery, reallocation of water to higher value uses and environmental conservation are given prominence under the IWRM implementation in the provision of potable water. This may have serious implications for the poor whose main source of livelihood in the White Volta Basin are agriculture and fisheries. How these play out, especially during the dry season farming using irrigation water are given attention in the next chapter.
8. IWRM and Livelihoods at the White Volta Basin

8.1 Introduction
The Ghana water policy identifies water as a cross-cutting element of the Ghana Growth and Poverty Reduction Strategy (GPRS II)\(^{37}\) which is linked to the Millennium Development Goals. This growth and poverty reduction strategy has, as one of its foci, the livelihoods of the people. What is considered a livelihood may comprise the capabilities, assets and activities of a people that are required for means of living. These include both material and social resources. But a livelihood is sustainable when it can “cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base” (Carney, 1998: 4; Chambers and Conway, 1992).

Often in IWRM implementation, substantial consideration is given to demand management, cost recovery, reallocation of water to “higher value” uses and environmental conservation to the detriment of agriculture which happens to be the main source of livelihoods to the poor. The socioeconomic activities prevailing in the basin and their implications for local livelihoods become very relevant for appropriate water resources management. The two major uses of water resources in the White Volta Basin are agricultural use and domestic use. The latter has been dealt with in the previous chapter. The present chapter therefore looks at water management for livelihoods in the basin. It describes the socioeconomic activities prevailing in the basin and how and what the linkages are with water use. In what ways do the institutional arrangements for managing water for livelihood activities at the basin influence IWRM processes? What are the problems in the use and protection of water resources in the basin?

8.2 Socioeconomic Activities at the White Volta Basin
The socioeconomic system complexities can influence the outcome of any IWRM intervention (see Chapter 3). This makes it an imperative to look closely at the various economic activities that people are engaged in the basin, and examine the linkages with water resources utilisation.

8.2.1 Agriculture
The population in most of the basin area are rural\(^ {38}\) and are predominantly engaged in crop farming. The economically active persons are engaged in commercial and subsistence agriculture. The farming system is a combination of crop rotation and mixed cropping. Farming is, however, considered as a last resort occupation by the few with formal education in the basin area, especially the youth. Reddy \textit{et al.} (2004) consider rural livelihoods in an agrarian economy to be intricately linked with access of rural people to water and other natural resources. In general, the climatic conditions are suitable for single wet season cropping which is usually between May and September but there are irrigation facilities available for the long dry season farming, though limited.

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\(^{37}\) The Growth and Poverty Reduction Strategy (GPRS I & II) is the road map for policy direction as well as the concentration of resources and interests in Ghana from 2006 through to 2009. Its aim is to “achieve accelerated and sustainable shared growth, poverty reduction, and promotion of gender equity, protection and empowerment of the vulnerable and excluded within a decentralised, democratic environment”.

\(^{38}\) The 2000 Population and Housing Census Report indicate that less that 15% of the population are urban. In some districts within the basin, the settlement is classified as almost 100% rural.
Dependence on rain-fed agriculture results in poor yields and seasonal unemployment during the dry season. This has necessitated the building of dams, wiers, dug outs and wells for dry season production. Crops grown include millet, sorghum, groundnut, rice, cowpea, soya beans and vegetables like tomato, onion, cabbage, pepper and okra. Table 8.1 shows the principal crops grown and their use. Animal traction is very pronounced in the basin but the use of hoes and cutlasses as the farming implement is also common. However, the use of tractors is gradually gaining ground (interviews, 2008: 2, 11, 13, 20, 29, 21, 37, 41, 51, 117).

Table 8.1 Principal crops grown in the basin and their use

<table>
<thead>
<tr>
<th>Crop Family</th>
<th>Crops</th>
<th>Sold*</th>
<th>Domestic Consumption</th>
<th>Type of Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>Sorghum</td>
<td>10</td>
<td>90</td>
<td>Pito Brewing</td>
</tr>
<tr>
<td></td>
<td>Millet</td>
<td>10</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rice</td>
<td>20</td>
<td>80</td>
<td>Parboiling &amp; hauling</td>
</tr>
<tr>
<td>Legumes</td>
<td>Groundnuts</td>
<td>60</td>
<td>40</td>
<td>Oil Extraction</td>
</tr>
<tr>
<td></td>
<td>Cowpea</td>
<td>40</td>
<td>60</td>
<td>Oil Extraction</td>
</tr>
<tr>
<td></td>
<td>Bambara Beans</td>
<td>40</td>
<td>60</td>
<td>Oil Extraction</td>
</tr>
<tr>
<td></td>
<td>Soya Beans</td>
<td>95</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Root Crops</td>
<td>Sweet Potato</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frafra Potato</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td>Pepper</td>
<td>20</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tomatoes</td>
<td>90</td>
<td>10</td>
<td>Processing factory</td>
</tr>
<tr>
<td></td>
<td>Onion</td>
<td>95</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Agro-based crops</td>
<td>Fibre</td>
<td>85</td>
<td>15</td>
<td>Ropes</td>
</tr>
<tr>
<td></td>
<td>Cotton</td>
<td>98</td>
<td>2</td>
<td>Cloths and Smocks</td>
</tr>
</tbody>
</table>

Source: Ministry of Food and Agriculture, Bolgatanga, 2008

Farmers along the valleys of the rivers engage in production of rice, sorghum, and maize. The residual moisture in the valleys in the dry season is utilized for melons, pumpkins and tomato farming (interviews, 2008: 2, 29, 37, 56, 89, 95). This creates some problems for the management of the water bodies. It goes against the buffer zone policy of the WRC and the Forestry Commission (interviews, 2008: 3, 12, 13, 46). That is, farming occurs close to the water bodies, even to the banks. This results in increases in siltation and subsequent likelihood of flooding of the plains during heavy rains.

Some farmer groups are aided by MOFA to acquire pumps for pumping water directly from the river for irrigation. On the uplands, farmers engage in the use of contour bonding, stone bonding, and grass bonds for conservation of water to improve production. Animal traction is also encouraged to conserve water in the ridges for production. Apart from the poor soils there is a lot of pressure on the land arising from the high population growth and migration closer to the rivers.

A sizeable proportion of the population are also engaged in animal rearing and fishing. Almost every farmer has some animals basically for domestic use. Land is, therefore, basically allocated for farming, grazing, settlements, road networks and forest reserves. Livestock is a source of

* The quantities indicated do not wholly get to the type of industry shown in the table within the basin. Varying quantities are bought by market women/middlemen who transport them to other market centres in the country.
income to farmers in addition to serving as insurance against crisis when immediate cash may be
needed. The method for rearing livestock is basically free-range except during the rainy season
when some of the animals are confined. The predominant livestock reared by farmers are cattle,
sheep, goats, fowls and guinea fowls. The source of drinking water for livestock consists of dams,
wiers and dugouts located at some of the villages.

8.2.1.1 Land Tenure System
Land ownership within the White Volta basin is vested in the lineage and no one can dispossess a
landholder or family of his land. Land use rights are passed on in a patrimonial manner. In some
cases the land remains under the custody of the Tindana who is the religious head. Women get
access to land only through allocations made to them by their husbands. Farmers have small
holdings, in many cases less than an acre. Farmlands are scattered around dwellings of compound
houses but some are far away from dwellings. In general land is regarded as sacred and it is
traditionally assumed that water bodies are part of the land.

8.2.1.2 Fishing
The development of fish resources is overseen by the Ministry of Fisheries (see 6.3.1.7). The
production of fish is mainly from rivers, dams, dug outs, reservoirs, and ponds. Fishing is
usually restricted in dams that are stocked with fish by the Ministry. The growth rates of fish in
such dams are monitored. The main methods for preserving fish in the basin include
smoking and salting. Refrigerating is not so pronounced.

The marketing of fish is mainly done by the fishmongers, the majority of whom are located at
Yapei and Tono. Fish production is hampered by inadequate inputs, especially fishing gear, non
availability of supplementary feed at the ponds, poor storage and marketing facilities.

8.2.2 Commerce
Bolgatanga is a regional centre that attracts people, services and markets. There are people within
the basin who depend on trading either as a full time job or on a part time basis. Trading activities
go as far as Techiman, Kumasi and Accra which are the main marketing centres in the country
and even across the border with Burkina Faso. The commercial sector is constrained by poor
transport services coupled with inadequate road network, limited communication facilities, and
poor market infrastructure.

8.2.3 Small and Medium Scale Industries
The industrial sector of the micro economy is highly undeveloped. This sector is dominated by
women as the main actors. Areas of operation include Shea nut butter production, groundnut oil
production, pito brewing, parboiling of rice, dawadawa manufacturing, spinning and cloth
weaving, basket weaving, pottery, and leather works. These activities require water in different
quantities at different stages of production. Those in pottery (mainly women’s groups) have their
own way of managing water sources for their operations. Economic groupings include those in
basketry, hats weaving, ropes and smocks production, leather works, pottery and blacksmithing.

8.3 Institutional Arrangement for Irrigated Agriculture
According to the FAO (2003) irrigated agriculture throughout the world covers about 275 million
hectares and accounts for 40% of the world’s food crops. But the total irrigated area in Africa is
less than 5% of this figure. Rain fed agriculture is practiced from May to September. To meet the
Millennium Development Goals there is need to increase irrigated areas in sub-Saharan Africa
and for that matter Ghana so that the 8 months of inactivity of farmers because of the long drought period (October to April) can be made productive.

In Ghana the main government agency responsible for agriculture is the Ministry of Food and Agriculture. This Ministry concerns itself with the management of soil and water for agricultural production purposes, i.e. nurturing plants and animals for the benefit of humans. The development of formal irrigation in Ghana was first initiated in the early 1960s and 22 public irrigation schemes existed in the country by 2003 (interviews, 2008: 2, 8, 20, 47). The construction of most of the schemes was supply-driven and the emphasis has shifted away from big schemes towards small schemes that could be farmer-managed (interviews, 2008: 2, 41, 56, 57, 117).

The increase in irrigated agriculture has resulted in greater water consumption in the face of the awareness created by the proponents of IWRM that water is a limited and finite resource. At the same time there is also a growing concern about the environmental consequences as well as the implication for other sectors if more water is used for agriculture. IWRM can simultaneously enable development, protect the environment and ensure sustainability (McCartney et al., 2008). In order to achieve this there have been interventions to effect changes in the institutional arrangements for efficient irrigation for agricultural production at the basin level.

8.3.1 Policies and Legislation

Ghana’s agricultural policy has five key objectives: i) ensuring food security and adequate nutrition for the population; ii) promoting supply of raw materials for other sectors of the economy; iii) contributing to export earnings; iv) increasing employment opportunities and incomes of the rural population; and v) generating resources for general economic development. The relevance of irrigation water management in the realisation of these objectives is a well established fact (FAO, 2005). The key issue in the development and utilisation of the water resources of the basin is to ensure sustainability while giving preference to domestic water requirements in case there are competing uses of the resource.

The policy reform strategy within the irrigation sub-sector is to increase agricultural production through development and management of water resources for irrigation. The reforms include: i) limiting the cost of irrigation projects to not more than US$ 600/ha; ii) recovery of at least operation and maintenance costs; iii) handing over the management of projects to farmers’ associations; iv) involving farmers from the inception, selection of technologies through to the decision-making stages of irrigation projects unlike the past years when management was largely in the hands of GIDA; and v) contribution of between 10 and 25% of project cost by beneficiary communities or associations for small-scale projects.

The Water Policy acknowledges that the availability and ease of access to water in sufficient quantities for cultivation of food crops, watering of livestock and sustainable freshwater fisheries is a precondition for the achievement of food security and self-sufficiency in food production to meet the nutritional needs of the population. To accomplish this, the Government has committed itself to:

- Support the establishment of micro-irrigation and valley bottom irrigation schemes among rural communities;
- Strengthen district assemblies to assume a central role in supporting community operation and maintenance of small-scale irrigation and other food production facilities;
- Promote partnership between the public and private sector in the provision of large commercial irrigation infrastructure;
Encourage the efficient use of fertilizers to reduce pollution of water bodies, as well as high-yielding crop species and agricultural extension services to ensure conservation of water;

Promote and encourage water use efficiency techniques in agriculture and reduce transmission losses of irrigation water in irrigation schemes;

Manage land use and control land degradation, including bush fires, to reduce soil loss and siltation of water bodies;

Develop a pricing system and a mechanism for delivering irrigation water that is affordable to farmers and also ensure cost recovery on investment made in infrastructure; and

Utilize data and information on water cycle, land cover/use, soils and socio-economic elements for planning, design and development of agricultural schemes (Agricultural Policy, 2003).

8.3.2 Water Management in Irrigated Agriculture

The Ghana Irrigational Development Authority (GIDA) is directly responsible for regulating irrigation systems in the White Volta basin of Ghana. The regulatory activities of GIDA are dictated by the Irrigation Development Authority Regulation, 1987 (L.I. 1350). This L.I. provides the procedure for managing irrigation projects as well as water management within such projects. In addition, the GIDA’s Technical Guidelines for Irrigated Agriculture (2004) gives further details on how to effectively manage water for irrigated agriculture including water supply, distribution and application management.

In 2006, amendments were made to L.I. 1350 to make it more responsive to sectoral needs. The passing of this legislative instrument promoted farmer participation in the management of irrigation projects and also legalized and streamlined the GIDA staff management role in project management. The L.I. stipulates that “there shall be established on each irrigation project a project management”\(^40\) which shall ensure the GIDA policy implementation. Section 6 of the amended version makes room for the formation of Farmers’ Cooperative Societies which shall be subject to the provisions of the Cooperatives Society Decree, 1968 (N.L.C.D. 252) as far as its administration and financial management are concerned. Subsection 3 of Section 1 provides for the inclusion of at least two of its representatives in the management of a project. This is an attempt to allow for representative participation of the user group in management decisions.

The L.I. further makes room for the formation of a Land Allocation Committee (LAC) (Section 3) and the establishment of a Disciplinary Committee for the management of the project. (Section 9) The LAC is meant to find solutions to land conflicts in project areas. It is also meant to minimise the interference of the Tindanas (landlords) in land allocation in the basin (study area). This has not been successful in the project areas with small dams (see 8.3.4). The farmers’ cooperatives philosophy has led to the establishment of WUAs, both at the large scale and small scale irrigation project sites (see 8.3.3 & 8.3.4).

The Disciplinary Committee is responsible for investigating any infringement or alleged infringements of any rules issued by the management and imposing the appropriate sanctions when necessary. The regulations recognise that the disciplinary committee is not infallible. It has provided for the establishment of an Appeals Committee to consider appeals arising out of decisions of the disciplinary committee. All these are meant to address the IWRM principles of justice, equity, participation and transparency in water management for irrigated agriculture.

\(^{40}\) L.I. 1350 section 1 sub section 1
Water user associations were formed as the water resources management component of the LACOSREP. These are working groups at the dam sites. These user associations are monitored by the MOFA extension department. But the management of large scale irrigation is under IDA. These WUAs are responsible for the day to day management of the dams/dug outs. They have their own internal arrangement for the benefit of their group members (see 8.3.4).

The Ghana Poverty Reduction Strategy 2003-2005 (GPRS) mentions irrigation development and the rehabilitation of existing viable facilities to attract private sector management as part of its package of infrastructure enhancement. To finance the GPRS a total budget for modernizing agriculture of USS 84.1 million is needed to vigorously promote mainly small-scale irrigation, which communities and districts can easily construct and maintain. Other priority activities are mechanization and the promotion of fishing hatcheries. The GPRS approach to the irrigation sub-sector development can be categorized into (i) medium to large-scale schemes and (ii) micro to small-scale irrigation schemes.

8.3.3 Large Scale Irrigation Schemes

Building of dams for domestic uses as well as livestock watering started in the colonial days but two big dams were constructed under URADEP (Upper Regional Agricultural Development Programme) in the 1970s for irrigation purposes. The GIDA (Ghana Irrigation Development Authority) was the consultant for the projects. They did the advertising, selection of contractors, and supervision of the construction. They also supervised the catchment area protection and planting of trees and grasses to protect the immediate environment. On the dam walls they planted grasses to hold the soil in check (interviews, 2008: 2, 9, 20).

The reforms in the irrigation sub-sector which was meant to conform to modern trends in efficient water management were to accelerate the slow pace of development of the potential of 346,000 hectares of irrigable land, out of which only 10,000 hectares had been developed in the 1990s. The reform strategy was to increase agricultural production, through development of water resources for irrigation.

The two large scale schemes in the study area are Tono and Vea (see 6.5.3). The source of irrigation water for the Tono irrigation project is the Tono Reservoir created as a result of the building of a dam across Tono River. The reservoir has a storage capacity of 93 million m$^3$ of which 10 million m$^3$ is dead storage. The total catchment area of the reservoir is 650sq km.

8.3.3.1 Organisational Structure and Operations of ICOUR

ICOUR is the company that is in charge of the management of the large irrigation schemes. The company has a board of directors made up of representatives from the Ministry of Finance and Economic Planning (MFEP), MOFA (Ministry of Food and Agriculture), GIDA, the Social Security Bank (because it financed the dam project but of late their participation has waned; their interest is not as when they had their money in the project), ICOUR management, Regional Coordinating Council member (who serves as the chairman) and a representative each from the farmers groups at the Vea and Tono project sites. Figure 8.1 depicts the organisational structure of ICOUR.

The company’s organisation, staffing, machinery and equipment requirements are geared towards managing and providing services to 2,873 hectares of irrigated land (Tono - 2,023 hectares & Vea- 850 hectares). There is much irrigation during the dry season when there is little or no water for plant growth. The water in the open canal as it passes through the communities is used for washing and cooking by the communities (interviews, 2008: 20, 21, 53, 56).

The activities of ICOUR include the maintenance of the canals for irrigation and the provision of technical advice to farmers who are participating in the project. The scheme is to improve food
Figure 8.1: Organisational structure of ICOUR

Managing Director

Deputy Managing Director

Project Manager (Vea)

Project Manager (Tono)

Finance & Administration Department

Finance Unit

Supporting Staff (Finance, Monitoring & Evaluation, Personnel)

Data Services

Stores

Accounts

Extension

Tractor W/ Shop

Irrigation Engineer

Accounts Unit

Extension

Tractor W/ Shop

Irrigation Engineer

Accounts Unit

production through 1) introducing artificial water control to minimise the effects of the vagaries of the climate (i.e. ensuring the provision of reliable and adequate supplies of irrigation water) and 2) increasing labour productivity by providing improved extension services, high yielding seed varieties, fertilizer and pesticides (interviews, 2008: 20, 21, 41, 48, 53, 57).

The values of crop production over the years at ICOUR project sites are presented in Table 8.2. Though there is a decline in outputs over in the last decade (see Table 8.2 the value figures demonstrate how much money the management of the resource injects into the local economy and the lives of the participating farmers. This eventually affects their living standards determining the services they are able to purchase, the provisions they are able to make for their households, and the schooling of their children. The income levels of the communities thus are reflective of the efficient way water resources are managed for productive purposes.

Table 8.2 Value of crop production at ICOUR project site

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop Production (tonnes)</td>
<td>17,809</td>
<td>19,700</td>
<td>16,042</td>
<td>8,103</td>
<td>7,657</td>
<td>8,850</td>
<td>8,220</td>
<td>8,655</td>
</tr>
<tr>
<td>Value (billions of Cedis)</td>
<td>22.2</td>
<td>39.5</td>
<td>35</td>
<td>20.2</td>
<td>22.4</td>
<td>27.2</td>
<td>25.7</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: ICOUR, 2008

The estimated area for cropping in 2007/08 is shown in Table 8.3. The Tono and Vea projects are noted for the production of rice, soybean, groundnuts, millet/sorghum and vegetables (onions, tomatoes). In addition, the ICOUR/UNDP environmental rehabilitation project now emphasises the raising of seedlings for communities, organisations and NGOs for the establishment of fruit tree plantations e.g. cashew, mango and maintaining the existing tree plantations. The dam water is also managed for fisheries development (interviews, 2008: 2, 13, 20, 117). This is a collaborative effort of IFAD, ICOUR and the ministry of fisheries.

Table 8.3 Cropping areas (hectares)

<table>
<thead>
<tr>
<th>Location</th>
<th>2007/08 Dry Season</th>
<th>2008 Wet Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tono (Kassena Nankana District)</td>
<td>1,380.0</td>
<td>1,200.0</td>
</tr>
<tr>
<td>Vea (Bongo District)</td>
<td>400.0</td>
<td>850.0</td>
</tr>
<tr>
<td>Total</td>
<td>1,780.0</td>
<td>2,050.0</td>
</tr>
</tbody>
</table>

Source: ICOUR, 2008

8.3.3.2 Accessibility to Water for Agricultural Production

The operations of ICOUR are financed from its internally generated funds though it relies on the central government for part of its operational funds. There is no free access to the water resource. The farmers pay for the water they use for irrigating their farms. The charges paid are used as a management tool to influence what people use the irrigation water for. The charges vary depending on the type of crop cultivated. Lower fees are charged for crops that fix nitrogen (N$_2$), for example, and higher fees for crops that have adverse effects on the soil e.g. those that build up nematodes. This strategy is to ensure the land sustainability for production. The crops that consume higher amounts of water e.g. tomatoes also attract higher fees.

These are meant to increase the efficiency of land and water use. However, these arrangements often exclude the poor from utilising the resource. This is because some poor farmers are not able to pay and non-payment means exclusion. A task force was set up in 2005 to ensure payment by
those who default in the next cropping harvest. Some of them are able to pay in kind. But this arrangement which allows for payment in kind is limited to only those whose produce are not immediately perishable e.g. onion, rice, soya bean. This offers some relief to those who do not have ready cash so they could have access to water for food production. However the practice does not favour the operations of the company (interviews, 2008: 13, 20, 117) since the company incurs costs in storing the food items that are used to pay off debts. There is also the marketing cost of the items. The company could compute these costs and then bill the user with the amount. This is found to have an adverse effect of reducing farmers’ returns on their investment thereby rendering them poorer and defeating the objective of the project.

The process of fixing the fee to be paid by the users starts with a bi-annual proposal from ICOUR: one at the beginning of each cropping season. The proposed fee is taken to a consultative meeting with farmers, the District Assembly and ICOUR personnel for deliberation, acceptance or review.

8.3.3.3 Farmer Cooperatives

The company has a policy to train and develop participating project farmers (village communities and cooperatives). Fifty four farmer based organisations (FBOs) were formed between 2000 and 2006, fifteen of which have been certified by the National Department of Cooperatives. These farmer based organisations, under the umbrella of village committees, comprise communities that were displaced at the time of the construction of the dams. Parcels of land at the project site are allocated to the village committee.

They distribute the land among farmers who have registered with them. Registering with the company demonstrates one’s interest in farming and the driving force for the farmers is the reliable and adequate supply of water for production and the assistance given members in acquiring credit for their farm operation as well as facilitating the marketing of their produce for them. A group has an average of 15 people. This arrangement works well in the Tono project but not at the Vea project. This is because the land allocated to farmers in the Tono project area is permanent. It has been acquired by the project through the government but the story is different with the Vea project. The people there were resettled on other people’s farm lands to give way for the construction of the dam. Consequently the land available for dry season farming is taken over by the land owners for their farming activities during the rainy season. In addition, Vea has a very high population density. For this reason, land management is better at Tono than at Vea. This is so because nobody wants to invest in a piece of land that will be taken away from him after the dry season farming.

The farmer based organisations have arrangements for meetings, procedures for electing their leaders and have bank accounts. “Working with the FBOs makes water management better. There are about 4,000 farmers involved and without these structures, dealing with individuals would have been very difficult.” The record of their routine meetings indicates that they are enthusiastic about the village committee meetings (the lowest attendance record of 63% in 2000 to the highest attendance 100% in 2006).

The user group meetings promote the attainment of efficient water management. The meetings afford them the benefit of learning how to grow healthy crops by practicing timely cultural practices and effective water management. Other areas farmers receive training include:

- Rural Health education- irrigation hazards and controls,
- Strengthening of Farmer Based Organisation;

41 This statement was made by Issah A. Bukari, managing director of ICOUR on the 20th July 2008
Record keeping;
- Compost preparation using modern technology;
- Irrigation operations and maintenance; and
- Integrated Pest Management techniques.

Three of the farmer groups (60 farmers) are trained in quality vegetable production (in collaboration with TIPCEE) using drip irrigation in order to minimise water wastage. This contributes to the human capital (Spellerberg, 2001) of the communities to enhance productivity and, hence, increase incomes.

The village farmers’ committees participate in managing water for agricultural production in the following activities:
- Distribution of irrigation water;
- Operation and maintenance of sub-canals and drains;
- Help in debt recovery;
- Farmers assist ICOUR in drawing seasonal programmes as well as determination of irrigation service charges; and
- Village committee land allocation (ICUOR, 2008).

8.3.4 Small Dams and Wells

The area under study is characterised by erratic rainfall and natural hazards like floods. This situation keeps food production far behind the consumption requirements of the people thus creating a longer period of hunger and intense poverty. This calls for developing small scale dams for irrigated agriculture to ensure the efficient use of water bodies within the White Volta basin. This is part of the reason for the introduction of the LACOSREP by MOFA supported by the International Fund for Agricultural Development (IFAD).

Under LACOSREP I and II (Land Conservation and Small Holder Development Project) 44 small dams and 32 dams respectively were constructed to aid dry season farming (see 6.3.1.3). This was a strategy for promoting dam reservoir construction as a means of improving incomes and general livelihood of farmers. These were meant to enhance irrigation and livestock production. Tables 8.4 and 8.5 give an indication of the spread of dams and pump irrigation schemes and the sources of water for the needed purposes within the basin (Upper East Region).

These dam sites are noted for vegetable production (okra, onions, tomatoes, etc). For efficient and profitable utilisation of these dams, a dry season 2nd cropping scheme was introduced by MOFA in 2003. A dry season 3rd cropping scheme was subsequently introduced at the basin in 2008 (see 8.3.5) to promote the production of 90-day early maturing high protein quality maize cultivation (interviews, 2008: 2, 56, 57).

Rain fed agriculture is referred to as the 1st cropping season - the normal cropping season (May/June and September). This is followed by the 2nd cropping scheme from October to December/January in the dry season using water from the White Volta River and dam sites. The crops usually cultivated in the 2nd cropping period: onion, tomato, pepper, okra, leafy vegetables, rice, water melon, and garden eggs, are largely for commercial purposes. After the droughts and floods which occurred in the region in 2007, this 2nd cropping scheme was strengthened by collaboration between MOFA and FAO to support farmers with inputs for intensive cultivation of the second crop.
Table 8.4: Communities/localities where irrigated agriculture is practiced

<table>
<thead>
<tr>
<th>Districts</th>
<th>Communities/Locations</th>
<th>Source of Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolgatanga</td>
<td>Sunbrungu, Yikene, Zaare, Yariga, Kumbosgu,</td>
<td>White Volta &amp; Dams</td>
</tr>
<tr>
<td></td>
<td>Kumbangre and Kalbeo</td>
<td></td>
</tr>
<tr>
<td>Bongo</td>
<td>Gowrie, Oncho-Free zone, Feo, Nyariga, Vea</td>
<td>Dams &amp; River</td>
</tr>
<tr>
<td>Talensi-Nabdam</td>
<td>Gua, Pwalugu, Tongo, Dosabligu/Kongo, Tindongo,</td>
<td>White Volta &amp; Dams</td>
</tr>
<tr>
<td></td>
<td>Yameriga, Wakii, Sheaga, Winkongo valleys, Arigu</td>
<td></td>
</tr>
<tr>
<td>Kassena Nankana</td>
<td>Bui, Anayari, Karidiga-Kurugu, Mirigu, Tono irrigational</td>
<td>Dams &amp; Rivers</td>
</tr>
<tr>
<td></td>
<td>area, Kologo, Naga Pungu – Telamia, Navio Valley, Paga</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Babile Valley.</td>
<td></td>
</tr>
<tr>
<td>Builsa</td>
<td>Chuchuliga, Gbedembilies, Fumbisi, Wiesi, Chiok, Akia.</td>
<td>Streams &amp; Dams</td>
</tr>
<tr>
<td>Bawku Municipal</td>
<td>Mandago (Valley Bottom) Bansi, Azumasapeliga, Sakpari,</td>
<td>White Volta &amp; Dam</td>
</tr>
<tr>
<td></td>
<td>Yalugu, Benguri, Naftolga, Zuabulga, Gentiga No. 1 Kpalugu,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kuhungugu</td>
<td></td>
</tr>
<tr>
<td>Bawku West</td>
<td>Yarigo, Kobore, Teogo, Tilli, Sapelliga, Googo, Sapkere,</td>
<td>White Volta &amp; Dams</td>
</tr>
<tr>
<td></td>
<td>Sougo, Timode, Tonde, Kpalsako, Tanga, Wiiga Boya</td>
<td></td>
</tr>
<tr>
<td>Garu-Tempone</td>
<td>Kugri, Kagrasia, Asrin, Takore, Pakore, Waadagu, Woriyanga</td>
<td>White Volta &amp; Dams</td>
</tr>
</tbody>
</table>

Source: Ministry of Food and Agriculture, 2008

There is an estimated irrigable area of 1,702.65 hectares for the small scale dams. Together with pump irrigation, the dams have yielded the outputs indicated in Table 8.6. The outputs of these vegetable crops for a four year period (see Table 8.7) have significant impact on the lives of the people of the Upper East Region. The increase in output has contributed considerably to incomes which households indicate that they use to support paying of children school fees, provide health needs and buying of grain to supplement losses for the rain fed crops and taking care of other household needs (interviews, 2008: 70, 71, 72, 73, 106, 107, 108, 110).

Table 8.5: Total number of small dams by districts in the Upper East Region, 2008

<table>
<thead>
<tr>
<th>Districts</th>
<th>Small scale dams</th>
<th>Total number of dams</th>
<th>Area (hectares) under cropping</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>District Assemblies &amp; NGOS</td>
<td>LACOSREP I</td>
<td>LACOSREP II</td>
</tr>
<tr>
<td>Bolgatanga</td>
<td>-</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Bongo</td>
<td>-</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Talensi-Nabdam</td>
<td>19</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bawku Municipal</td>
<td>3</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Bawku West</td>
<td>14</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Garu-Tempone</td>
<td>5</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Kassena Nankani</td>
<td>1</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Builsa</td>
<td>-</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>44</td>
<td>29</td>
</tr>
</tbody>
</table>

Source: MOFA, Regional Office (Bolgatanga), 2008
To ensure the effective running of the irrigation facilities, the LACOSREP project encouraged and facilitated the formation of Water Users Associations (WUAs) in all the dam sites. The beneficiaries of these dam sites became one of the stakeholders in managing water resources. This was done for the purposes of instilling the concept of community ownership and management of the irrigation facilities to ensure sustainability and profitability of the irrigation facilities. The activities involved in this concept have been extended to cover other small dams that were constructed before the LACOSREP project.

The WUAs are responsible for protecting the catchment areas of the dams resolving conflicts among WUA members; controlling the use of irrigation water; generating revenue to support the routine maintenance of irrigation facilities; as well as offering members the opportunity to access services provided by development partners such as District Assemblies, and NGOs (interviews, 2008: 14, 21, 29, 31, 53,).

The WUAs have been developed into cooperatives with the assistance of the Department of Cooperatives registering them as limited liability business enterprises under the cooperative societies law NLCD 252 (see 8.3.2). Based on the recommendation of the Department of cooperatives in 2002 after assessing the WUA operations, the formation of district WUA councils was brought into the arrangement for the management of the resources. These councils are the mouth piece of WUAs to liaise with District Assemblies, the Regional Coordinating Council and other development partners for the proper functioning of these groups.

8.3.5 Irrigation along the White Volta Using Water Pumps

The period between March and early June is considered as the ‘hunger period’ of the region when most farm families would have exhausted their food items from the harvest of the previous year. This was considered a ‘resting’ period by the people but in reality it is a wasted (unproductive) period since no work goes on among the predominantly farming families. The hunger period is sometimes a result of crop failures due to drought and/or floods.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato Area (hectares)</td>
<td>879</td>
<td>628</td>
<td>655.8</td>
<td>1,085</td>
</tr>
<tr>
<td>Production (metric tons)</td>
<td>10,636</td>
<td>6,594</td>
<td>7,805</td>
<td>12,478</td>
</tr>
<tr>
<td>Onion Area (hectares)</td>
<td>63</td>
<td>50</td>
<td>207.9</td>
<td>211.6</td>
</tr>
<tr>
<td>Production (metric tons)</td>
<td>625</td>
<td>420</td>
<td>1,892</td>
<td>2,010</td>
</tr>
<tr>
<td>Pepper Area (hectares)</td>
<td>38.5</td>
<td>45.4</td>
<td>57.8</td>
<td>65.8</td>
</tr>
<tr>
<td>Production (metric tons)</td>
<td>89</td>
<td>11.34</td>
<td>109.8</td>
<td>170.0</td>
</tr>
<tr>
<td>Okra Area (hectares)</td>
<td>4.9</td>
<td>8.1</td>
<td>4.1</td>
<td>10.5</td>
</tr>
<tr>
<td>Production (metric tons)</td>
<td>4.41</td>
<td>16.2</td>
<td>10.34</td>
<td>22.1</td>
</tr>
<tr>
<td>Leavy Vegetables Area (hectares)</td>
<td>10.4</td>
<td>18.6</td>
<td>15.4</td>
<td>25.6</td>
</tr>
<tr>
<td>Production (metric tons)</td>
<td>20.8</td>
<td>29.76</td>
<td>12.32</td>
<td>35.84</td>
</tr>
<tr>
<td>Rice Area (hectares)</td>
<td>1,091</td>
<td>900</td>
<td>896.5</td>
<td>623.0</td>
</tr>
<tr>
<td>Production (metric tons)</td>
<td>4,910</td>
<td>3,660</td>
<td>3407</td>
<td>2,804</td>
</tr>
<tr>
<td>Maize Area (hectares)</td>
<td>-</td>
<td>8.0</td>
<td>71.0</td>
<td>678.0</td>
</tr>
<tr>
<td>Production (metric tons)</td>
<td>-</td>
<td>30</td>
<td>85.2</td>
<td>1,492</td>
</tr>
</tbody>
</table>


As a strategy for achieving all year round food security and improving incomes during this slag period, MOFA decided to promote the production of a 90 day early maturing high protein quality maize cultivation with pump irrigation using water from the White Volta and other streams.
MOFA assisted some farmer groups to acquire pump machines for pumping water directly from the river for irrigation. This ushered in the dry season 3rd cropping scheme between March and June (see 8.3.4). The inputs support provided by MOFA with assistance from FAO (interviews, 2008: 2, 56, 57) includes water pumps, pipes, maize seed and fertilizer. This support increased area under cultivation, for example, from 29 hectares in 2007 to 146.4 hectares in 2008. This policy direction has drastically increased the use of pumps in the basin from only 20 pumps in 2002 to 165 in 2008 (see Tables 8.7 & 8.8).

Table 8.7: Number of irrigation pumps by districts in the Upper East Region 2008

<table>
<thead>
<tr>
<th>District</th>
<th>Pumps supplied by MOFA</th>
<th>Pumps owned by individual farmers</th>
<th>TIPCEE</th>
<th>Techno-serve</th>
<th>NGOs / Other organisations</th>
<th>District Assemblies</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolgatanga</td>
<td>8</td>
<td>57</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>65</td>
</tr>
<tr>
<td>Bongo</td>
<td>13</td>
<td>36</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>51</td>
</tr>
<tr>
<td>Talensi/ Nabdam</td>
<td>17</td>
<td>75</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>92</td>
</tr>
<tr>
<td>Kassena/ Nankana</td>
<td>25</td>
<td>185</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>212</td>
</tr>
<tr>
<td>Builsa</td>
<td>15</td>
<td>21</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>36</td>
</tr>
<tr>
<td>Bawku Municipal</td>
<td>16</td>
<td>38</td>
<td>5</td>
<td>3</td>
<td>29</td>
<td>-</td>
<td>91</td>
</tr>
<tr>
<td>Bawku West</td>
<td>17</td>
<td>15</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>5</td>
<td>41</td>
</tr>
<tr>
<td>Garu-Tempane</td>
<td>3</td>
<td>5</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>114</strong></td>
<td><strong>432</strong></td>
<td><strong>7</strong></td>
<td><strong>9</strong></td>
<td><strong>29</strong></td>
<td><strong>14</strong></td>
<td><strong>605</strong></td>
</tr>
</tbody>
</table>

Source: MOFA, Regional Office (Bolgatanga), 2008

Table 8.8: Increased use of Water Pumps from 2004 – 2008

<table>
<thead>
<tr>
<th>Districts / Years</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolgatanga</td>
<td>4</td>
<td>7</td>
<td>10</td>
<td>32</td>
<td>65</td>
</tr>
<tr>
<td>Bongo</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>28</td>
<td>51</td>
</tr>
<tr>
<td>Talensi/Nabdam</td>
<td>3</td>
<td>3</td>
<td>11</td>
<td>35</td>
<td>92</td>
</tr>
<tr>
<td>Bawku Municipal</td>
<td>2</td>
<td>14</td>
<td>15</td>
<td>19</td>
<td>91</td>
</tr>
<tr>
<td>Bawku West</td>
<td>3</td>
<td>12</td>
<td>29</td>
<td>34</td>
<td>41</td>
</tr>
<tr>
<td>Garu-Tempane</td>
<td>1</td>
<td>4</td>
<td>10</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>Kassena/Nankana</td>
<td>4</td>
<td>9</td>
<td>10</td>
<td>59</td>
<td>212</td>
</tr>
<tr>
<td>Builsa</td>
<td>1</td>
<td>5</td>
<td>10</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>20</strong></td>
<td><strong>59</strong></td>
<td><strong>100</strong></td>
<td><strong>237</strong></td>
<td><strong>605</strong></td>
</tr>
</tbody>
</table>

Source: MOFA, Regional Office (Bolgatanga), 2008

The ‘three crops per year’ programme has its own implication for water management in the basin. First, farmers along the valleys engage in the production of rice, sorghum, melons, pumpkins and maize. This creates problems for the management of the water body as far as respecting the buffer zone policy of the WRC is concerned. All the vegetation along the river banks is cleared for farming. Second, as a result of this, water loss through evaporation is increased thereby reducing the volume of water in the rivers. Third, this conflicts with the protectionist policy of the forestry department. This resulted in the Forestry Commission seizing pumps supplied by MOFA in 2007. It took the intervention of the Regional Coordinating Council to resolve the conflict (interviews, 2008: 2, 3, 55, 56). Fourth, the farming practices expose the soil at the river banks to severe
erosion and thereby contributing considerably to the silting of the river which compounds the flooding problem during the rainy season. Fifth, there are fuel spillages from the water pumps and agrochemicals leak into the river causing pollution.

All these have implications for water users downstream. There is higher cost in treating water for domestic use in the Tamale municipality which depends on water from the White Volta. The quantity of water that is abstracted directly from the river for irrigation has a negative impact on the amount of water available for hydropower generation downstream. Unfortunately, the WRC is not able to monitor and determine the quantity of water that is pumped directly from the river for irrigation purposes.

The increase in cultivated acreage and subsequent output increases translates to increased income for the basin households. Farmers producing tomatoes and onions during the 3rd cropping period receive more than twice the prices under the normal seasons produce. Farmers obtain a lot of investment money from these activities making the outlook brighter for the farming households in the basin.

However, the coordinating functions of the WRC are yielding positive results. The instruments employed comprise economic and assuasive tools. Public awareness creation and education about the need to leave a protective cover for the rivers carried out in the communities have encouraged the re-forestation of some portions of the river banks e.g. Sapellega and Mongnore. The Forestry Commission educates communities on the type of commercial trees, like mangoes and acacias, which are to be planted close to the river so that farming is not that close to the river. The seedlings were subsidised or free in the initial stages but some community members are now trained in raising these seedlings for purchase by those who want to have woodlots. This now serves as an alternative livelihood system for those involved in keeping the nurseries.

These commercial trees are expected to bring additional income to those who have taken to it as an alternative job. Since it is considered their individual investment the entry into the established woodlot and its destruction by others is limited to the barest minimum. The woodlot is privately owned and thus has the best attention the farmer can offer because the farmer sees it as his/her source of livelihood. This seem to me a people centred, participatory approach which builds on the principles of a sustainable livelihoods approach which also coincides with Community Driven Development. The people participating in the protection of the water resource see the programme as contributing to their livelihood and, hence, their incomes. They can initiate this activity without any external pressure because of the perceived benefits.

8.3.6 Collective Interest and Group Action

8.3.6.1 The Case of Winkogo Dam Area

The institutional arrangements for water usage within the Winkogo dam area is an example of local efforts at managing water resources. The Winkogo water users association (WUA) was formed to see to the efficient management of the dam water at Winkogo for agricultural purposes. This dam is on a stream, Awaara, a tributary of the White Volta. In 1961 a dugout was constructed for irrigation purposes during the dry season. In 1998, IFAD broadened the dugout and built a small dam and provided canals for increased dry season farming. The system operated under the Upper Regional Agricultural Development Programme (URADEP) using a committee system. The committees included the Water Allocation Committee, the Land Distribution Committee, and the Marketing Committee (interviews, 2008: 38, 39, 82).

The people of Winkogo are basically subsistence farmers, fishermen and animal keepers. Almost everybody in the community owns some animals (cattle or sheep). The community felt the need for water sources for dry season farming and watering of animals. However, dry season farming
is impossible without conserved water for irrigation (interviews, 2008: 56, 57, 38). They also perceive the water body as a god. Three grooves, namely Tingani, Akatezingo and Barnigia serve as a protective cover over 50 meters square area. So they realised that if they could manage the water resource well, that will mean secured livelihood for them as well as fulfilment of spiritual needs. This collective interest resulted in the acceptance of the WUA concept (interviews, 2008: 38, 39, 70, 71, 72, 73). This group acts in a logical manner in support of their group interest which follows the premise of rational, self interested behaviour as noted by Ostrom (1990) (see Olson, 1965).

The water body is seen as playing a key role in the economic life of members. From their own perspective their entire lives depend on the water/dam. Availability of water in the dam implies that more farming activities can be carried out in the dry season. That translates into more income, solving many problems and meeting household needs (such as feeding, schooling and clothing) (interviews, 2008: 38, 39, 70, 71, 72, 73, 74).

The WUA is made up of farmers and animal rearers. All the fishermen are farmers but not all the farmers are fishermen. The Association is managed by an executive committee whose members are elected at a general meeting by voting (universal suffrage). These members serve a term of 3 years but one can run for two consecutive terms only. If there is a non-performing executive he/she is replaced at a general meeting by voting (Guidelines and constitution for district WUA councils; interviews, 2008: 74, 75, 57, 38, 39). The executive members manage the dam for irrigation and the other needs; and advise and educate its members on their activities.

The Association usually has monthly meetings at which minutes are kept but does not submit a report to any organisation or agency. At such meetings, members discuss new developments concerning the dam and assess payment of levies/dues. At a quarterly meeting, the executives render accounts of the group. Bank accounts are kept with the Agricultural Development Bank at Bolgatanga. The signatories are the Chairman, the Secretary and the Treasurer (interviews, 2008: 38, 39, 74, 75).

There are different arrangements for dry season and rainy season usage of the dam water. During the dry period between April and June water levels in the dam are always low. Fishermen are prevented from fishing during this period. This arrangement helps to prevent muddying of waters by fishermen which makes it impossible for animal watering. The WUA leadership work in close relation with the Assembly member as well as the chief to ensure that the arrangement works well. Compliance with the guidelines given by the executives is very good because everybody enjoys the benefits of the arrangement. The other arrangement is that during the rainy season, the animals must be shepherded by boys and girls. During the dry season the farmers are restricted to the irrigated areas and almost always people are on their plots so it is not easy for animals to destroy crops.

In order to maintain the system, members of the association pay dues of GH₵ 0.50 ($0.36) per year. In addition, people who use tankers to draw water from the dam for constructional purposes are charged fees. But the indigenes (people who are known to “belong to the community” either by birth or by a long stay in the community) fetch water for all kinds of purposes for free (washing, building, other household uses). Money accruing from these sources is used to maintain the dam and repair the fences on the irrigated lands.

Extension services are provided by the MOFA to the WUA members. The Ministry provides assistance in the formation of the WUA and gives advice on how to protect the dam, and the catchment area protection by planting grass and trees around the dam. There is also consultation among the chiefs, Tindana/land owners as to how best they can maintain/protect the dam. There
are negotiations as to how close to the water body they can farm. There are formal rules not to farm close to the banks but those are often violated without any serious sanctions.

The land tenure arrangements that prevail are that the farmers have access to the portion of land they are using all the year once it is allocated. The only problem is that the land holdings are too small - between ¼ to ⅜ of an acre. The dry season farming/gardening is between October and May. The whole land/plot is controlled by the WUA and the executives assist in allocating them among its members. ‘Nnobo’ or ‘asogtaba’ is practiced. The challenges they face include: i) Plots are allocated to men so if a woman’s husband dies there is problem with allocating plots to widows; ii) When dams break during floods, reconstruction of the embankment is a huge challenge; iii) Broken fences lead to stray animals disturbing farmers.

Collective group action is demonstrated in the building of a broken dam in 2008. The members of the group had a common interest and they felt that they would be better off if the dam was reconstructed. The dam broke during the 2007 flooding of the White Volta basin implying no water for dry season farming in 2008. The members of the WUA, acting rationally and being self-interested mobilised themselves to rebuild the dam to facilitate their production activities. The dynamics of group/collective action with the support of GTZ - a German NGO - was at work. GTZ supported them with food (maize) whilst the association organised themselves into 6 groups. Two groups were at work each day after which they were given their portion of maize. In all there were 500 maxi bags of maize. GTZ also provided them with the technical persons who supervised the work. The association provided the labour and the tools for the work. Within 3 weeks they had completed everything. The joy of achievement was seen with the members (observations, 2008; interviews, 2008: 38, 40, 41, 82).

8.3.6.2 The Case of Binduri Dam Area

The Binduri dam was constructed in 1962 but broke down in 1975 and was repaired in 1997. The institutions involved at this dam area differ from that of Winkogo though similar principles are at work. The members are basically onion producers. In order to use water for maximum production on a sustained basis, MOFA facilitated the formation of a WUA, which is meant to take a leading role in the day-to-day management of the resources. MOFA assisted and supported the putting together of the constitution for running the association. The association therefore reports quarterly to MOFA.

The monitoring and evaluation department of MOFA pays regular visits to the dam area to find out what is being done and to advice farmers on what is needed to be done to improve their operations. A local NGO, ZOVFA also introduced the farmers to organic farming for better produce which have longer shelf life. ZOVFA has been promoting organic fertilizers usage among the WUA members but some are still using inorganic fertilizers as there is no price differentiation between organically produced vegetables and those produced using inorganic fertilizers. The driving force for the Association has been the paramount importance ZOVFA places on looking for marketing outlets for the farmers for marketing their produce.

The Ministry of Fisheries has been carrying out its responsibility of restocking the dam with new fish stocks as well as monitoring and controlling the use of appropriate net sizes that are used in order to ensure sustainable fishing. Though this monitoring is not adequate to ensure proper practices due to lack of organisational capacity (few field staff), the cooperation among these

42 This is a locally designed system for coping with high cost of labour on farmlands. Farmers may not have the money to hire labour to work on their farms due to poverty. In this system a farmer solicits the assistance of neighbours with their own labour force in working on his farm on condition that he will also make his labour available when his neighbour should also be in need. Through this diverse kind of jobs are accomplished without recourse to money which is difficult to come by.
government agencies, the NGO and the local bodies (WUA, Tindana, and landlords) have been productive (interviews, 2008: 31, 4, 51, 53, 56).

Membership of the Binduri WUA is made up of farmers from 8 catchment communities - Binduri, Sarago, Bankango, Bologu, Poryameri, Zuuri, Sakpare and Asitempere. There are 489 members; 55% are females. The WUA is run by an 11 member executive comprising a Chairman, a Secretary, a Treasurer, an Organiser and 7 members (fishermen, livestock rearers and vegetable farmers) and the leadership is representative of these groups. The leaders are elected and mandated for 3-year term. An executive is qualified to run for 2 terms (WUA constitution, 2003).

Although females are in the majority there is only one female in the executive committee. This situation where the women majority membership is not reflected in the leadership positions is explained by local custom where women were not even consulted when men were taking decisions that affected the community. The Binduri WUA is not happy with the situation and believes that as more women get exposed to new developments and as men accept female leadership the situation may change (interviews, 2008: 31, 51, 53).

The Association is responsible for land allocation to members. Each member has access to 25m × 25m land but a member loses the plot after the dry season farming. Because members have access to their plot only during the dry season, members feel that the cost of using compost is not recovered within just one season and that the land owner becomes the beneficiary in the next season. Hence, the land tenure system does not promote land improvement. The fragmentation of land is a result of an increase in population. For onion production 25m × 25m plot could have a yield of between 6-15 bags (a bag is about 75kg) depending on the cultural practices adopted e.g. weeding, fertilizers application, etc. A bag of onion may sell for GHe7.00 ($5.00) each. This indicates that such land size may mean a lot to a farmer who relies on dry season gardening.

During the main season the land is utilized by the land owners (the arrangement has serious implication for land improvement). Members pay levies for the running and maintenance of the facilities but enforcement is a problem. Strict enforcement implies denying the poor access to water for production purposes. In reality, prices cannot be used as a tool to allocate water efficiently in this regard. It rather worsens the plight of the poor in society. Thus the application of the IWRM principle of water being treated as economic good fights against equitability as far as accessibility is concerned.

Part of the problem has to do with the land owners (landlords who are mainly Tindanas) who do not see any reason for paying levies to benefit from the usage of their own lands. There is also the problem of weakness in leadership because of family ties. The executives are not able to enforce the bye-laws of the Association because members may take actions (sanctions) against their own relatives.

Conflicts with land use are adjudicated by the head of clan together with the Tindana. If it cannot be resolved at this level it may be handed over to the police. In the dam area, conflicts within the WUA are resolved with the assistance of MOFA. The Tindanas also offer annual sacrifices for a good harvest; and offer sacrifices during drought to encourage rainfall. At times they collect money for this purpose and the Association has respected them and contributed (interviews, 2008: 31, 32, 56, 88, 99).

There are mechanisms to ensure equity in the management of the dam water. An appointed member of the Association holds the key to the valve to the canal. At the beginning of the season, the canal is opened to all farmers from 7 am – 2 pm on a daily basis. This is done during the land preparation period through to the period of transplanting seedlings until when the crops require a lot of water. At this stage, the dam area is divided into two blocks. One part is supplied with water between 6 am – 12 noon whilst the other half is supplied between 1.30 pm – 5 pm. If an
individual misses his/her allotted time he/she is blocked and will not have access to water for that
day (interviews, 2008: 31, 32, 51, 53).

This creates misunderstandings. Some members think that there should be exception in some
cases. This has been deliberated several times at their general meetings but the consensus reached
is that this arrangement serves the collective interest and makes management easier.

In order to sustain their operations and maintain the facilities the WUA members pay levies.
However, there are some members who default in paying the levy. Paying in kind has been
suggested before at a general meeting but it was rejected by members because of the difficulty
associated with keeping of the produce thus collected (interviews, 2008: 32, 88). These levies are
said to be enough to maintain the facilities but during floods (as experienced in August 2007) it
may not be enough if the dam breaks or is destroyed by the floods.

Other challenges encountered include the problem of controlling free range livestock and crop
farmers’ conflicts. Handling the fishermen who want to do fishing all year round, even when the
water level is so low that the water tends to be muddied, is a great challenge. The quest of the
fishermen is to have enough catch for higher income when water levels are low. They do not have
adequate knowledge as to why they should be stopped from fishing during certain seasons.
Despite these challenges the WUA executives are able to handle all conflicts among the different
water users.

These associations (WUAs) contribute to the social capital of the communities through their
membership as found in the “closed system of social networks inherent in the structure of
relations between persons and among persons within a collectivity” (Zhou and Bankston, 1994:
824). These “... consist[s] of some aspect of social structures, and facilitate[s] certain action...
within the structure (Coleman, 1988: S98).

8.4 Water Management for Fish Production

The Ministry of Fisheries is involved in sensitizing the communities not to use unacceptable
fishing methods and also not to farm along the river banks. Recently, the ministry has embarked
on a project to manage the ponds within the basin so that there can be off season fishing in these
ponds. There are over 100 ponds that have been identified for this purpose. The Ministry of
Fisheries in conjunction with the Forestry Commission is facilitating forestation along the banks
to check soil erosion, enhance limited evaporation from the water bodies, and to promote an
environment which is conducive for fishes to breed.

The MOFA programme of providing pump machines to help the people in alternative livelihoods
has had conflicting results. They have laid pipes which will facilitate pumping water from the
White Volta to irrigate 500 hectares of land for dry season farming. This is seen by the fishermen
as something that is in conflict with the education being carried out by the ministry of fisheries to
promote fish production and management.

8.4.1 Institutional Arrangements for Fish Management

The key government body responsible for managing fish resources is the Ministry of Fisheries
43. The ministry has a regional office in Bolgatanga headed by a regional director and district
offices headed by a district officer. There is collaboration between fishermen’s association and
the fisheries department at the district level for effective management of fish stock in the dams.

43 At the time of collecting data in 2008 this used to be the situation but in 2009 a new government came to
power after a general election and changed the ministry to a directorate under MOFA.
The regional directorate reports to the Minister through the chief director copied to the Regional Coordinating Council on monthly, quarterly, biennial and annual basis. The district office reports on monthly basis to the region.

The regulation and monitoring of the fisher folks are carried out by the department of fisheries. Meetings are held with the fishermen’s associations and the fish mongers to ensure that regulations are observed. The regulatory tools of the department include banning fishing between June and August in the ponds, dams and dug outs. It has been difficult to carry out this in the rivers. In addition, the ministry’s efforts at managing fish resources are concentrated on sensitizing fishermen in the proper fishing methods. The basic tool has been education (see 8.4.2).

There are problems with monitoring due to inadequate staff as well as the ministry being seriously under resourced. For example, the regional office has only a 10 year-old vehicle for their mobility in the region.

People who do not comply and get arrested during the ban periods have their nets seized until the ban is lifted and a penalty/fine is paid. The fine is determined at a meeting with the fishermen (not fixed). The amounts realised are used to motivate volunteers who assist the limited staff in their monitoring activities. The involvement of the fishermen has proved to be beneficial.

At times the police are brought in to ensure order when some fishing communities are found to be recalcitrant. Incentives are also used as tools to effect and reinforce compliance of communities with the regulation for managing fish stocks in the dams. Those who are found to comply with the regulation are given fishing inputs by the Ministry whilst those who do not comply are ignored. They are also sensitized against the use of net mesh sizes that are not recommended. This is often done at the fishermen association meetings/groups.

Often there are conflicts among WUA members. Usually it is between the fishermen groups and gardeners. The fishermen prefer water to be preserved in the dams always so that their fishing activities can be sustained all year round. The gardeners want to draw water for cropping purposes in the dry season. The animal rearers also want water for their animals. The depleting of water from the dams for farming deprives the fishermen from fishing. Often conflicts of this nature are resolved by the Tindana or chiefs. In some cases, it is the MOFA that resolves the conflicts. But there is no structure in place to link MOFA with the Fisheries Ministry for dialogue on such issues. However, there is a cordial relationship between the two heads (MOFA and Fisheries) such that informally they consult each other.

The heads of the various ministries and agencies in the basin admits that the establishment of the WRC and subsequent formation of the White Volta Basin Board is gradually creating awareness of each other’s activities. Through the board’s meetings things being done by MOFA, NGOs and Assembly etc are known to each other with regards to water resources because these are represented on the board.

8.4.2 Strategies for Managing Water for Fish Production

This section covers the strategies for managing fishing in (i) the dams and (ii) the rivers. The strategy for managing fish in the dams has been the involvement of the fisherman’s association for the mutual benefit of the associations and the Ministry of Fisheries. The Fisheries Ministry has organised the landing bays around the Tono dam into associations. For each bay a task force is formed made up of 8 members suggested by the executives of each bay. The associations are made up of bays 1 to 5 (see Table 8.9). If there are educational programme the ministry contacts the associations for such programmes but some of the associations do not usually accept the ministry as an entity working for their good. They perceive the ministry as a body which is an impediment in their struggle to make a living.
Table 8.9: Fishermen associations at the various bays

<table>
<thead>
<tr>
<th>Bay number</th>
<th>Communities or fishermen from</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Boania</td>
</tr>
<tr>
<td>2</td>
<td>Wuru</td>
</tr>
<tr>
<td>3</td>
<td>Chuchuriga and Nyangria</td>
</tr>
<tr>
<td>4</td>
<td>Gia</td>
</tr>
<tr>
<td>5</td>
<td>Betiu and Kajolo</td>
</tr>
</tbody>
</table>

The channel of information from the fisheries ministry to the fisher folks is through the associations. There is a chairman, a secretary and a treasurer for each bay (association). One executive member each from the bays is nominated to form the overall association for the Tono dam. The chairman is from bay 5, the vice chairman is from bay 3, and the secretary is from bay 2; the representatives from bay 1&4 are members. Whilst the individual bays association meets once in a month, the central executives meet quarterly (interviews, 2008: 22).

The Chuchuriga and Nyangnia associations are faced with a language barrier because the two communities speak different languages. This often results in conflict. Some of the bay associations find it difficult to pay fees for the management of the dam because they think it is a government project and that they do not see the need to pay such contributions towards its management (interviews, 2008: 20, 22, 23, 24, 25, 85, 111).

There are occasions when those who are vocal within the associations create management problems. They raise false alarms of corruption among executive members. When these executives are removed by a meeting and these people manage to get those positions they tend to mismanage the association. In one instance the executives were making yearly accountability of their activities but the new (vocal) executives failed to do same. Such occurrence affects their activities (interviews, 2008: 22, 85).

The task force of the associations are allowed to use a portion of the amount they realise from fines from poachers for their activities. A portion is saved for the future use by the bay associations. Anytime a poacher is arrested the fish catch is confiscated and sold by the task force. The amount is deposited in the association’s accounts. They decide at a meeting how the money should be used. The local people in some communities pose a great challenge to its future as they are not willing to comply with the arrangement any longer.

There are a number of challenges that face the organisation of the associations for the management of the resources. Among them are: i) poor leadership which makes it difficult for some of the bays to have regular meetings which in turn affect the general operations; ii) sometimes there are conflicts within the associations but often with the involvement of the local chiefs these are settled; iii) level of education of the executives affect the operations- Most are illiterate except the secretaries who are often with Middle School Learning Certificates (MSLC) i.e. basic education (Level 10); iv) the ministry restocks the ponds and dams at a cost but the local people do not understand why they should contribute some fees towards its management.

Women feature prominently in the marketing of fish harvested. Fishermen sell their catch to their wives on credit who then process the fish by smoking. They then sell to the market queens who subsequently sell to individuals. In fact most of the women own the boats and nets. Therefore the women determine the price of the fish catch which they themselves buy from the fishermen (mostly their husbands). The owner is supposed to enjoy 1/3 of the catch, the women and the...
fishermen are supposed to take 1/3 each. Consequently, the women end up benefiting from 2/3 of the proceeds (interviews, 2008: 22, 23, 24, 25, 35, 36, 112).

This arrangement has generated a kind of struggle: the men want to liberate themselves from what they term “their wives entanglement”. The ministry of fisheries, in an attempt to have a better relationship with the fishermen and thereby control fish resources came in to facilitate easy loan acquisition for the men. This is indirectly easing the conflict between the husbands and wives since the husbands are becoming less dependent on their wives in carrying out their business. This is a peculiar situation where men depend on women for survival in their businesses in the Ghanaian context.

Fishing in the rivers has some slight differences. Over 55% of the inhabitants of some communities along the White Volta and its tributaries (e.g. Yapei, Nasia) depend on fishing for their livelihoods. In fact the percentage used to be higher but now some people are leaving fishing because of the depletion of fish resources in the rivers. The men are engaged in fishing in the rivers whilst the women dominate the processing and marketing.

The depletion of fish resources is a result of bad fishing practices such as the use of unauthorized mesh size (smaller than approved), the use of chemicals (DDT), traps and scarifying of fish (which is locally referred to as ‘do and die’ method). Other methods used include hooks and baskets. From the perspective of the fisher folks water levels are going down due to seasonal variation. From February-April the water level in the White Volta is very low and it is in these months that the crude methods are employed. During flooding periods, the ponds which are dotted in the basin are naturally restocked. The Ministry of Fisheries has not been involved in restocking these naturally occurring ponds (interviews, 2008: 34, 35, 36, 113).

There are also fishermen associations that govern fishing in the rivers. These associations have a chairman, secretary, treasurer, organizer and a Patron who is an elder within the community as their officers. They do elect these officers at their general meeting but do not have a fixed term of office. New elections are only conducted when members raise issues against any executive member. The issue is discussed at the general meeting before electing an individual (interviews, 2008: 36, 35, 34). There are a number of fishing associations in a single community without an umbrella organisation. This makes the coordination of the activities of fishermen in the rivers more difficult.

Similar to what happens with fishing in the dams the fishermen in the rivers also sell to their wives or to the one who owns the fishing gears. Most often it is the women who buy the gears. The men are obliged to sell to them. Unlike the situation in the dams the fishermen here determine the price for the fish but the women seriously influence the price. The wife also buys on credit and pays only after sales. The women process the fish by smoking before selling. If there are losses incurred the women discuss the issues with their husbands and usually a compromise is reached. Sales go on by the road side at towns like Yapei and Nasia or are sold to middle women involved in the fish trade. These transport the produce to Tamale, Techiman, Sunyani or Kumasi markets for sale.

8.4.3 Fishing and Traditional Authorities

The chiefs claim ownership over the water bodies and demand some quantities of fish as their royalties. A representative of the chief - ‘Nterc’ - takes care of the river but the Tindana takes care of the land within the Gonja lands unlike the other areas in the Upper East where all are in the hands of the Tindana. The Nterc’s responsibilities include: (i) ensuring that water is not polluted (he has local representatives who will report anyone who pollutes the river for a fine to be paid or a warning given); (ii) ensuring a bumper harvest by consulting the gods and offering sacrifices; (iii) investigating deaths by drowning and telling communities what should be done to appease
the river god; and (iv) collecting on specific days from the various communities a share of the fish from the fishermen for the chief.

The ‘Katere’ manages the natural ponds on behalf of the chief. Proceeds from fishing in the pond are given to the chief. Here fishing is allowed only in April-May. Unlike what pertains in the Gonja land the ponds in Baare lands are in the hands of the Tindana. The ponds here are considered as gods with the Tindana taking care of their shrines. Trees around the shrines are not to be felled and commercial fishing in the ponds is not permitted. Fish taken from these ponds are not brought home but can be cooked and eaten in the farm by men only. No female is allowed to eat from it.

Conflicts sometimes do occur among the associations involving boundaries of areas of fishing. If the conflict is among the members of an association, it is resolved by the members themselves and their executives. If it is between two associations, the chief may involve the ‘Katere’ in resolving it. All unresolved conflicts come before the chief or Tindana for amicable settlement.

The Tindana or Yidana (head or one in charge of a clan) supervises the clearing of weeds around a water source as well as the cleaning of ponds where water is fetched for domestic use. They announce the cleaning exercise the night before the collective action. Other activities often include de-silting of ponds for clean water. During such community action all community members are expected to participate. If an individual absents him-/her-self because of a legitimate reason like sickness he is pardoned but is sanctioned for other reasons. The sanction applied may be the payment of a fowl for the purposes of sacrifices to pacify the gods for the disobedience.

Some of the ponds have crocodiles in addition to fishes. The belief is that the crocodiles are lesser gods who communicate with God for rains to fall. The traditional authorities are responsible for the maintenance and the management of the water sources. The rural people understand that a violation of the instructions of the traditional authority means the invitation of curses on their life and family. Consequently their call for communal work is promptly heeded to.

The District Assemblies get involved only in the collection of taxes from the fishermen through the district assembly revenue collectors.

8.5 Industrial Water Use

The major industrial water use in this area is by the Northern Star Tomato Company Limited at Pwalugu though there are a few who utilise water for small scale mining, pito brewing and pottery. The tomato factory which relies on local farmers for its raw materials processes tomato for the local market. The factory draws water directly from the White Volta for its operations yet there are no records on quantities of water needed for its operations and how much is lifted each day. The factory operates under the assumption that there is always enough water available since the river never dries up (interviews, 2008: 33).

There is no functional disposal treatment plant at the factory. The effluent from the factory goes to the lands close to the river and eventually gets into the river without any treatment. Though the EPA is aware of the factory’s operation, it has not been able to enforce the law and certify the environmentally sound operation of the factory. “Actually, most of the things that needed to be done before the factory could start operations have not been in place. Since this is a government project some of these requirements were somehow overlooked. This project is under the President’s Special Initiative (PSIs). So the ministry just gave the go ahead for the project to start operation. It is more of a political project”.44

44 This was part of personal conversation with the Production Manager of Northern Star Tomato Processing Factory at Pwalugu on 24th August, 2008.
This is a clear example of the problems of sectoral management of resources without proper coordination mechanisms in place. Conflicting objectives of different sectors give rise to situations which can hinder the achievement of the maximum utility to be derived from the use of water resources.

The tomato growers associations are not happy with the management of the factory since the factory does not pay them “good” prices for their produce. The factory maintains that their price quotations are in the interest of the farmers. The factory offers a flat rate for the produce in one particular year not considering whether it is a high price season or a low price season. This pricing system actually is to the advantage of farmers since it gives them stable prices on which they can plan their farm operations. Again great losses from their produce, when the price would have fallen low in the market, are avoided.

8.6 Inferences

The chapter has shown that the economic activities in the basin are basically crop production, fishing and animal rearing all of which are dependent on water availability. The crop production follows two main lines – rain fed and irrigated; the latter is also categorised into those operating under large irrigation schemes and those on small dams/wells/dugouts as well as those pumping water directly from the river. There is only one agro-industry concern, a women’s group involved in pottery, pito brewing and “galamsay” mining activity in the basin.

The organisations/agencies involved in managing these activities are the MOFA, the Irrigation Development Authority, EPA, the minerals commission, Ministry of Fisheries, ICOUR and the WUAs. These are decentralised to different levels: MOFA and Fisheries from the national to the regional and then to the district levels but the EPA is only decentralized to the regional level. At the local/community level they are linked up with the WUAs. The WUAs way of managing water for their common good demonstrates the existence of collective interest and how it brings about group action. Sustained progress is likely to be realised if the management of water is designed to serve the collective interest of a group of people. Ownership then becomes both meaningful and profitable. These interests are embedded in both social and economic wellbeing.

Livelihoods issues, which are of common interest to the people, have the potential of inspiring the people to take common actions in the management of water resources. Consequently, linking water resources management with sustainable livelihood improvements holds a better prospect for optimal benefits from the utilisation of water. The use of economic prices for efficient allocation of water could worsen the plight of the poor and hence defeat the principle of equity in access to the resource. Both formal and informal institutions have proved to be useful under different circumstances.

The problems with water use are identified as: erratic and unreliable rainfall pattern; land pressure (small farm size pushing more people to farm along river banks); floods and storms (leading to crop destruction), deforestation around water bodies, pollution of water by agrochemicals, high competing demands for water in dry season (for farming, fishing, domestic uses and animal watering), rapid siltation of current dams, shortage of shallow ground water and wrong perception of water as a resource. Effective institutional arrangement is needful in dealing with these issues.

The major challenges with the management of water resources for livelihoods are the ‘clash’ between the traditional authorities and the modern institutions governing formal organisations. The community members tend to respect the traditional institutions more than the modern laws. The allocating of land for production and the fishing rights of individuals are restricted by the local traditions.
9. Interactions among Water Institutions and Agencies for Transboundary Management

9.1 Introduction

In the previous chapters a number of institutions and organisations were identified to be involved in the management of water resources at the White Volta basin in Ghana. The White Volta basin is an international one but transboundary water management has not been well organised in the past. Ad hoc measures were often taken in times of floods or severe drought to address the situation. The present chapter now focuses on institutions and agencies/organisations which are involved in transboundary water resources management to understand the interfaces of the national, intermediate and the local institutions with the international institutions. It is also to find out the extent to which these arrangements facilitate sustainable management of water resources in the basin. How do the different levels interlock and what are the difficulties encountered in these new arrangements? Attention is also given to how the new institutions established as a result of IWRM approaches interacts with existing institutions and what changes have occurred within the basin organisations with the introduction of the IWRM pilot project.

The analyses are based on interviews with some individuals and organisations involved in the management of the basin as well as review of documents from agencies and ministries in Ghana and Burkina Faso. The section after the introduction is on general characteristics of the international basin (9.2). The international level legal and organisational changes and their relationships are addressed in section 9.3; the next section presents the analysis of institutional responses at the national, intermediate and local levels (9.4). Section 9.5 examines the interactions between new organisations and associated institutions versus existing organisations and institutions (9.5). This is followed by the roles of formal and informal institutions at the local level and the pattern and nature of their linkages. Basin organisational changes and institutional arrangements as a result of transboundary IWRM practices are examined under section 9.7. The chapter concludes with inferences (9.8).

9.2 General Characteristics of the Basin

The Volta River Basin is in West Africa and covers an area of approximately 400,000 km². The basin is shared by six West African countries but the largest part of nearly 85% is shared between Burkina Faso and Ghana. The basin is divided into four major sub-basins: the Black Volta, the White Volta, the Oti and the Lower Volta. Table 9.1 shows the distribution of basin area per the six riparian countries.

Table 9.1: Distribution of basin area per country

<table>
<thead>
<tr>
<th>Country</th>
<th>Area of country within Basin (km²)</th>
<th>% of total Basin Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Côte d'Ivoire</td>
<td>9,890</td>
<td>2.48</td>
</tr>
<tr>
<td>Mali</td>
<td>12,430</td>
<td>3.12</td>
</tr>
<tr>
<td>Benin</td>
<td>13,590</td>
<td>3.41</td>
</tr>
<tr>
<td>Togo</td>
<td>25,545</td>
<td>6.49</td>
</tr>
<tr>
<td>Ghana</td>
<td>165,830</td>
<td>41.6</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>171,105</td>
<td>42.9</td>
</tr>
<tr>
<td>Total</td>
<td>398,390</td>
<td>100</td>
</tr>
</tbody>
</table>
The increase in population and economic development in these countries and the consequent increased demand for water for industry, energy, agriculture, and domestic consumption are a possible source for international conflicts. Thus competition over water remains a potential for tension and even conflict among these countries, particularly between Burkina Faso and Ghana. Ghana relies heavily on the flow of the Volta and its tributaries coming from Burkina Faso for energy production and to a limited sense for agricultural purposes. The major concern of Ghana is to keep the water flowing downstream. On the other hand Burkina Faso, which is at the upstream, is expanding its irrigated agriculture using the Volta and building the Ziga dam for hydropower generation. From the Ghanaian perspective Burkina Faso’s water consumption upstream is responsible for reduced water level in the Akosombo dam which generates Ghana’s hydropower.

The vital nature of freshwater and the problems with water level control and flood related issues are sufficient incentives for these countries to take the initiative for international cooperation and benefit sharing. Development of the river basin is essential for economic and social progress of the respective countries, but there is the risk of not achieving this without cooperation at the international level. However, for many years the basin remained one of the few transboundary river basins in Africa which had no formal legal and institutional arrangements for the management of disputes over the utilisation of its resources.

Limited consultation and coordination between Burkina Faso and Ghana demonstrated by uncoordinated policies and development initiatives were serious threats to the sustainable management of the Volta River Basin. Sudden releases from the Bagre dam in Burkina Faso into the main White Volta River without any information sharing with Ghana have been a major water management concern in Ghana. This creates a lot of flooding problems in Ghana and results in great loss of lives and properties to residents of the basin on the Ghanaian side.

9.3 International Level Legal and Organisational Changes and Relationships

This section examines how well the national institutional structure facilitates or hinders international cooperation with the countries that share the basin with Ghana, especially Burkina Faso. Organisations/agencies involved in water management within the basin include the Ministry of Water Resources, Works and Housing (MWRWH), the Ghana-Burkina Faso joint technical committee on integrated water resources management, Water Resources Commission, and the White Volta Basin Board. The Water Resources Commission (WRC) is the lead organisation involved in water resources management in the country (see 5.5).

In chapter 5 it was established that the WRC came into being in 1996 (by Act 522 of 1996) following the execution of the Water Resources Management (WARM) studies supported by CIDA, DANIDA, DFID, CfD, GTZ, UNDP and the World Bank. Prior to this date, the management of the country’s water resources was fragmented among various institutions and organisations with no clear policy on who is in control. The transboundary water management issues were handled by the Ministry of Foreign Affairs because of the assumption that these are part of issues that could be placed under diplomatic considerations.

The structure of the WRC was such that it had a subcommittee, International Waters Committee, which had the responsibility of: (i) identifying international waters and drafting bilateral...
agreements, (ii) establishing mechanisms for informal discussions on a technical level with the riparian countries, and (iii), examining the possibility of initiating a multi-national regional agreement for the development of the Volta Basin (see 5.4.4.2). The committee was thus responsible for shared water resources with riparian countries and international water organisations as well as external support and programmes. The membership of the committee was made up of a representative each from WRC, VRA, HSD and a chairman. This committee on transboundary water issues has established working relationship with the other riparian countries to facilitate the sustainable management of water resources within the basin.

The commitment to transboundary management of the basin by the six riparian countries (Ghana, Benin, Burkina Faso, Cote d’Ivoire, Mali and Togo) which share the Volta was demonstrated by steps taken by the Heads of State of these countries when they signed the Convention to establish the Volta Basin Authority (VBA) in 2007. This is a regional organisation to oversee the management of the Volta Basin. Some of the initiatives taken were:

- The Ghana-Burkina Faso Joint Technical Committee on IWRM under the auspices of the West African Technical Advisory Committee of the Global Water Partnership,
- The GEF Volta project to approach transboundary environmental problem areas in the Volta Basin and its downstream coastal area,
- The IUCN and GWP ‘Improving water governance in the Volta River Basin’ through a consensus on key water management principles and institutionalized coordination mechanism, and
- GLOWA Volta project on integrated assessment of feedback mechanism between climate, land use and hydrology (research project) (see 6.3.5).

9.3.1 Ghana Burkina Faso Joint-Technical Committee on Integrated Water Resources Management

This committee was formed following the signing of the statutes and adoption of the institutional framework documents for the VBA by a Ministerial Council. The subcommittee of Ghana’s WRC at the National level played a leading role in the process. Five out of the six countries have already had parliamentary ratification of the Convention and the Statutes and four have already deposited the ratification instrument with its headquarters in Burkina Faso as at August 2009. A total of four national forums and two transboundary forums for actors led to the establishment of a local transboundary committee for the management of the White Volta basin and a multi-level arrangement for trans-border water governance (see figure 9.1) was put in place. These processes culminated in the formation of the Burkina Faso-Ghana Joint Technical Committee on IWRM (JTC-IWRM). It was through the activities of the Interim Executive Directorate that the operation of the VBA was started together with its priority activities. In this regard, partnership arrangements were initiated with SIDA/IUCN/PAGEV, and GLOWA Volta Project.
Figure 9.1 Organisational frameworks for the management of water resources in the Volta Basin

Source: Adapted from PAGEV (2007)

Legend:
JTC-IWRM = Ghana-Burkina Faso Joint Technical Committee on IWRM; MAHRH = Ministère de l’Agriculture, de l’Hydraulique et des Ressources Halieutiques (Burkina Faso); MWRWH = Ministry of Water Resources, Works and Housing; DGRE = Direction Générale Ressources en Eau; PAGEV = Projet d’Amélioration de la Gouvernance de l’Eau dans le Bassin de la Volta (Project for Improving Water Governance in the Volta Basin); WRC = Water Resources Commission

Guidelines were put in place for the establishment of local transboundary consultative committees and a national committee of JTC-IWRM was formed. These brought about some policy and
institutional changes in the management processes. As a result of the adoption and implementation of a Code of Conduct in the management of shared waters the existing bilateral consultation mechanisms between Burkina Faso and Ghana on water management became well defined, broadened and strengthened. This was done with the support of the West Africa Technical Committee of the Global Water Partnership (GWP/WATAC) in 2002.

The institutional changes included first, a new consultation mechanism in place for joint management of the natural resources of the Volta Basin (see figure 9.1). Second, the WRC became the focal organisation for transboundary water issues (interviews, 2008: 1, 42, 50, 95). It seeks assistance and support from the relevant agencies or organisations as the need may arise in fulfilling their functions in this regard. The establishments that assist in these issues include the Attorney General’s department (for legal support), Meteorological Services Department, Volta River Authority, and Ministry of Foreign Affairs (interviews, 2008: 1, 42, 50, 95).

Third, the formation of the transboundary sub-committee at the White Volta Basin Board was greatly influenced by these developments. This committee is now responsible for drawing up an annual programme of activities to ensure that key stakeholders are informed of and involved in the JTC-IWRM. Fourth, the linkages with the Local Transboundary Committee has been developed and become operational.

The result has been a positive impact on the management of floods in the White Volta basin of Ghana. DGRE was supported (by PAGEV) to rehabilitate two river gauging stations downstream of the Bagré dam to gather information on river flows into Ghana, which supports the existing framework for advance warning of extreme events, such as drought or flood. Thus, there is now the sharing of information on water flow regulation from the dam at the upstream (Burkina Faso) to Ghana to alert those in disaster management to adequately prepare for any eventuality.

9.3.2 The GEF Volta Project

Global Environmental Facility (GEF) Volta River Basin Project was initiated in 1999. With support from UNEP/GEF, the Environmental Protection Agency of Ghana initiated the involvement of all the six riparian countries of the basin in developing plans and actions for the integrated management of the basin. It started with the preparation of a Transboundary Diagnostic Analysis (TDA) of the basin and a Strategic Action Plan (SAP). These served as the basis for the formulation of a GEF project proposal. A Steering Committee comprising the Ministers of Environment and Water Resources of the riparian countries supported the process with their inputs in 2000. The project was executed in 2002 with the development of a full project on "Addressing Transboundary Concerns in the Volta River Basin and its Downstream Coastal Area".

The West African Interim Secretariat for IWRM as a sequel to the GEF Project suggested the establishment of a Volta Basin Technical Committee (VBTC). The VBTC had representation from all the riparian countries and was mandated to work towards the establishment of a Volta Basin Management Structure.

9.3.3 The IUCN and GWP ‘Improving Water Governance in the Volta River Basin’ (PAGEV)

In 2004, IUCN initiated a three-year “Project for Improving Water Governance in the Volta Basin” (see chapter 6) in response to the need for transboundary coordination and cooperation
with respect to water resources management in the Volta Basin. This project was commonly referred to as 'PAGEV' by its French acronym. PAGEV was part of the Worldwide Water and Nature Initiative (WANI) of IUCN that seeks to demonstrate how to mainstream the ecosystem approach into river basin planning and management. The project was developed and executed jointly by IUCN-BRAO and GWP-WA and involved two countries in the Volta Basin (Burkina Faso and Ghana).

The PAGEV project is one specific outcome of international cooperation in management of natural resources in the Volta basin. It brought about the collaboration among PAGEV, WRC, DGIRH and GWP-WA in a bid to strengthen the JTC-IWRM that had been established (see 9.3.1). As part of the outputs of the relationships, a water audit that addressed the dynamics of water availability and demand under various scenarios of the Volta basin between Burkina Faso and Ghana was undertaken and completed in 2007. This served as the compilation of a decision support knowledge base for the basin for the projections of water demands for different uses in Burkina Faso and Ghana using the Water Evaluation and Planning System (WEAP). The draft report was jointly validated by key research and national organisations from the two countries in Accra in May 2007. These organisations included GLOWA, IWMI, VBA, DGRE, and WRC.

Despite the fact that the Volta Basin Authority was set up for the six riparian countries their activities are pronounced in the White Volta basin. This development is as a result of the limitations caused by both funding and personnel. In support of this pilot IWRM project alone PAGEV received funding of US$500,000 from WANI/DGIS in March 2004 and an additional 9 million Swedish kronor from SiDA in September 2004 whiles governments of Burkina Faso and Ghana contributed in-kind by seconding experts to the project together with experts from GWP/WA and IUCN-BRAO. The IUCN-BRAO under its Water Governance project in 2006 also provided funding through the VBA to the tune of €39,990. Because these funding bodies will want to see success, much effort was expended to have a positive story told. This affirms the belief that IWRM principles may not be implemented in the developing countries if there are no external stimuli. Thus local ownership of the process is lacking which has the potential of influencing the success of the implementation.

The activities of the WRC with regard to transboundary water management are also driven by donor funds. These funds also come with their own conditionalities and in this particular example the donor countries which supported the process attached ‘conditionalities’ which bore the principles of IWRM to their programme design and projects. They came with the imposition of the neo-liberal ideas of treating water as a commodity and allowing the market to allocate water resources to ensure sustainability and efficiency. The power of external influence was created because in the face of the inadequacy of government budget the substantial external inflow of funds was a respite for the governments. This generated the push for water sector reforms.

Other push factors included: (i) Ghana has had the challenge of floods and drought in recent years which resulted in the loss of crops, landed properties and lives. In order to mitigate the effects of these there was the need for improved management practices and these necessitated changes in goals and objectives in basin management. The transboundary management effort with Burkina Faso has this as one of the forces. (ii) International discourses about water management and international commitment made by the government to satisfy the conditions of IWRM (e.g. West Africa Water Resources Policy, Dublin principles) influenced reforms in the water sector.
9.3.4 The GLOWA-Volta Project

GLOWA-Volta project is a research network involving Bonn University (where the Centre for Development Research (ZEF) is the Head Institute, Remote sensing Research group) and the Institute for Land and Water Management) Fraunhofer Institute for Environmental Atmospheric Research (IFU), Coarmisch-Partenkirchen and Institute for Tropical Medicine and Hygiene Heidelberg University. In collaboration with Council for Scientific and Industrial Research: SARI and WRI (Water Research Institute), University of Ghana (Remote Sensing Application Unit, Population Impact Project and Institute of Statistical, Social and Economic Research) and Institute de l’Environnement et de Recherche Agricoles (INERA).

The project seeks to develop a scientifically sound decision support system for the assessment, sustainable use and development of water resources in the Volta Basin. The research activities are concentrated on water resources in the basin, access to water, cost issues, water quality, taking measurement of river system and to predict the extent of flooding. The project is funded by the German Federal Ministry of Education and Research. It is one of the 3 pilot basin case studies aimed at developing integrated strategies for sustainable and fore-sighted management of water, lakes and rivers at West Africa regional level

Two other major research activities are being carried out by CGIAR in the Volta basin. These are the Assessment of Water in Agriculture and the Challenge Programme on Water and Food.

9.3.5 ECOWAS Water Resources Coordination Centre

The ECOWAS Water Resources Coordination Centre (WRCC) which used to be a Unit (WRCU) is one of the four organs of the Permanent Framework for Coordination and Monitoring (PFCM) of IWRM in West Africa. It was established in 2001 by ECOWAS Heads of State and Government for the purposes of promoting, coordinating and implementing an IWRM policy in West Africa. This was in response to the international consensus created in the nineties around the IWRM concept which brought about reform processes in many countries. Water policies were modified, legislation adapted, and new organisations created. The aim of the PFCM is to put into place a framework which is conducive to promoting water infrastructures investments, not to manage such investments. Its mission was to help the ECOWAS States in defining and pursuing sustainable water management policies.

The process of Integrated Water Resources Management (IWRM) in West Africa was initiated at the West African Ministerial Conference on IWRM held in Ouagadougou in March, 1998. During the conference the 16 countries of ECOWAS decided to engage in changing from sectoral and technocratic water resources management towards participatory and integrated management in conformity with the principles adopted by Dublin Conference and ratified in Rio de Janeiro in 1992.

The four relevant declarations at the 1998 Ouagadougou conference are:

i. Implement in the respective countries a process of integrated water resources management based on National Water Action Plans;

ii. Create a framework for regional co-operation on integrated water resources management; harmonisation of policies and legislation on water issues and exchange of experience;
iii. Create or re-vitalise the consultative frameworks between riparian countries for joint management of shared basins;


It was in pursuance of these that, a regional action plan for IWRM (regional water vision for 2025 presented and discussed at the world water forum in The Hague in 2000) was validated and adopted by the Conference of Heads of State and Government of the ECOWAS in December 2000. The action plan states that “by 2025, water resources are managed efficiently and effectively in an environmentally sustainable manner so that every person in the region has access to safe drinking water for basic needs, has safe excreta disposal facilities, food security, poverty is alleviated, human health is protected, and also the biological diversity of the terrestrial and aquatic ecosystems protected” (WRCU, 2007: 9). These developments were influenced by the WSSD Plan of Implementation, Johannesburg, 2002. For example Article 26 urges countries to “Develop integrated water resources management and water efficiency plans by 2005, with support to developing countries, through actions at all levels” This triggered an important dynamics in the West African region and a number of countries (including Ghana) engaged in the process of developing IWRM plans.

The WRCU is steered by two governance bodies: The Ministerial Follow-up Committee (MFC) and the Technical Advisory Committee (TAC) for IWRM in West Africa. Members of MFC are the Ministers in charge of water resources and the members of TAC are the Focal Points. There are also members of the IWRM sub-Regional Consultative Council (RCWRC) which are the Focal Points, representatives of the local authorities, partners, civil society and private sector. The WRCU through its TAC approved a West Africa Water Resources Policy document: Strategic Plan for 2007-2015 and the change of name from WRCU to Water Resources Coordination Center (WRCC). The strategic plan is meant to address the challenges of water mobilisation and management in a concerted manner in West Africa. The regional integration, through cooperation and sharing of knowledge is meant to increase the pace of the region moving towards a sustainable management of its water resources. It allows for a flexible and adaptive implementation by member countries.

The strategic action plan recognises that, an IWRM framework needs to impact on the three management systems to be effective and therefore calls for considerations from three perspectives, namely; (i) the political perspective of socio-economic planning (carried by e.g. the States, decentralised authorities); (ii) the perspective of patrimonial management of water resources (carried by e.g. water administrations); and (iii) the perspective of sectoral management of water resources (carried by user sectors e.g. domestic water, agriculture, industries).

Through the development and usage of strategic integration tools like a regional water policy, a framework convention for shared waters and a regional observatory, the PFCM influences the integrating and developing of the regional water basin management. Four strategic domains of intervention are employed:

i. Development of the strategic framework of the water sector,

ii. Management and sharing of information,
iii. Capacity building, and


The PFCM uses 3 additional domains of intervention to ensure closeness to the concrete needs of the actors of the regional water sector in order to gather the relevant regional or international support for them. These are (1) direct support to countries; (2) direct support to transboundary basins; and (3) facilitation of regional thematic programs.

The international waters committee of the WRC forms the link between the WRCC and Ghana and thus coordinates water management in Ghana in compliance with the ECOWAS water resources policy. These regional developments significantly influenced Ghana’s adoption of the IWRM principles and methods in managing her water resources at the Volta basin.

9.4 National, Intermediate and Local Institutional Responses

9.4.1 PAGEV and Local Basin Management Processes

The PAGEV project aimed at improving water governance in the Volta River Basin through a consensus on key water management principles and institutionalised coordination mechanisms. It had the overall objective of assisting Burkina Faso and Ghana to agree on key water management principles and to establish a framework for collaboration in the management of their shared water resources. The project implementation started in 2004. It was implemented in partnership with the Global Water Partnership- West African Water Partnership (GWP-WAWP), WRC and Directorate General for Water Resources (DGRE) of Burkina Faso. The project had a pilot zone in Burkina Faso made up of communities lying close to the Nakanté (or the White Volta). These include Béléyerla, Zékézé, Sampéma and Môg-nôré villages. Those on the Ghana side start from the frontier up to the foothills of the Gambaga scarp, and include Sapeliga and Sakom in the Bawku West District, Mognore in the Bawku Municipality, and Kugrasia in the Garu-Tempane District (interviews, 2008: 1, 50, 51). These areas that were included in the pilot are among areas that were extensively flooded in the West Africa sub region in 2007 (between July and September).

The selection of the sites was the outcome of complementary situation analysis jointly undertaken by staff of WRC, DGRE and PAGEV. The collaborative efforts linked the local communities in the establishment of the White Volta Community Consultative Forum (interviews, 2008: 42, 50). This forum brought together experts, representatives of local government organisations; water users associations; farmers groups; as well as community organisations in the selected sub-basin. The outcome was a collective deliberation on workable solutions to issues affecting the common use of the White Volta resources. Issues given prominent attention included collective participation of different groups in the society (including women), conflict resolutions, river bank restoration and a small reservoir rehabilitation, which would guarantee the equitable and sustainable management of their shared water and other natural resources.

9.4.2 Policy and Institutional Frameworks

There are two main outcomes that emerged from these arrangements. First, there was the establishment of multi-stakeholder forums for IWRM at the community, national and transboundary levels. This enhanced local participation in decision making in natural resources management of the basin. Second, there was the initiation of innovative co-ordination
arrangements on transboundary water management from a multi-level perspective backed by new agreements and protocols to promote long-term transboundary cooperation. These were:

i. Formulation of a code of conduct for the development and management of the shared water and other natural resources of the Volta Basin;

ii. Establishment of multi-stakeholder forums for IWRM at the community, national and transboundary levels to promote cooperation;

iii. Development of guidelines on governance of the local forums and establishment of links to national and transboundary level institutions; and

iv. Signing of the bilateral agreement between Burkina Faso and Ghana formalizing the JTC-IWRM (WRC, 2003).

Further, national and transboundary forums were held to promote consultations among actors in the management of the basin resources. PAGEV facilitated the improvement of the institutional capacity for transboundary data collection and sharing by assisting in the establishment of river gauging stations downstream of the Bagré dam and on the Nouahou River (a tributary of the White Volta in Burkina Faso) in order to have details of the contributions of flows from these channels. PAGEV also supported DGRE to establish a water quality monitoring system in order to accurately establish the quality of flow into Ghana.

In 2006 a joint team of PAGEV and GWP-WA experts supported by an external Consultant facilitated the putting together of operational guidelines for the functioning of the local transboundary committee. This was validated at a 2nd transboundary forum at Bolgatanga (Ghana) in January 2007 (PAGEV, 2008).

Arrangements of stakeholders from national to local levels were put in place for efficient management (see table 9.2). These organisational arrangements were meant to bring about strong linkages with the local, national and international levels efforts at managing water resources in the basin.

Table 9.2: Organisational stakeholders from national to local levels

<table>
<thead>
<tr>
<th>Organisation/Agency</th>
<th>Responsibilities</th>
<th>Contributions of PAGEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Resources Commission</td>
<td>Co-ordination &amp; implementation of government policies in IWRM; mandated to regulate and manage Ghana’s water resources.</td>
<td>Directly responsible for implementing IWRM pilot interventions on the Ghana &amp; Burkina Faso side of the basin through its basin office at Bolgatanga.</td>
</tr>
<tr>
<td>Water Research Institute</td>
<td>Undertake water quality and hydro-geological mapping in the White Volta Basin with support from WRC (DANIDA funding).</td>
<td>Provide water quality and hydro-geological data for the knowledge base component.</td>
</tr>
<tr>
<td>Ministry of Water Resources, Works and Housing - Ghana</td>
<td>Formulates and coordinates all water sector policies in Ghana; Monitors, supervises and evaluates activities of agencies in the</td>
<td>Monitor the cooperation between the Water Resources Commission and Hydrological Services Department.</td>
</tr>
</tbody>
</table>
realisation of water sector policy objectives through a Water Directorate.

| District Assemblies (Bawku Municipal Assembly, Bawku West and Garu-Tempate District Assemblies) | Oversight responsibilities over the IWRM pilots.  
- Provide financial and technical support to the pilot interventions.  
- Lead in environmental awareness campaigns.  
- Implement government’s development programmes at the community level ;  
- Plan and recommend strategies and activities for improved environmental protection ;  
- Promote indigenous culture that promote and enhance environmental conservation.  
- Oversight responsibilities over the IWRM pilots.  
- Provide financial and technical support to the pilot interventions.  
- Lead in environmental awareness campaigns.  
- Implement government’s development programmes at the community level ;  
- Plan and recommend strategies and activities for improved environmental protection ;  
- Promote indigenous culture that promote and enhance environmental conservation. |
| Environmental Protection Agency (EPA) | Provide technical support to the Districts to monitor impacts to ensure that the sustainable management of the environment (land, forest and water resources) envisaged in the Project are carried through.  
- Implement environmental policies, regulations and programs;  
- Ensure compliance and enforcement of environmental regulations (EIA);  
- Conduct and promote environmental education and awareness.  
- Provide technical support to the Districts to monitor impacts to ensure that the sustainable management of the environment (land, forest and water resources) envisaged in the Project are carried through.  
- Implement environmental policies, regulations and programs;  
- Ensure compliance and enforcement of environmental regulations (EIA);  
- Conduct and promote environmental education and awareness. |
| Volta River Authority (VRA) | Ensuring the health of the river and the lake.  
- Generate Electricity for domestic and industrial uses ;  
- Carry out river transportation on the Volta Lake;  
- Ensure the sustainable development of the lake and its resources.  
- Generate Electricity for domestic and industrial uses ;  
- Carry out river transportation on the Volta Lake;  
- Ensure the sustainable development of the lake and its resources. |

Source: Adapted from PAGEV, 2007

Other supporting organisations are the Ministry of Food and Agriculture, The Forestry Commission and a local NGO, ZOVFA (Zuuri Organic Vegetable Farmers Association) (interviews, 2008: 1, 50, PAGEV, 2007).

All the initiatives for IWRM practices seem to originate from the international community rather than the countries involved. The funding for its success depends heavily on how much the donor community is prepared to give out. How workable these initiatives are going to be in other basins and with the other riparian countries will depend on sustainable source of funding from Ghana and the transferability of these principles to other basins/sub-basins. PAGEV is at the moment in the process of upscalling their interventions beyond the pilot areas. The outcome will be essential ingredients for future actions.

9.5 New institutions and organisations versus existing institutions and organisations

The PAGEV project is a water management initiative of the World Conservation Union (IUCN) in Africa with funding from SiDA and WANUDGIS and with the support of GWP/WA. It adopts the mainstreaming of the ecosystem approach into river basin planning and management. Collaboration between IUCN-PAGEV and ZOVFA was formed for the implementation of aspects of the transboundary IWRM.
ZOVFA was established in November 1993 (see 6.4) in a village called Zuuri. It has grown to become a local NGO which has been registered with the Department of Social Welfare and the Registrar-General’s Department in Ghana. ZOVFA started through groups’ formation and its activities were jointly implemented through the association of women and men groups. It was formed among other things to:

- Promote sustainable farming practices especially organic production of vegetables.
- Support community tree growing and agro forestry as a means to reversing the increasing environmental degradation.
- Undertake co-operative marketing of agricultural produce as a way of reducing the exploitation by the urban – based middlemen and women.
- Serve as a spring-board for undertaking local community development activities in the Upper East Region of Ghana which happens to be part of the White Volta basin (interviews, 2008: 51, 52).

The activities under the pilot transboundary IWRM project were implemented in collaboration with this local NGO, ZOVFA from Ghana and another local NGO, Bissakou-Pou from Burkina Faso, and with the support of the decentralised technical and administrative structures of the district (interviews, 2008: 1, 50, 51, 53). At various local workshops, communities were mobilised and trained to identify with the project on river banks protection whiles meeting some livelihood needs through poverty reduction initiatives. These arrangements with IUCN-PAGEV, Bissakou-Pou, ZOVFA and the District assemblies are a reflection of how new arrangements are playing out with existing ones in the basin.

The effects of these developments have influenced the creation of buffer strips along the White Volta and reforesting the strips in selected communities as well as rehabilitation of the small reservoir at Sakom village near Zebilla in Ghana. The aim was to conserve land and water resources of the White Volta River for sustainable development.

The approach to accomplish this was by (i) helping the communities in the two countries to jointly manage their water resources in a sustainable manner; (ii) checking soil erosion along the river banks to restore and maintain the land cover; and also reduce sedimentation of the river channel; (iii) improving the productivity in the flood plain near the small village of Sakom while assuring the sustained functioning of the ecosystem; (iv) supporting local initiative in income generation, to ensure food security and reduce poverty; and (v) protecting the existing forests through the development of woodlots as alternative source of fuel wood for the rural communities (PAGEV, 2007; interviews, 2008: 1, 50, 53).

It appears the communities have not fully understood the principles behind the creation of the buffer strips because they claim the strips closer to the water bodies are more fertile for their farming activities and hence do not seem to comprehend why a fertile land should be left to fallow whilst there is hunger (interviews, 2008: 14, 49, 81, 31, 131).

9.5.1 IWRM and Alternative Livelihood

The IWRM pilot intervention activities included the conservation and protection of water bodies in 8 communities (four each from Burkina Faso and Ghana). Seven community nursery sites were established with a total of about 27,000 trees seedlings (including acacia and albizia) and about
6,500 imported fruit seedlings (grafted mangoes and guavas), which were transplanted on the river banks in 2006. The new institutional arrangements resulted in the formation of river bank protection committees which have been supported to raise nearly 14,000 seedlings (acacia, Parkinsonia and grafted mangoes) and had transplanted them on the river banks by July 2007 (interviews, 2008: 50).

Exchange of visits among the communities to share experiences were organised to offer some communities the opportunity of learning from other communities. These activities were supported by a joint planning of technical services from different sectors (Agriculture, Forestry and Environment) with the NGOs to limit fragmentation among organisations that could have adverse effects on the effectiveness of natural resources management interventions.

At the community level workshops, were organised to train local people to be involved in the project on river banks protection. Training sessions were organised as a way of building the capacity of the communities in protecting the buffer strip from bushfire whiles limiting animal grazing. This also enabled each community to constitute sub-groups for the surveillance of the plants. It is too early to tell if these surveillance groups are going to be sustained with the passage of time after the PAGEV project has ended. Some of the initiatives led to ZOVFA operating through some water user association (see 9.5.2). Some of such WUAs include the Sakom, Mongnore and Sapeligwa water user associations.

9.5.2 The Sakom Water User Association

The Water Users Association of Sakom was revitalised with the support of ZOVFA. This WUA comprises communities that were forced to move to farm at the banks of the White Volta after the dam they were using for their farming activities collapsed in 1998. Due to the destruction of vegetation cover at the river basin, the White Volta Basin Board decided to relocate the community back to the original settlement in order to protect the water body. The community had moved to the river bank because the collapsed dam deprived them of the privilege of using water from the dam for their dry season farming, animal watering and for domestic purposes. The Board decided to rehabilitate the dam to make water available for them (interviews, 2008: 1, 14, 15, 50).

The rehabilitation was undertaken in collaboration with PAGEV with assistance from the Bawku West District Assembly. The White Volta Basin board, the District Assembly and PAGEV identified ZOVFA which was already in organic farming promotion and tree planting campaign within the basin and contracted them to facilitate the project since they (ZOVFA) were already having good working relations with the communities. This is a demonstration of how existing local organisations can be utilised for new policy and programme implementation. It also shows the level of cooperation among the local government units/agencies, the water management organisations and private NGOs. These interactions have the potential of ensuring integrated and sustainable management of water resource in the basin.

The communities were trained in how to manage the dam for their own benefit. This was done in collaboration with the ministry of Food and Agriculture (MOFA). The activities included operations such as planting of grass and filling of eroded parts and raising of seedlings for planting at the upstream of the dam to limit erosion and sedimentation of the reservoir and to reduce evaporation from the water body (interviews, 2008: 1, 14).

As a prelude to the rehabilitation of the dam ZOVFA undertook communities mobilisation and sensitization to fine tune the project on themes including environmental hygiene, and water
pollution, and stressing the need for the conservation of water and other natural resources in the basin. ZOVFA enjoyed the support of the technical structure within the basin (i.e. MOFA, Forestry Division and Environmental Protection Agency) (interviews, 2008: 1, 50, 51).

The Sakom river banks protection committee was given training to build their capacity in protecting the buffer strip from bushfire and also to limit animal grazing. Similar projects were undertaken at Sapelig and Mongnore (interviews, 2008: 1, 14, 51). These strengthened members to protect the grafted mangoes which were transplanted at the river banks. Further, each community constituted sub-groups for the surveillance of the planted trees. The collaboration between PAGEV and the GWP-WA brought about the training in IWRM and conflict management among the communities in 2007.

The various interactions among all the organisations at the Sakom dam site and their linkages are depicted in figure 9.2 below. This also depicts the interactions among the laws, rules, principles, and practices governing the various organisations. The strengthening of such linkages is vital for the sustenance of the benefits of the IWRM methods and practice at the basin.

**Figure 9.2 Organisational Interactions at Sakom Dam Site**
The Sakom WUA is managed by an executive committee whose memberships are elected at a
general meeting for a 3-year term. It is governed by a constitution drafted with the help of the
District Assembly, MOFA and the department of cooperatives. Every member is supposed to pay
yearly dues of GH¢2 ($1.43) at the end of the main harvest period. Five people are in charge of
the nursery which is supposed to raise seedlings for planting at the catchment area of the dam.
The driving force for association members participation has been that water availability is critical
to their life. If there is no water, there is no survival. Therefore any programme that contributes to
the making of water available is supported (interviews 2008; 14, 50, 51, 53).

The dam water is managed for irrigation, watering of animals, fishing and for domestic purposes
(e.g. washing, brewing pito, and bathing and for building purposes). The irrigators are involved in
dry season gardening in onion, tomatoes, okra, rice, maize, millet and groundnuts. The committee
decides on when to open the canals for irrigation and also assesses the condition of the canal
every two weeks. They inform the members about activities and measures in protecting the water
at the normal quarterly general meeting but may call for emergency meetings as the situation may
demand. There are 270 members (interviews 2008; 14, 50, 53).

Those who work at the nursery are volunteer workers. With the assistance of ZOVFA, these
volunteers are taught how to raise seedlings, and trained to do grafting (in mangoes). It is
expected that the skills acquired by the volunteers will become a source of livelihoods for them
since they now undertake the nursery keeping as their source of income. This is because the
demand for seedlings for tree crops is increasing as people desire to set up their own woodlots or
plantations. The volunteers are now grafting more mangoes for sale to interested community
members.

The people have indicated that at the river bank where they moved to settle land was ‘sold to
them’ by the landlords there before they could carry out their farming activities. Thus they were
charged some amount before farming those lands during the season. But at the dam site this form
of land tenure does not exist. That serves as an incentive for them to move away and not to return
close to the river.

The rules governing the management of the dam were made by the WUAs at general meetings
and enforced by collective decision to obey these rules because it is the only means by which they
can ensure continued livelihoods. “So we are our own police and all community members
understand why such rules must be obeyed. It is simply for our survival”.

The factors that promoted better local organisational (WUAs) performance for IWRM interventions include the following:

1. Organisational rules are simple and easy to understand by members;
2. Broad local involvement in organisation and its rules;
3. Fairness in resource allocation;
4. Clear mechanisms for enforcing rules;

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41 Statement by the Sakom WUA chairman during discussion with the executive members of Sakom
WUA, 2008
5. Clear, broadly acceptable mechanisms for sanctioning rule infractions; and

6. Accountability of the leaders.

The activities of the association are funded through two sources: (i) the association have its communal farm where communal labour is utilized for production. Usually, the women in the group market the produce and the sales are used as part of the funds for running the association- (some go into maintaining the dam); (ii) the second is through dues paid by members. The homogeneity of identities and interests of members became a driving force for effective organisation.

9.6 The Roles of Formal and Informal Institutions at the Local Level and their Linkages

Three types of local institutions relevant to IWRM practices in the basin are identified: civic, public, and private in their formal and informal forms. In the rural contexts these impact livelihoods through information gathering and dissemination, resource mobilization and allocation, skills development and capacity building, providing leadership, and networking with other decision makers and institutions.

The civil society institutions operate within the rural producer organisations, cooperatives, savings and loan groups etc. Local governments and local agencies (e.g. extension services and the district assembly (town councils and unit committees) are the local public organisation whereas the private organisation are made up of service organisations such as NGOs. The implementation of IWRM actions in the White Volta sub-basin demonstrates that planning and implementation of community-based activities can be shared between sectors as well as between these formal and informal institutions.

Equally important to the functioning of the institutions are the linkages and interconnections they have with each other and rural households; these affect flow of resources and decision making power among social groups, and thus their capacity to adopt the IWRM interventions and its principles. Two types of linkages relevant to adopting IWRM are: (1) Linkages to organisations/agencies: the degree to which different households are linked to various organisations in their locality impacts their access to resources and decision making, and thereby their capacity to change. Institutional connections provide households and communities greater flexibility in their choice of diversification and adaptation strategies. For example, households that are better linked to the water user associations and irrigation organisations benefit more from external support for adaptation, if it is channelled through these existing organisations. (2) Linkages between institutions: the effectiveness of a particular institution in coordinating and responding to changes in water resources governance is shaped by its connections with other local and external institutions. Connections between local and higher level institutions assist in allocating and distributing power among stakeholders of a given locality that are being governed by local institutions for gains from outside the locality. This is what the links with ZOVFA exemplify.

Communal pooling is seen in the joint ownership and sharing of wealth, labours, or incomes across households, or mobilisation of resources held collectively during times of scarcity by the WUAs. This is made possible because of the closely knit social networks among communities and households. During the dry periods for example, there is increase water rationing. The negative effect of crop failure is reduced because (i) the farmers have more equitable access to the
WUA; (ii) the WUA which is responsible for governing distribution of benefits from the communal dam is livelihoods related body.

The local government (i.e. the District Assembly) facilitated the functioning of the local institutions by creating effective support for sanctions used by the local organisations; provided necessary support in terms of information, finances, and skill development. Local institutions are the intermediaries for external support to IWRM interventions (Agrawal et al., 2008). They are the media through which external interventions reinforce or undermine existing practices. However, despite the central role of the local informal institutions (e.g. the tindana, women and youth associations) in the rural communities, they are often not supported by government and external interventions in IWRM. The external support that was provided was channelled through formal agencies (District Assemblies, NGOs, and the River Basin Organisation).

Partnerships between informal processes and formal interventions to facilitate IWRM implementation are limited. Nonetheless, grassroots participation in water resources management is enhanced where the community members realised the direct benefits.

River bank restoration was initially resisted by the local people because of fears of losing rights to access to land. The members depended on resources available from the ecological system and that any arrangement that was seen as interfering in their access met some resistance. Such fears were allayed by initiating dialogue between land owners and farmers and also making the benefits of the intervention clear and visible to the people. This was facilitated by ZOVFA in collaboration with the Forestry Division (i.e. the economic gains from the fruits of the mangoes and the woodlots and the added benefit of still being able to use the land for crop production) (interviews, 2008: 14, 51, 53). This demonstrates the essential role of education and information flow in the learning process of behavioural change in IWRM implementation process.

Difficulties encountered by the local organisations include limited appropriate leadership in running the associations due to low level of social capital and periodic changes in leadership. Low level of educational attainments limits the number of members who can manage the affairs of the organisation. Once leadership is changed the new entrants require a lot of training to be able to effectively lead the association to achieve the desired objectives.

Informal relationships between households, the chiefs, and tindanas helped ZOVFA in its awareness education in the promotion of the IWRM principles and interventions. Without local organisations, rural poor groups find it far expensive to access water for agricultural purposes and other uses relevant to their local needs. It is equally very difficult to increase their information knowledge on integrated water uses. Though limited the existing cooperation between local institutions (formal and informal) has contributed to the deployment of specific IWRM interventions among households and social groups with external support. It comes out from the analyses that it is of necessity to involve both formal and informal institutions in IWRM interventions for a successful implementation (Margerum and Born, 1995). Focusing primarily on technological and infrastructure development without due diligence to local institutions and their interactions are not likely to shape changes in the management of water resources.

9.7 Basin Organisational and Institutional Changes

9.7.1 Types and nature

The transboundary water management arrangement necessitated the establishment of the Volta Basin Authority which has the objective of strengthening the existing institutional and legislative
structures for improved governance at the basin. The pilot project for the implementation of IWRM in the basin resulted in PAGEV whose preference for the bottom-up approach triggered the re-organisation of communities for participation in the project. The approach demanded the formation of local transboundary committees to link up with the basin management board as well as the international level. These institutional changes were based on ‘induced institutional innovation’ deriving from exogenous factors such as the IWRM philosophy from the promoters and the associated foreign funding and conditionalities.

The collaborative efforts of a joint team of PAGEV and GWP-WA ushered in a set of rules- the operational guidelines for the functioning of the local transboundary committees. This brought together participants from Burkina Faso and Ghana, including the Governor of Centre-East Region in Burkina Faso; the Regional Minister of Upper East Region in Ghana; the Acting Executive Director of VBA; top government officials, Departments and Districts representatives; decentralized technical structures of state agencies; SNV; GLOWA-Volta; partner NGOs from Burkina Faso and Ghana; WRC; DGRE; civil society organisations and the team from PAGEV. The approval of the guidelines was followed by the drafting of the Conventions and Statutes for the internal operations of the transboundary committee. These changes of the drafting of water laws, and creation of or change in water organisations at the national and international levels derive from the intentional design approach to institutional reforms/changes.

The executive committee of the joint Transboundary Committee has been responsible for capacity building and training of stakeholders on IWRM and conflict management, facilitated by GWP-WA. The transboundary committee coordinates joint cross-border activities, solve any local level water use problems and disputes, and strengthen cooperation between the two countries.

PAGEV in collaboration with GWP-WA assisted the national forums in formulating rules and regulations to guide their operations. The Water Users’ Associations (WUA) that has been established by the two countries have become important features in the management of water resources in the basin. In order to address the challenges of linking the local and the conventional transboundary structures the multi-level transboundary coordination framework which comprises several actors on various organisational levels; i.e. community, regional administrative/sub-basin, national and transboundary is being pursued (refer to figure 9.1).

At the community level, the river banks protection committee has also been formed at each village with 3 representatives as official spokespersons at the national forums. These are responsible for organising the community and supervising the river banks protection activities. In Ghana they report to the District Assemblies. The coordination of the different national forums is the responsibility of the two basin agencies i.e. Nakanbé Water Agency (in Burkina Faso) and White Volta Basin Board (in Ghana).

At the national level are the water policy implementation organisations of Burkina Faso (DGRE) and Ghana (WRC). The two organisations were the focal points to PAGEV and their respective heads were the co-directors of the project. PAGEV worked with GWP-WA to revitalize the JTC-IWRM, and the JTC-IWRM is responsible for ensuring that the coordination of national transboundary issues link up with the VBA at the basin level through their respective ministries in charge of water.

9.7.2 Outcomes

The changes in the basin organisational and institutional arrangements and the transboundary water governance system have resulted in: (i) the establishment of transboundary collaboration
between authorities and technical structures of the two countries; (ii) improvement of relationships or cooperation between Burkina Faso and Ghana with respect to IWRM in the Volta Basin and the promotion of good neighbourliness at the institutional level in the area of shared water resources management, (iii) the extension of the reforestation to neighbouring villages of the pilot area; (iv) the resolution of cross-border conflicts at local level by the technical services and the local authorities; (v) increases in the income of farmers working at the river banks; (vi) the project which was preparatory to the establishment of the Volta Basin Authority (and its Code of Conduct) could serve as model for the IWRM at the level of all countries sharing the Volta Basin.

The analyses give real indications that (i) the involvement of local stakeholders (authorities, technical structures, NGOs and communities) allow for effective implementation and sustainability of water resources management programmes; (ii) the official recognition of the bank protection committees by the regional and district authorities as associations for the management of the shared water resources could strengthen the autonomous management at community level; (iii) community participation is subject to the taking into account of the needs of the communities involved.

The PAGEV approach to protection of the river banks together with linking poverty alleviation to water and soil conservation have strongly influenced the operations of agricultural programmes in the pilot zone. The creation of buffer zones is being replicated by the Regional Directorates of Agriculture and other community based projects from the areas along the border between Burkina Faso and Ghana as part of support to communities to improve small-scale irrigation for food security.

9.8 Inferences

This chapter has shown that transboundary coordination of management of the Volta River Basin has evolved rapidly. The WRC has the mandate and a sub-committee in place for international negotiations on water. They have had good consultations and bilateral agreements that have the potential for efficient use of the resources for the benefit of the riparian countries. The project constitutes an innovating tool for the integrated management of water resources of the Volta Basin but the scope (in terms of area) targeted by the pilot interventions is too limited. Up scaling the project to cover a broader scope may reveal challenges that are inherent in the IWRM principles and methods.

There exist very strong vertical links with organisations from the local to the basin and finally to the national and international but very weak links at the basin and community levels. This is because the links with the national are more of the hierarchical type of coordination. On the other hand at the local level they typically rely on cooperative types of coordination mechanisms. The coordination mechanisms for water resources management are established for: enhancing information flows for better informed decisions, coordinating decision-making and implementation, improving regulation and promoting democratic governance.

The new institutions and organisations do not ignore the existing ones (formal and informal) but rather are exploring ways of effective cooperation. If community crafted institutions are perceived to be fulfilling the felt needs of the community, they tend to respect and conform to the demands of that organisation or institution and wins their support for any initiative. The drafting of water laws (code of conduct), and creation of or change in water organisations at the national and the transboundary levels followed the intentional design approach to institutional development. Notwithstanding, these changes are also influenced by some exogenous factors including the
IWRM philosophy, conferences and agreements from the international community and external funding. This bears the features of ‘induced institutional innovation’. The changes that are taking place within the WUAs and ZOVFA are explained in the context of survival in terms of social, cultural and economic factors.

PAGEV has succeeded in establishing basic water governance structures (policy and institutional) for the operations of multi-stakeholder forums for IWRM at the local community, national, river basin, and transboundary levels. The challenge is in sustaining the vertical and strengthening the horizontal coordination and linkages among various programmes and projects in the basin. To succeed in linking across scales, continual actions are needed to:- (i) test and consolidate the transboundary model; (ii) synthesise learning and use effective dissemination methods to enable replication and up scaling of these approaches.
10. Conclusions and Recommendations

10.1 Recapitulating Research Questions

This thesis set out to understand why the concept of integrated water resources management (IWRM) is being adopted and how it is being interpreted in different countries. It also hoped to unravel how the philosophy has been applied in developing countries. Institutions are essential in the sustainable management of water resources. How then do the institutional arrangements and the interactions among the institutions in developing countries influence the way they manage their resources.

The single case study dealt with in this research is Ghana. Hence, the thesis focuses on IWRM interpretation and implementation in Ghana. It examines the nature of the problems in the use and protection of water resources in Ghana; the extent to which water related problems in the use and protection of water resources can be attributed to institutions in Ghana; the existing organisations and institutions and how these have been modified with the adoption of the IWRM philosophy; which of the new institutions function and which do not and why; which socio-economic factors in the White Volta basin influence the practice of IWRM; and how can water management be improved in Ghana.

This chapter attempts to integrate the information collected and analysed in the previous chapters in order to provide a comprehensive set of answers to the key research questions. It focuses on conclusions and implications for theory (see 10.2), implications for practice (see 10.3) and recommendations (see 10.4). It then extrapolates to the other developing countries (see 10.5).

10.2 Conclusions for Ghana

In the water management world, four paradigms have been simultaneously marketed worldwide. These include the paradigm shift from government to governance, from centralization to decentralization, from water as a gift of God to water as an economic good and from sectoral to integrated water resource management. The first three paradigm shifts are independent of the water issue; the last paradigm shift has incorporated the first three in its many shades. This book has exclusively focused on the water paradigm, but has more often than not also discussed the other three shifts.

The existing literature argues that a sectoral approach cannot address the multiple uses and challenges facing water. It calls for integrated water resources management. However, while the vision of a comprehensive approach conjured by the idea of integrated water resources management is very theoretically appealing; while the advantages of the concept are much greater than the disadvantages (see Table 2.5), the concept remains elusive (Conca, 2006). The literature offers diverse definitions for the concept (see Table 2.3) but it is not often clear how ‘affordable’ the comprehensive approach is in a developing country.

Chapter 3 examined the existing literature on the application of the concept in developed and developing countries and concluded that there are, at least, 9 reasons that can be derived from the literature to explain why IWRM is not always a success story in developing countries like Ghana (see Table 3.2). Nevertheless, the approach to examining IWRM in terms of how it was adopted and interpreted began with an open approach.

46 An earlier draft of this Chapter has been submitted to Water Policy in 2009. It is in the review process.
This section tries to sum up the key trends in Ghana’s water policy since colonial times. Customary water law existed in pre-colonial times; its main tools were taboos and prohibitions and compliance was forthcoming as people were afraid of the wrath of the spiritual leader and the gods. The system was decentralised, water and its services were seen as a gift of God and no payments were made for these services. Given the limited uses of water in those days, the management style was integrated if localised. During the colonial period, codified laws replaced the customary laws, at least on paper if not in fact; the system became centralised and hierarchical, water access became subject to permits and licenses; and sectoral approaches were prioritised.

In the post-colonial era, the written laws were improved upon; the centralisation of power and authority was consolidated, sectoral approaches were further elaborated, but were subject to limited resources, and water services were subject to a complex regime of tariffs, subsidies; and water was sometimes provided free of cost. Water was nationalised and was invested in the Government in trust for the people; thus divesting local owners (mostly the Tindanas) of their rights over the water. Since the early 1990s, the government has been adopting the concept of integrated water resources management – which shifts management of water from line hierarchies to a governance concept which involves horizontal coordination and the inclusion of stakeholders in policymaking; is a mixture of top-down and bottom-up approaches; and a key rationale is the need for efficient uses of water, which implies that water is or at least should be seen as an economic good (see Table 10.1). The evolutionary changes are consistent with the findings in the literature (Gupta and Dellapenna, 2009; Dellapenna and Gupta, 2008).

### Table 10.1: Changes in water policy in Ghana

<table>
<thead>
<tr>
<th>Paradigm Shifts/Periods/Regime</th>
<th>Government to Governance</th>
<th>Centralisation to Decentralisation</th>
<th>Cultural to Neo-liberal</th>
<th>Sectoral to Integrated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customary (Approximately before 1874)</td>
<td>Customs (Uncodified customary laws and cultural practices; traditional authority)</td>
<td>Decentralised form of management</td>
<td>Water defined as free gift/common good for all</td>
<td>Integrated Water Resource management (cultural)</td>
</tr>
<tr>
<td>Colonial (1874-1957)</td>
<td>Government; introduction of codified/written laws + customary laws</td>
<td>Centralisation</td>
<td>Free good but controls e.g. acquisition of permits/licence</td>
<td>Sectoral approaches to water resources management</td>
</tr>
<tr>
<td>Post Colonial Regime (1957-1998)</td>
<td>Government; more of written law + less of customary law</td>
<td>Centralisation</td>
<td>A mixture Tariffs introduced + subsidies; free</td>
<td>Sectoral Approaches to water resources management</td>
</tr>
<tr>
<td>Modern (1998-date)</td>
<td>Governance: Participation, equity, accountability, etc.</td>
<td>Mixture of Centralisation + Decentralisation</td>
<td>Pricing of water as an Economic good; Privatization</td>
<td>Integrated Water Resources management</td>
</tr>
</tbody>
</table>

10.2.1 Factors of Change Leading to Adoption of IWRM in Ghana

This thesis aimed to understand the reasons why water management has changed in recent years; to assess the factors of change.

In general, post colonial water policy in Ghana was fragmented, coupled with the absence of a common coordination mechanism. This apparently led to the drying up of water bodies due to uncontrolled clearing of vegetation along riverbanks for agricultural activities. The supplies of
potable water to both urban and rural communities were hampered. In addition there was pollution of water bodies through human activities of the ever-increasing population such as domestic and industrial waste disposal, and mining activities.

To address the problem the government started institutional reforms in the 1990s, which eventually resulted in the moving away from the over centralised management system under the GWSC. This followed the decentralisation process and the subsequent adoption of the integrated water resource management (IWRM) model for the management of Ghanaian water resources.

There were two major push factors that were responsible for the initiation of the water sector reforms in Ghana. These are: (1) endogenous factors that are internal to the water sector, and (2) exogenous factors which are outside the confines of both water institutions and the water sector.

The endogenous factors include first, water scarcity in terms of quantity and quality. Poor water quality is a widespread problem in the country but very severe in the urban communities due to pollution from human activities of the growing population and effluents from industrial activities. This can affect human health and productivity (see Chapter 1). The quantity problem is seasonal but pronounced in the north of the country, especially in the case of water availability for agricultural sector. Second, conflicts among the various water user sectors are very common in the north (the White Volta basin). These conflicts often result from scarcity and are especially severe during the dry season farming period. Third, there were operational inefficiencies of water organisations due to conflicting water sector laws and regulations, and inefficiencies in water management organisations/agencies. The hierarchical nature of water management and allocation together with insufficient sharing of information and poor sectoral integration created the conditions for change. Fourth, the financial constraints in the maintenance of water infrastructure meant that the government budget hardly catered enough for these facilities and the revenue generated from their operations were less than the input costs. Fifth, population increase and urbanization leads to an ever growing demand for water for productive and domestic needs. This created the situation where the existing institutions and organisations became inappropriate to deal with management issues and hence created the economic urge for change. Socioeconomic activities within the basins, which call for aligning policies and laws to provide the needed environment for such activities also provided the push for changes in the management institutions and organisations; Sixth, Ghana has faced increasing floods and drought in recent years which has resulted in the loss of crops, landed properties and lives calling for a new management approach; and seventh the concern for the protection of the environment of water bodies provided another impetus to search for a different approach.

At the same time, the water sector derived a substantial influence from exogenous factors emanating from changes in the local government system in the economy. These exogenous factors include (i) economic and political reforms which were influenced by the development ideology of the West. The bottom-up approach to economic development which requires the active participation of stakeholders necessitated a decentralisation policy (Ayee, 1997; Crook, 2003). This resulted in a mismatch between the centralised water management organisation and the many decentralised units/assemblies that were to take care of water issues. This then induced the changes in water management institutions and organisations so that water management structures fall in line with the general governance structures. (ii) UN conferences and international agreements led to greater priority being given to new concepts and ideas – e.g. environmental impact assessment; and these were then adopted in national policies; The Millennium Declaration has prioritised water access for the poor; (iii) International discourses about water management had a major influence. Three pathways can be distinguished – these discourses may be adopted by the government as part of its international commitments; national scientists participating in these discourses may import these and make them part of national
policy (Haas, 1989) and lastly, donor agencies and banks can incorporate these ideas into their help (Scheumann et al., 2008; Gupta, 2009).

In the case of Ghana, the Government has made commitments to adopt and meet the conditions of IWRM (e.g. in the West Africa Water Resources Policy, Dublin principles) influenced reforms in the water sector. However, a reading of this thesis shows how important the aid agencies, the World Bank and the international bodies have been to finance and stimulate water management in Ghana. Development cooperation from development partners came with prescriptive and normative policies based on western ideologies. Donor countries which supported the water sector attached ‘conditionalities’ which promoted the principles of IWRM in their programme design and projects. These came with the imposition of the neo-liberal ideas of treating water as a commodity and allowing the market to allocate water resources to ensure sustainability and efficiency.

The power for external influence was created because in the face of the inadequacy of government budget the substantial external inflow of funds was a respite for government. This generated the push for water sector reforms. In order to mitigate the effects of these there was the need for improved management practices and these necessitated changes in goals and objectives in basin management; (iv) The transboundary management effort with Burkina Faso was another such force. A lot of international influence through funding efforts of seeing the success of the transboundary management at the White Volta Basin brought to bear a kind of pressure to reform to the preset standards.

A combination of the effects of all these factors increased the demand for change in the water sector institutional arrangement. The diagram in figure 10.1 depicts the conceptual framework of the Ghana situation.

**Figure 10.1: Conceptual Framework for Ghana situation**

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The diagram in figure 10.1 depicts the conceptual framework of the Ghana situation.
10.2.2 Adopting IWRM against the Background of Decentralisation and Shift to Governance

The decentralisation policy aims at the devolution of authority to the district and the local level authorities and the utilisation of more participatory approaches in the management of resources. Devolution and participatory methods have the potential to improve water management at the local level (WWDR, 2006; Giupponi et al, 2006; Alaets, 1997). To ensure that the management of water resources was devolved to the lowest level, the CWSA was created to spearhead the management of rural water supply with the involvement of community water and sanitation boards or water and sanitation committees (CWSA Act 564 of 1998; CWSA Policy Guidelines, 2005).

The Water Resources Commission, as the only centralised national water management body, is expected to have the potential of realising an efficient and equitable allocation of water across sectors. The WRC through the governance structures of delegated management is represented at the regional/basin level by the River Basin Boards. The Boards thus represent a coordination mechanism between government agencies with the participation of a representative of the traditional authorities (chiefs), civil society and women groups (interviews 2008: 1, 12, 42, 46).

However, decentralisation has not been achieving the anticipated results in Ghana for six reasons: (1) the decentralised units do not have the adequate human resources to carry out their activities. The District Assemblies, for instance, do not have the personnel (e.g. water engineers) to effectively assess and monitor water infrastructure development. They still rely on regional or national offices for such staff. (2) Financial resources are still centralised. Programme activities from the decentralised units at the basin or local level have to wait for financial approval from the centre. (3) The shift from government to governance has imposed more financial and managerial burden on the local communities than they can bear. Yet the decentralisation process was not accompanied by a commensurate shift in political and financial power to the local level (interviews 2008: 1, 6, 37, 47, 76, 78, 80, 82, 83, 84, 89, 90, 124). In practice there is a combination of centralisation and decentralisation. (4) The bottom-up approaches to developing comprehensive plans involves so much participation that there is loss of focus. (5) At the national level, the WRC does not include a representative of the private sector. As shown in Chapters 7 and 8, private sector companies play an important role in water resources development in the region, because they are contracted for the provision of infrastructure and – in the case of drinking water supply – they are also contracted for community capacity building. Unlike public sector agencies and NGOs, the private sector companies do not represent public interests. (6) With regard to domestic water, every inhabitant of the region is a water user. Relative to domestic water use the number of agricultural water users is limited but still large, considering the number of those who are interested in getting access to irrigation water. Hence, direct participation of the water users in decision-making at the Basin Board is not possible.

If the District Assemblies are represented at the Basin Board, they could be considered as the representatives of the water users, because the Districts are represented by elected Assembly members. The organisation of the water user associations (WUAs and WATSAN committees) at the District level could result in their representatives serving as members of the Boards, or as resource persons to be consulted in planning processes. This organisation at the regional or basin level may require continuous funding and support. However, this may be a worthwhile investment in order to be able to bring the experience as well as the views and interests of the water users to bear on water resources planning and management in the White Volta Basin.
10.2.2.1 Changes in the Basin

The changes in the basin organisations (DAs & WATSANs) and the institutions governing them show institutional changes endogenous to the economic process of decentralisation of development planning in Ghana. Drafting of water laws, water policy, creation of Basin boards & WRC are evidence of intentional design approaches/methods. These are also explained by 'induced institutional innovation' due to the exogenous factors of IWRM philosophy being promoted by the international community. Changes in the WUAs are as a result of the fact that members want to survive in terms of social, cultural and economic factors.

The deductions made out of these are that institutions interact to give a changing form depending on the changing environment. Their processes of change are not to be considered as simple displacement of one institutional arrangement by another. Consequently, the transfer of the so-called “best practices” can be dysfunctional.

The water management institutional reforms have proved to be a complex process in Ghana. The rational choice institutionalist ideal expects that societies will choose rationally from a set of policy alternatives. This does not necessarily happen in water institutions in Ghana. The change in incentives did not yield the anticipated change in behaviour. This is a result of a cultural mismatch between decision-making in IWRM and the local institutions. The Ghanaian economy is mainly rural and hence does not easily respond to the price incentives as put forward by the IWRM philosophy. It is difficult to understand how pricing can be used to change behaviour towards a resource which individuals have been using as a free commodity (common good) over the years for domestic purposes. The change in the social value of water as a gift of God, which can be obtained at anytime without exhaustion to that of water as a resource that is limited and now being considered as a commodity cannot be abrupt.

Are the outcomes then a result of path dependency (policy and structural choices experiencing the influence of the past?) or could it be unintended outcomes (that can be positive or negative for resource management)? The established patterns of behaviour that already have been proved (Hall & Taylor 1996; Thelen, 1999) are still being used in trying to meet new challenges in resources management. The Ghana water management system has initiated a new path. But this new path does not represent a radical break from the past. Many of the institutions of the old path continue as before, some old institutions are transformed for new purposes, and new institutions are introduced. This represents a new path because the “logic” of the water management system has significantly changed, i.e., the incentive structures for key actors and patterns of strategic interaction among them within the sector have changed significantly.

This particular conception of a path switch-over may be different from that commonly assumed by other theorists of path dependence. If the proposition that, a new path can only be constituted by complete, radical change (what North calls discontinuous change, e.g. natural disasters), then the concept is of rather limited use.

Though change could be difficult, in the Ghanaian situation, there is a kind of selection among the various logics that are presented to the actors through the IWRM ideas. The selection is based on the general conclusions drawn from specific examples of change elements and the perceived prospects available to the actors. For purposes of agricultural production there is a gradual change from the old mode of management towards the WUA model since the new system seems to make water available for production all year round to support their livelihoods. The community crafted institutions that are perceived to be fulfilling the felt needs of the community are respected and the people conform to the demands of that institution and accept it as a legitimate entity.
The grafting of IWRM institutions on the existing sector-specific institutions has resulted in a mixture of outputs. There is interaction of the existing institutional elements and that of the new concept, giving rise to new cooperation (which is not formal linkages) among the basin organisations involved in water management. The sustainability of the output will depend on whether the beneficial elements of the new institutions will persist or that of the old based on the perceptions of the beneficiaries.

There is the indication that appropriate or adequate understanding of local institutions and how they respond to changing societal conditions is crucial in determining the path of institutional change and hence institutional arrangement in water management within a given context. This affirms the importance of understanding the learning processes of a society in order to predict the success or otherwise of the IWRM approaches in any given situation.

10.2.2.2 Linkages among Water Organisations

The basin level organisations show no formal linkages among them. There remain very strong vertical links with organisations from the local to the basin and finally to the national but very weak links at the basin and community levels. This is because the links with the national are more of the hierarchical type of coordination with its associated power relationships. And these have political and legal basis due to the fact that the organisations involved are in the public sector. The horizontal linkages are weak because each line department concerns itself with its own activities and nothing more. On the other hand at the local level they typically rely on cooperative types of coordination mechanisms.

There exists a strong link between the basin secretariat and the water resources commission as well as the basin board in Burkina Faso which makes the management of the upper–stream lower-stream integration concept workable. The coordination mechanisms for water resources management are in place to enhance information flows for better informed decisions, coordinating decision-making and implementation, improving regulation and promoting democratic governance.

There exists a problem of institutional fit /interplay in water supply at the local level. The CWSA which is responsible for rural water supply operates under MWRWH at the national level but at the community/district level operates under MLGRD leading to many operational difficulties. The rules and practices of the two ministries differ, the human resources requirements are different and the competences are not the same. The lines of command become somewhat unclear at the local level.

Since the top-down sectoral approach seems to be working well, especially in the agricultural sector it implies that no drastic changes in the agricultural sector may be needed. It will rather be appropriate to strengthen the various sectors to perform well in their respective fields and the WRC helps in getting the various water use sectors into a close cooperation and coordination.

At the basin level governance structures based on customary law and those based on modern law coexist. Institutions based on customary law have been formally recognised in the Constitution (see section 5.4.4), since “public affairs would be better managed if public officials were informed by the value systems that underpinned Ghana’s indigenous political institutions” (Arhin, 2002:1). In the local government system (section 6.2.1.1) the traditional authorities have no formal representation at the District and sub-district levels. They are however known to play important roles in managing public affairs at the sub-district level. Though formal law acknowledges the role of the traditional authorities in land management in the basin, their role in the management of water resources is not explicit. In fact in the light of the WRC Act 522 of 1996 their claim to ownership of the water bodies is non-existent anymore because these are vested in the President to hold it in trust and on behalf of the people of Ghana.
The chiefs and the *tindanas* are the two institutions responsible for conflict resolution in the communities ranging from social, business and even spiritual issues. The *tindanas*, rather than the chiefs are in charge of natural resources but they do not have a regional or district representation in the formal management structure. The ignoring of this local institution through the manipulation and marginalisation of the *tindana* has contributed in part to some of the failures of the current management process. The shift from cultural management to the neo-liberal ideas has proved to be incompatible with the culture and institutions in Ghana.

10.2.3 Interpretation of IWRM in Ghana

The IWRM philosophy is defined severally by different authors and practitioners. The different types of definitions emanate from the different conceptualisations and/or interpretations of integration. Table 10.2 recalls Table 3.1 and adds the Ghanian interpretation of IWRM.

Table 10.2: Interpretations of IWRM

<table>
<thead>
<tr>
<th>Integration</th>
<th>Definition</th>
<th>Ghana’s interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sectoral integration</td>
<td>Integration of different uses (domestic, agricultural, industrial and recreational) of water/water using sectors. Integration is used to refer to coordination between sectors and agencies.</td>
<td>Limited integration of the agricultural (irrigation) sector</td>
</tr>
<tr>
<td>Integration of water resources management in the broader development context</td>
<td>Integration links water resources management with a nation’s economic planning and development; and with the general social, technological, and environmental development.</td>
<td>Superficial integration limited by resource availability</td>
</tr>
<tr>
<td>Water as an integral part of the ecosystem</td>
<td>Integration takes into account the aquatic ecosystem (fauna and flora), land, environment and infrastructural development in the basin; integrating the (biophysical) resource base.</td>
<td>Limited attention to ecosystems (fauna)</td>
</tr>
<tr>
<td>Spatial integration</td>
<td>Integration of upstream and downstream uses; the planning and development considers upstream and downstream link as one entity.</td>
<td>Ensures upstream-downstream consideration in planning water management</td>
</tr>
<tr>
<td>Blending of actions and objectives</td>
<td>Integration is seen as the blending of actions and objectives, considered appropriate by different actors, for the attainment of maximum utility in a river basin or watershed.</td>
<td>There are still elements of objectives and actions undertaken by different actors which are not blended</td>
</tr>
<tr>
<td>Political, technical cooperation, and legal</td>
<td>Describes the vertical integration of national, state and local IWRM policy development and legislation to</td>
<td>This is being well pursued under the WRC</td>
</tr>
</tbody>
</table>
pillars identify and share data gaps to integrate legal and financial authority for river basin organizations

Supply and Demand Managing demand to meet supply on a sustainable basis In practice, limited attention is given to supply management

These definitions have influenced the various methods and approaches adopted by developed and developing countries.

Ghana adopts a narrow view of the concept (or the philosophy). This has led to the acceptance of IWRM as a blueprint package comprising: a national water policy, a water law and regulatory framework, recognition of the river basin as the appropriate unit of water and land resources planning and management, treating water as an economic good and participatory water resource management. This is generally easy to do (see 3.2; IWMI, 2007) and it seems Ghana has gone that easy way.

Ghana has accepted IWRM in theory to mean: (a) managing water as an integral part of the ecosystem; (b) Integrating water resources management with the nation’s economic planning and development; (c) Water management is based on hydrological boundaries but the hydrological boundaries are not in tandem with physical geographical boundaries of Ghana which creates its own management problems (interviews 2008: 1, 42); (d) integration of different uses of water/water using sectors. This involves the coordination of sectoral plans and the coordination among water management agencies. (e) Managing demand to meet supply on a sustainable basis

Government, supported by donor organisations, and not by the stakeholders themselves initiated river basin management. The implementation processes show that Ghana’s experience with IWRM is still evolving, and the interpretation of the concept and application of the principles in practice are being introduced in various sector-related policies, plans and programmes. The transition has been managed in a gradual, and incremental basis mostly donor funded. The major donor, DANIDA, brings its funding to an end in 2008. The Commission, having established the Water Management fund, thinks it is in the position to shed off some of its foreign dependence but the annual accounts of the WRC does not support that it can be achieved in the next five years.

10.2.4 Strengths and Weaknesses of the IWRM Approach in Ghana

There are opportunities/strengths emerging from the implementation of the IWRM in Ghana. The opportunities include first, the widespread international acceptance, which offers Ghana the avenue of receiving financial and technical assistance from the international community who want to see the successful implementation of the concept in developing countries. Second, it sets the direction for long term planning of water resources and can be well exploited for equitable allocation of water resources to the competing uses and sectors. Third, because it includes elements of good water governance (coordination, equity, inclusiveness, and participation) a high degree of the success of the bottom-up approach to planning water resources for sustainable development and management is anticipated. Fourth, its comprehensiveness and holistic nature offers the opportunity of looking at water management issues from the multidimensional, multi-interest, multi-purpose and multi-causes perspectives in order to resolve them through multi-institutional and multi-stakeholder coordination for the attainment of maximum utility from the resource (Adeel, 2004; Jonch-Clausen, 2004; Biswas, 2004; Anderson et al, 2008). Fifth, because
the water institutional changes were in tandem with countrywide economic reform and political reconstruction it was less costly having the changes on the part of government.

Sixth, another good thing about IWRM in Ghana is the changes in the perception of influential organisations (MOFA, CWSA, EPA and GIDA) which led them to support the reforms (private interest theory), and the consideration given to the social setting, the perception of the resource by the people and the value they place on the resource.

Seventh, the irrigation management transfer improved cost recovery. This implies getting the most value for money from investments in infrastructure although this has shifted the cost burden to the poor in society (Berck, 1996; Jaglin, 2002; Tod et al., 2003; McDonald and Ruiters; 2005; Cleaver and Toner, 2006). Eighth, the cautious approach to private sector participation in water supply which was intended to create opportunities for further public-private collaborations was lauded as having the potential to deal with the imperfections in existing organisations, though this approach has been challenged in the literature as a neoliberal ideology which amounts to an abdication of central government’s responsibility (McDonald and Ruiters; 2005). Nineth, the national registry of water users allows the WRC to collect fees for water use as well as identifying the over allocated water sources and imposing a degree of demand management on users of national waters

Despite these strengths the IWRM philosophy and methods seem to present highly challenging and complex implementation tasks. First, the interpretations of the concept seem to bring too many issues on board. Thus the comprehensive approach encompasses too many issues to be considered simultaneously but the basin secretariat that represents the WRC has only one basin officer and a supporting staff at post. Integrating activities, which are in several departments, with such limited human resources is a challenging task. Second, the unclear nature of what is meant by IWRM confuses the work of the WRC and makes them dabble in so many things leading to loss of focus in some cases. The loss of focus is compounded by the participatory approach with the great number of interest groups.

Third, Ghana has a large informal sector and therefore its economy did not respond positively to the economic incentives for water reallocation. This compares with the findings of IWMI (2007) (see 3.4) that largely informal economy has characteristically informal markets (presence of mutual help and community management organisations and institutions). This affirms the position that an omnibus institutional arrangement prescription for all economies at different development stages may not achieve the desired purpose. Fourth, the shift from cultural management to the neo-liberal ideas has proved to be incompatible with the culture and institutions in Ghana. Fifth, the process of internalising the exogenous ideas to promote ownership and leadership of the management plans was not given proper attention. Sixth, the devolution of management responsibility to the lower (local) levels of governance was not accompanied by financial power to perform. The top still wields the power to get things moving and this worked against implementation of programmes. The emphasis placed on the role of the formal stakeholders somehow weakened the power of the informal stakeholders. Seventh, there is a sort of centralisation that came along with integration, which may reduce responsiveness of institutions and organisations to different stakeholder needs. Due to the democratic processes involved a diversity of different stakeholders with different interests comes into play. Different institutions govern the different stakeholders concerned with water management and may require vast resources for coordination. As the issues involved get multiplied the more complex the situation becomes and the more resources that are needed to execute the needed integration (Biswas, 2004; interviews 2008: 1, 42). Eigth, the activities of the WRC are donor fund driven (DANIDA, World Bank, EU, CIDA, etc). These funds also have their own conditionalities that often lead to sectoral approaches rather than integration. For example, DANIDA gives support at a point in time for water and sanitation programmes without any freedom of using such funds in related sectors for
achieving the objectives of the nation in water management. Ninth, some issues to be integrated are practically difficult to achieve. For example, substituting water as a ‘social good’ by water as an ‘economic good’ has not been practically easy. The predominantly subsistence agricultural environment at the basin does not allow for the full cost recovery principle to operate (interviews 2008: 1, 2, 8, 20, 42, 47, 48, 56, 66, 67, 68, 117). Tenth, direct abstractions from rivers for agricultural purposes are not even monitored let alone being controlled due to limited human, financial and material resources.

The major problem with the DAs is how to coordinate effectively the diverse sub-sectors and the NGOs at the local level due to limited capacity, funds and the enormity of the great numbers involved. An attempt to bring all NGOs under one umbrella- the NGO FORUM failed for the same reasons (interviews 2008: 1, 4, 5, 8, 12, 33, 78, 79, 85, 116, 117).

The current planning and budgeting system at the District level is already challenging because it involves different actors (District Administration, General Assembly, Sector Agencies, stakeholders to be consulted). Moreover, funding for water resources development comes from a variety of sources (District Assembly Common Fund, revenues of the District, funds from international donor agencies and from NGOs). The planning is further influenced by the fact that water resources development (both regarding drinking water and agricultural use) has a high political priority in the region.

Furthermore, the July 2010 United Nations General Assembly adoption of the Human Right to Water and Sanitation which has been supported by Ghana along with 121 other countries raises new questions. Will Ghana now discard the cost-recovery principle in favour of the human rights principle, is it going to blend the two principles, or is it going to ignore its commitment to progressively implement the human rights principle at national level? If it decides to implement the human rights principle it may have very limited or no resources left for IWRM.

10.2.5 Implications for Theory

The table below (10.3) recalls Table 3.3 and adds the Ghanaian situation. These comparisons bring out some messages for theory. One, there may be no universal instruments for IWRM implementation. The local action which considers limited areas may be more appropriate for individual countries. Different implementation factors operate differently at different locations and that a generic template of “best practices” may not work for others. These factors relate the level of urbanisation of the economy.

Two, the interconnective view of management may not work for developing countries. The cultural context of the country is a critical issue in determining the extent to which IWRM could be beneficial. Without an understanding of informal collaboration, customs and networks, a formal IWRM framework may face great challenges.

Institutional mis-matches are a serious drawback to the IWRM implementation. The greater the link of IWRM initiatives with the political and legal/institutional framework the better chances of success. Policies geared towards the promotion of ownership of programmes stand a better chance of acceptance and success.
### Table 10.3 Strengths and weaknesses of IWRM applied to Ghana

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Ghana</th>
<th>Weaknesses</th>
<th>Ghana</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Allowing local water rights to work in the conservation of water resources and distribution of water (through local negotiations, agitations, customs and traditions based on the principles of enforcements of personal positive behaviour and equity). Local rights are participatory in operation, self-regulatory, sensitive to the vulnerable (e.g. widows &amp; the poor), and able to contain conflicts.</td>
<td>This has been affected by the WRC Act 522 but traditional principles easily get enforced</td>
<td>1. Comprehensiveness requires huge administrative capacity and financial resources which are not readily available</td>
<td>Limited administrative capacity and financial resources</td>
</tr>
<tr>
<td>2. Improvement and modernisation of irrigation and drainage infrastructure projects (“local actions”) since there is so much funding and monitoring by donor community together with expert support/assistance.</td>
<td>IWRM principles works better at irrigation project site with funding from IFAD and other donors</td>
<td>2. Conflicting policies with some responsibilities of state bodies overlapping creating confusion over implementation.</td>
<td>Same exist between MOFA and the Forestry Commission</td>
</tr>
<tr>
<td>3. Preparation and implementation of Integrated Water Management plans in selected/limited areas.</td>
<td>Basin plans prepared for “priority basins” and being implemented</td>
<td>3. Definition of Acts not adequately capturing what is envisaged in policy documents</td>
<td>Limited Acts to cover all areas envisaged in the water policy</td>
</tr>
<tr>
<td>4. Relatively, richer urban centres where public water supply systems are under the ambit of direct influence of the formal institutions.</td>
<td>Cost recovery principles applied at urban communities supplied by GWCL</td>
<td>4. Existing formal water rights are complex to operate—issued under different water regimes and alien to pre-colonial Africa; so many water users with flexible, changing off-take structures leading to difficulty in monitoring all abstractions</td>
<td>Monitoring of abstraction very difficult</td>
</tr>
<tr>
<td>5. Where top-down model management approaches which depends on professionals to lead the</td>
<td>Experts from government agencies do the planning with stakeholders inputs at workshops</td>
<td>5. Central government’s unwillingness to transfer water rights to WUAs</td>
<td>Central government hold rights in trust for citizens. Water is viewed as more than a commodity due to its social value and being associated with livelihoods</td>
</tr>
</tbody>
</table>

The economy is more rural so there is limited connections to the water economy with formal organisations

Local level still rely on the
| 1. planning process because they have clear understanding of a collaborative planning process and where stakeholder inputs are needed | 2. Changes in power relations. | 3. Limited ability to enforce laws and regulations | 4. Top for approval of plans and projects |
10.3 Conclusion for IWRM Practice in Ghana

IWRM in Ghana is based on the basin-scale approach with Basin boards managing their respective basins whilst the WRC coordinates at the national level. Stakeholder participation tends to involve many government organisations/agencies with limited local organisations involvement. Full-cost pricing principle is applicable to some extent only in urban water supply but not in rural water supply where citizens do not understand why they should pay for water they consider as a gift of nature their ancestors have bequeath unto them; and where they do not have the resources to pay for the services.

The issue of competing usage of the resource is well understood but the WRC has not been successful in regulating the use. The study gives the evidence that policies that are geared towards enhancing community livelihoods and the promotion of the local economy promote stakeholder participation. It engenders trust and local enthusiasm in the creation and promotion of effective institutions for the sustainable management of water resources. IWRM works when the process is driven by local interests and is focus at addressing real needs for water use sectors, e.g. agriculture, water supply or the environment.

Local level participation in decision-making involves a greater number of people with its attendant cost implications. Yet the funding of IWRM activities is more donor-driven which brings into question the issue of sustainability. On the issue of equitable allocation, domestic water supply takes precedence over other sectors but equity principles in water resources utilization among individuals are best practiced by the agricultural WUA members for irrigation purposes.

Through the internationally accepted comprehensive approach, Ghana has received a lot of financial and technical assistance but the application of these funds with their conditionalities has ended up in somehow promoting sectoral approaches instead. The institutional changes that occurred are as a result of unintended outcome of some developments or induced by external pressures. Table 10.4 compares the application of IWRM in Ghana with the general content of IWRM.

Table 10.4: IWRM content compared with what pertains in Ghana

<table>
<thead>
<tr>
<th>Content/Nature</th>
<th>Ghana situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin scale or catchment level approach</td>
<td>Basin board manages various basins with WRC coordinating at the national level</td>
</tr>
<tr>
<td>Full participation by all stakeholders</td>
<td>Tend to be government agency/organisations biased; limited local institutions involvement.</td>
</tr>
<tr>
<td>Full-cost pricing</td>
<td>Applicable in urban water supply (though with a lot of resistance from civil society) but not applicable in rural water supply</td>
</tr>
<tr>
<td>Equitable allocation of water resources</td>
<td>Domestic water supply takes precedence. Adequately applied among WUA members</td>
</tr>
<tr>
<td>Reliable and sustained financing</td>
<td>Questionable; licensing &amp; fees not adequate; mainly donor funded</td>
</tr>
<tr>
<td>Strengthen women’s role in water management</td>
<td>Very limited</td>
</tr>
<tr>
<td>Integrate different elements of the water resource:</td>
<td>Land &amp; water management not well integrated</td>
</tr>
<tr>
<td>(land with water, Water supply &amp; water demand, Urban &amp; rural water issues)</td>
<td>Data for this is limited; fragmentation still exists</td>
</tr>
<tr>
<td>Policies of all different sectors that have</td>
<td>WRC has made appreciable progress – national water policy in place</td>
</tr>
<tr>
<td>implications for water</td>
<td></td>
</tr>
<tr>
<td>Transboundary river basin management</td>
<td>Well established and operating successfully</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Competing usage understood</td>
<td>Yes, but do not have the capacity and sufficient resources to regulate</td>
</tr>
<tr>
<td>Water as social, economic and environmental good</td>
<td>Accepted at least, theoretically. Implementation has been mixed</td>
</tr>
</tbody>
</table>

This work concludes that Ghana, like other developing countries often adopts such paradigm shifts in the management of their water resources primarily as a result of exogenous pressures (and to a limited extent endogenous factors) but that (a) lack of domestic ownership and leadership of the concept, (b) limited resources, and (c) institutional mis-match, often results in an implementation of the ideas that is limited to implementation in form rather than practice.

### 10.4 Recommendations for Ghana

A critical question is – what does the above analysis imply for improving water management in Ghana? The IWRM concept as is being interpreted and practiced takes on too many issues at a time. (1) Ghana can manage its water resources better if essential elements for IWRM are well identified within each basin. Subsequently, the key components that account for the greatest changes in the basin could be selected and goals or targets set for them. Given the fluid nature of the IWRM concept and the limited resources of Ghana, on the other hand, only such a focused and very limited interpretation of IWRM is likely to be affordable and workable and lead to the optimum utilisation of resources. It could result in spending less time in planning because it will result in concentrating on and working with a smaller set of more relevant and prioritised recommendations. This way there will be room for reconciling values, interests and needs that exist within each basin. It will also mean that exogenous ideas can be internalised, working within existing cultural practices with a history of success and slowly moving towards second order learning that may challenge past path dependencies.

(2) Another approach is to strengthen the various sectors to perform well in their respective fields. For example, within the agricultural sector alone there are three parallel management/governance structures without formal linkages at the basin level (i.e. Regional Directorate & District Offices, GIDA and ICOUR). Since the individual sectors are performing well it is recommended that Ghana interpret the IWRM philosophy to mean close collaboration, cooperation and coordination instead of integration and its associated comprehensiveness, which results in increased complexities. This can be facilitated by the WRC by helping in getting the various water use sectors into a close cooperation and coordination of policies.

(3) In line with the fact that livelihoods influence the outcome of policies for management of water resources it is recommended that the sub-committees of the basin board be reorganised along livelihoods objectives or goals instead of the present sub-committees which are organised around topical issues like environment, land use, Research, Education and Public Awareness etc. There could be, for example, a sub-committee on managing water for agriculture, which is likely to bring about the proper coordination of agricultural sector agencies of MOFA (Regional Directorate and District Offices), GIDA and ICOUR. Based on the same argument there could also be a sub-committee on domestic and industrial water management to coordinate the activities of GWCL and CWSA; another on livelihoods such as fishing and so on. The number of the sub-committees should depend on the key elements identified within the basin. These will help reduce the problem of “horizontal fragmentation” and facilitate effective coordination and cooperation.
These will then be effectively coordinated at the basin board for better water management in Ghana.

Other recommendations include: (i) The active revival of some of the beneficial traditional management instruments should be carefully identified and promoted to enhance proper water reallocation and compliance. How to incorporate the role of the tindana in the modern management system should be explored and applied to improve compliance in water management rules. A policy in the direction of legalising community-crafted institutions of this nature is likely to enhance implementation. The dispossessing of peoples’ ownership of natural resources should be done in a fair and appropriate manner and should go along with adequate compensation. (ii) Capacity building for relevant staff in water management coupled with education for the people to understand and appreciate the issues involved with IWRM may lead to acceptance and ownership of ideas for effectiveness. (iii) The major water-related governance structures at the community-level are the water user organisations (WUAs and WATSAN committees/Water Boards) which have been promoted by the respective state agencies (MOFA and CWSA) and NGOs. The respective sector agencies have made efforts to promote the formation of a regional network of WUAs as well as of WATSAN committees in order to harmonize their operations but this form of higher-level coordination and representation exist just in form. It is therefore worth considering a possible representation of WUAs/WATSANs at the DAs. (iv) The Regional Coordinating Council (RCC) represents the major coordination mechanism beyond the District level. However, since the development planning authority has been devolved to the District level, regional coordination takes place in the form of facilitation and oversight of District-level planning. There is the need to undertake a review of the local government structure to allow for an appropriate legislation that may enhance better coordination by the RCC at that level so as to make it more functional. (v) The district assemblies seek for the effective means which the communities use to mobilise for sustainable community collective initiative and adopt same for water resources management where applicable. For local level compliance with sector-level water and pollution licenses, a legislation making district environmental committees mandatory for DAs is recommended. Other recommendations include (vi) Enhancing linkages and coordinating the role of NGOs and the donor community, as well as strengthening the technical support system in potable water delivery. All these are to be done in the light of the selected goals in the basin to bring about focused efforts. (vii) Considering the specific characteristics of the region, it might also be useful to coordinate with sector agencies that are not included in the WRC national board. These include MOFA (considering their role in promoting irrigated agriculture), the Ministry of Fishery, the Health Service (considering the role of water-related diseases in the region), and the Minerals Commission (considering the problems caused by mining). Consultation meetings with these agencies will have positive implications for the overall management of the water resources.

10.5 Implication for Other Developing Countries

The experience of Ghana cannot easily be generalized to other developing countries. However, apart from the issues on the tindana which might be location specific the other points may have relevance for developing countries because there are common conditions in their economies. The comprehensive interpretation of IWRM may not be easy to implement for many reasons. There are too many issues to be considered at a time, which confuses the situation rather than resolves it. These eventually give rise to elaborate institutions and institutional interactions that developing countries do not have the capacities to manage. Developing countries may have to adopt the integration definition which adopts the idea of considering the basin as a system and paying attention to the key components and relationships that account for the greatest variability in system behaviour (see 3.2; Mitchell, 2006). Most developing countries have large informal...
sectors and therefore their economies may not respond positively to the economic incentives for water reallocations, a cardinal principle in the comprehensive IWRM approach.

The cost implications for water management cannot be supported by developing countries like Ghana and continual dependence on donor support may not be sustainable. The knowledge about what goes into environmental and ecosystem resources management should be a focus of training for water resources management personnel and water professionals.

Institutional arrangements should take into consideration existing cultural practices and should not ignore proven and successful local practices. Hierarchical institutional and organisational arrangements call for structured governance at various levels. There should be the promotion of co-operation instead of inter-agency rivalry at each level.

In addition the bottom-up approach to developing a comprehensive plan often involves too much participation, which may eventually lead to loss of focus. On the other hand the top-down approach needs professionals to lead the planning process, which may not be available or may take too long a time to produce. It will be appropriate for developing countries to therefore, reflect on sub components of IWRM which are the desired goal or objective of the selected basin e.g. restoring a river habitat, managing water for agricultural production or reconciling competing water uses given their limited resources.

Focus on prioritization, rather than holism, indigenising exogenous ideas, and working within existing cultural practices with a history of success and slowly moving towards second order learning is what has been termed “limited water resource management”\footnote{This is similar to what Butterworth \textit{et. al.} (2010) refer to as a range of lighter, more pragmatic and context-adapted approaches, strategies and entry points. They suggest that this is more service-oriented, locally rooted and balance approach to IWRM and better matches contexts and capabilities.}. This might prove to be appropriate for developing nations like Ghana.
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List of Interviewees

1. White Volta Basin Officer (Aaron)
2. Ministry of Food and Agriculture, Regional Deputy Director (Alhaji Salifu)
3. Forestry Commission
4. NGO Forum secretary
5. NGO Forum Chairman
6. Community Water and Sanitation Agency, Regional Extension Officer (Steve Anakum)
7. Department of Fisheries, Regional Extension Officer (John Anafo)
8. Irrigation Development Authority, Regional (Jawad)
9. Ghana Water Company Limited, Regional Director
10. Regional Hydrologist, Bolgatanga Nyankpala (Sylvester Dako)
11. Lecturer, University of Development Studies, Tamale (Ampofo-Yeboah)
12. White Volta Basin Board member (Zoogah Mukasa)
13. Savannah Agricultural Research Institute, GLOWA Project (Dr. Fosu)
14. Focus Group Discussion, Water User Association, Sakom
15. Tindana of Sakom (Atobaga Abanga)
16. District Water and Sanitation Team, Zebilla (Lambert Azorka)
17. Zebilla Chiefs and elders
18. Youth group, Zebilla
19. Women group, Zebilla
20. Managing Director, Irrigation Company of Upper East Region
21. Farmers, Water User Association, Tono
22. District Office Fisheries, Navorongo
23. Fishermen, Boania
24. Fishermen, Wuru
25. Fishermen, Gia
26. Pualugu Chief and elders
27. Water Board Chairman, Zebilla
28. O & M Technical Officer, Water and Sanitation Development Board
29. Focus Group Discussion, Tomatoes farmers’ Association, Pualugu
30. Pualugu Tindana
31. Focus Group Discussion, Water User Association, Binduri
32. WUA Chairman, Binduri
33. Manager, Northern Star Tomato Co. Ltd
34. Assembly member, Yapei (Salifu Seidu)
35. Fisherman, Yapei (Fuseini Nylepani)
36. Fisherman, Yapei (Issifu Aimean)
37. District Planning Officer, Tongo
38. Winkogo, Water User Association, Talensi-Nabdam
39. Chairman, Water User Association, Winkogo
40. GTZ Site engineer
41. GTZ Field extension officer
42. Water Resources Commission, Executive Secretary (Ben Ampomah)
43. Water Research Institute, Dr. K. Kankan-Yeboah
44. Water Directorate, Ministry of Water Resources, Works and Housing (Frempa Yeboah)
45. Community Water and Sanitation Agency, Head office (Charlotte A. Engmann)
46. Water Resources Commission Staff
47. Chief Executive, GIDA (David Lamptey)
48. International Water Management Institute, Head of Ghana Office
49. Forestry Commission, Accra
50. PAGEV, Project Coordinator
51. Chief Executive, ZOFVA (Phillip Ayamba)
52. Women group, Serigu
53. ZOFVA, Executive Officer
54. Sapellega, Chairman of tree planting groups
55. Regional Coordinating Council, Water desk (John Adongo)
56. Ministry of Food and Agriculture, Monitoring and Evaluation Officer, Upper East Region
57. District Director, Ministry of Food and Agriculture (Talensi Nabdam)
58. Tindana, (Baare) Bagun
59. Baare Water User Association chairman
60. World Vision Internation, Project Officer
61. Household 1, Zebilla
62. Household 2, Zebilla
63. Household 3, Zebilla
64. Household 4, Zebilla
65. Household 5, Zebilla
66. CIDA, Accra office
67. DANIDA, Ghana office
68. GTZ, Regional Coordinator, Tamale
69. Opinion leader, Sapellega
70. Household 6, Winkogo
71. Household 7, Winkogo
72. Household 8, Winkogo
73. Household 9, Winkogo
74. FGD, Winkogo WUA
75. Household 10, Winkogo
76. Water and Sanitation Department, University of Cape Coast
77. Geography Department, University of Cape Coast
78. Environmental Protection Agency Regional Office, Bolga
79. Small scale miners at Tilli (FG)
80. District Water and Sanitation Team, Walewale
81. Youth group, Walewale
82. District Water and Sanitation Team, Talensi-Nabdan
83. District Water and Sanitation Team, Bongo
84. District Water and Sanitation Team, Kasena-Nankana
85. District MOFA Director, Kassena-Nankana
86. Tindana, Tilli
87. Chief Tilli
88. Tindana, Binduri
89. Wetlands Management Unit, Accra
90. District Representative on White Volta Basin Board, Garu-Tempane
91. District Representative on White Volta Basin Board, Walewale
92. Youth group, Baare
93. Ghana Water Company Limited, Accra
94. Aqua Vittens Rand Limited
95. Densu Basin Board officer
96. PURC
97. Watsan members, Sapelega
98. Watsan members, Pwalugu
99. Elder Baare (Surpugade Laatbedumi)
100. Pito Brewers Association, Baare
101. Youth group, Bolga
102. Household 12, Bolga
103. Household 13, Bolga
104. Household 14, Bolga
105. Household 15, Bolga
106. Household 16, Pwalugu
107. Household 17, Pwalugu
108. Household 18, Pwalugu
109. Household 19, Pwalugu
110. Household 20, Pwalugu
111. Regional Director, Fisheries, Bolga
112. Women group (fishmongers), Tono
113. Women group (fishmongers), Yapei
114. Volta Basin Research Unit, Legon
115. Center for Scientific and Industrial Research
116. Environmental Protection Agency
117. International Food Policy Research Institute
118. Household 21, Navrongo
119. Household 22, Navrongo
120. Household 23, Navrongo
121. Household 24, Navrongo
122. Household 25, Navrongo
123. Household 26, Navrongo
124. Regional Water and Sanitation Team, Bolga
125. Household 27, Sapelega
126. Household 28, Sapelliga
127. FGD, Sapelliga
128. Household 30, Sapelliga
129. Household 31, Walewale
130. Household 32, Walewale
131. Youth group, Sapelliga
132. Household 33
133. FGD, Zebilla
Annexes

Appendix 1: Interview Schedules/Guides

A. Interview Schedule for Ministries, Departments and Agencies

General activities of ministry/agency: Mandates with LIs, core activities, administrative structure, staffing, logistics, mode of operation, any problem with mandate? Problems with administrative structure, any change in mandate/mode of operation in the past? Any conflict in mandate with others; Has IWRM affected your mandate and operations in any way?

Water management activities: In what ways are your ministry/department/ agency involved in water resources management? Conflicts with the operations of other ministries/agencies; how are conflicts resolved if any? Any support and/or cooperation from other agencies? Any activities in water body protection; strategies adopted; what sanctions for offenders; who enforces the sanctions; do they work; why? Problems/constraints

Ministries or agencies with close working relations: Name of ministries/agencies, relationship with the other organisations and institutions in the water sector; nature of the relationship - functional, formal, any lines of communication among these? Cooperation in any project; project nature; which category of people involve; nature of cooperation; results; Relationship with the White Volta Basin Secretariat


Water Policy Formulation: Involvement of the ministry/agency - at what levels; nature, processes

Relationship with WRC and MWRWH: nature of links (including communication); representation on the WRC Board, directives received, directives implemented, not implemented; why? (Reasons); any problem with functional relationships

B. Interview and FGD Guidelines for Community Visits

Observations:
General: Road network: schools, markets, clinics, electricity.
Water related: Sources of drinking and irrigation water, functioning of infrastructure, different water uses (irrigation, livestock, domestic, other), land under irrigation, types of dams, extent of vegetation cover around water bodies, and water extraction methods.
Specific: at Winkogo how WUA members are organised for the rehabilitation of their broken dam - the leadership style, outside support, driving forces, division of labour etc.

Questions for community visits
Major uses of water; Major constraints/problems/conflicts within water governance: What are the biggest water related problems in the community? How are they dealt with?
Actors: Who are the actors in the local water sector (NGOs, Gov: political and administrative actors (DAs & Metro), CBOs, private sector)? (What are their roles? How do they interact)?

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**Procedure of establishment of water infrastructure:** How was water infrastructure established? Who supported? How did it start? Was it a community initiative? What was the community contribution? Why do some communities have dams and others don’t?

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

**Access to water:** What is the water allocation mechanism? (What are mechanisms for dam areas: among farmers, fishermen, and livestock keepers? Are there mechanisms for domestic water? What mechanisms exist for non-dam irrigation areas, Equity in access to water?)

**Access to land:** What are the criteria for irrigation land distribution? (For how long is land allocated? Has any change happened in the past? How is the handing over between wet and dry season? Are there special measures for draught? Do landowners charge some fees? How is it organised? Who oversees allocation of land? Do original owners have a say in the allocation (at large irrigation scheme areas)? Equity in acreage allocation, Kind of contractual agreements on use of land; between which actors?)

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

**Collective Action:** Which are the water management activities that need collective action? (How is that organized? How many are involved? Does it work well? How strongly can free riders impact on common result? Are there sanctions for free riders? If collective action fails, are there individual solutions? When and how does it work well?)

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

C. Interview Schedule for the Basin Secretariat and the WRC

**Why the WRC, Basin Boards were formed:** Mandate with LI; core functions; ability do carry out functions; constraints; conflicts with other autonomous bodies in water use; what is the operational area of the Basin Board; How does the WRC implement its decisions; number of River Basin Boards in operation.
Composition: why present composition (basin & national); any desired change in present composition; why; other institutions are considered relevant apart from those represented on the national WRC

Operations of Secretariat: nature; staffing; organisational structure; who reports to whom; who funds activities; Do you see these functional arrangements as appropriate?

IWRM in Ghana: What issues informed the adoption of the IWRM principle; What actually do you mean when you say IWRM; What are you integrating; what means are you using to achieve these/how is it accomplished; what instrument are being used; what are the processes involved; which institutions/agencies are actively involved; what do they do; how do you get your directives to the organisations/agencies involved; level of cooperation; what sanctions for violating directives;

Legal issues & Regulation: which laws support your activities? Any conflict with other organisations; why water use regulations in Ghana; what laws regulate water use; for what purposes do one need a permit? How long can one hold on to a license; what happens if conflict between two water users both granted water rights?

Water resources ownership in Ghana: Nature; who owns water resources; what do you do with those who claim ownership by tradition?

Water Abstractions: How is registration of water users done? What about drilling companies, potable water provision companies; how easy it is; fees involved (for mining, agriculture, industry, potable water); how is the fee determined; any exemptions; procedures for regulating groundwater development

Transboundary issues: What transboundary co-operations exist; links with other riparian states: nature of links; communication- mode, frequencies; drivers; projects together; successes & failures

Relationship with water research organisations: which ones? Nature of agreement/working relationship;

D. Interview Guide for Water Research Institutes

The role of your institute in IWRM in Ghana; areas you do research to support water resources management; How well are you positioned to do all that; What is the nature of your working relation with WRC; What are some of the works you have done for WRC; links between your institute and MWRWH and other water user agencies and ministries; How do the result of your research feed into water policy in Ghana? Representation on the WRC Board

E. Interview Guide for International Organisations, NGOs and Donors

Major activities in the water sector: form of support: research, financial assistance, technical assistance, and training? Why support in these areas? For how long have you been giving these supports? When is present support ending?

Why your support for IWRM in Ghana? Description of support (extent of coverage, amount involved material/personnel involved, Continuity? Any conditionality for continued support
**Water Policy Formulation:** How do your activities influence policy decisions? Which areas do your activities affect policy direction?

**Future Support:** Which areas: training, research, infrastructure provision etc, and why?

**F. Interview Schedule for PAGEV**

- What is PAGEV?
- What are the interventions? Content of the transboundary cooperation;
- How is the programme implemented?
- What institutional arrangements were put in place for the project to work?
- How many communities are involved in the IWRM interventions?
- Did the project have any gender perspective?
- What are the environmental programmes undertaken and how did you go about them?
- Any achievement of the project in water resources management for the countries involved?
- Are there any useful lessons learnt in the processes involved?
## Appendix 2: Contemporary concepts in water management and associated institutional responses

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Institutional responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Broadening perspective</td>
<td></td>
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<tr>
<td>a) Coordinated water management</td>
<td>Omnibus national water agencies</td>
</tr>
<tr>
<td>b) Links with environmental management</td>
<td>Ministries of environment with water resources branches</td>
</tr>
<tr>
<td>c) Links with economic and social policy</td>
<td>Planning commission or coordinating bodies</td>
</tr>
<tr>
<td>d) Broadening range of professions</td>
<td>Professionals from disciplines beyond engineering, including law, economics, geography</td>
</tr>
<tr>
<td>2. Expanding the range of choice</td>
<td>Policies to improve water use efficiency, such as recycling, wastewater renovation, planting of draught resistant crops Policies to supplement construction options such as flood insurance, land use control, flood plain mapping</td>
</tr>
<tr>
<td>3. Water as an economic good</td>
<td>Charges for resource use: water withdrawal charges, prices to reflect real costs, Allocations to reflect values in use, metering</td>
</tr>
<tr>
<td>4. The river basin as a unit for management</td>
<td>River basin planning</td>
</tr>
<tr>
<td></td>
<td>River basin management</td>
</tr>
<tr>
<td>5. Public involvement</td>
<td>Ad hoc, usually at end of process, narrow range of methods</td>
</tr>
<tr>
<td></td>
<td>Continuous, often required by law, using wide range of methods</td>
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<tr>
<td>6. Environmental protection as key element in water management</td>
<td>Specific legislation or clauses in water legislation</td>
</tr>
<tr>
<td></td>
<td>Environmental impact assessment</td>
</tr>
<tr>
<td>7. Protection of minority rights and redress of social losses</td>
<td>Social impact assessment</td>
</tr>
<tr>
<td></td>
<td>Settlement of native land claims</td>
</tr>
<tr>
<td></td>
<td>Institution of compensation measures</td>
</tr>
</tbody>
</table>

*Source: Abstracted from Sewell and Biswas (1986) and Biswas (1990)*
### Appendix 3: Nature of Informal Water Economies during Economic Growth

<table>
<thead>
<tr>
<th>Description / Characteristics</th>
<th>Phase I: Completely Informal</th>
<th>Phase II: Largely Informal</th>
<th>Phase III: Formalising</th>
<th>Phase IV: Highly formal Water industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of users in the Formal sector</td>
<td>≤5%</td>
<td>35%</td>
<td>35-75%</td>
<td>75-95%</td>
</tr>
<tr>
<td>Examples</td>
<td>Sub Saharan Africa</td>
<td>India, Pakistan, Bangladesh</td>
<td>Mexico, Thailand, Turkey, Eastern China</td>
<td>USA, Canada, Western Europe, Australia</td>
</tr>
<tr>
<td>Mode of predominant water service provision</td>
<td>Self supply &amp; informal community institutions</td>
<td>Partial public provision of service but self supply dominates</td>
<td>Private public provisioning; attempts to improve service &amp; manage the resource</td>
<td>Rise of modern industry; High intermediation; self supply disappears</td>
</tr>
<tr>
<td>Institutional Arrangements</td>
<td>Self help; mutual help and feudal institutions dominate</td>
<td>Informal markets; Mutual help and community management institutions</td>
<td>Organised service providers; self supply declines; informal institutions decline in significance</td>
<td>Self supply disappears; all users get served by modern water industry</td>
</tr>
</tbody>
</table>

Abstracted from IWMI (2007)
Appendix 4: Community Forum Address

Address Presented by Mahama Osman Azuku (Water and Sanitation Board Chairman) 
During a Community Forum Held on the 17th December 2006 at the Zebilla Primary School Block

Mr. Chairman, DCE, DCD, Chief Representative, Assembly members present, all customers present ladies and gentlemen. I am once again much pleased to have this opportunity to welcome and equally share ideas with our numerous customers on the operations of the water system.

Mr. Chairman, before I move to elaborate on my welcome address let me take this chance to congratulate the newly reconstituted board members and to equally register my greatest gratitude to the out gone board of members for their dedicated and devoted services to the board. In fact, the out-gone board members need to be commended for their performance since the formation of the board. I wish them well and may the Almighty Allah guard them in their next field of operations. However, it is my hope and prayer that the new board will do the same if not much better for the smooth flow of water to the community.

Mr. Chairman, let me add that their services has not been in vain since their experiences and skills acquired is an asset for the entire development of the community. In fact, the new board still accord their experience in times of problems and many more.

Mr. Chairman, to recall events, this very board for the passed nine (9) months organised a forum with the customers purposely on the performance of the board and its associated problems. This time round the board is shifting it focus to the sustenance of the water system which is the resource base of the system (tariff).

Mr. Chairman, all customers present, the main purpose of this forum/meeting is to adjust the tariff structure of the system which has experienced a quiet number of years without any serious attention. Customers and other stakeholders will bear me that for almost two years now nothing has been said about the tariff of the system which is the only main source of income to the board.

Mr. Chairman, considering the high cost living coupled with the tremendous increase in materials and services the board cannot survive without a better tariff structure. As indicated in my last address during the meeting, most of the issues raised had not been given the fullest attention as a result of low tariffs structures. The issues of better remunerations, replacement of major pants, settlement of electricity bills among others are yet to be attended to since these can only be addressed by way of financial resources.

Mr. Chairman, the issues of staffing had been attended to though the remunerations are not something better to talk about. The meters problem is receiving positive attention with the support of DISCAP through Community Water and Sanitation Agency (CWSA) and the usual purchase by the board to reduce wastage and equally promote sanity within the system. The inconsistency in the payment of departmental water bills is pending though the board for the first time received part payment of bills in March 2006 the subsequent bills submitted to government of yet to be given attention. This is done through the support of all departments concern, District Assembly and CWSA respectively.

Mr. Chairman, another area of concern to the board is the routine maintenance of the system, which has become a bottleneck, as there is a public out cry on the leakages and the occasional overflow of the high level tank. This issue, the board attributed it to fatigue on the part of the operator as a lone personal belonging to that section. In fact, this is one of the major problems that customers had to consider and compromise with the board on the upward adjusted of the tariff. The new tariff shall address if not reduce most of the issues indicated to bring about better improvement into the system.
Mr. Chairman, DCE, all protocol observed, my address would be incomplete if highlights are not made on the Electricity bills and the behaviour of some customers when it comes to settlements of bills/ arrears. The board was disconnected by the VRA as a result of accumulated bills during their last exercise on disconnections. However, defaulters of water bills see no reason(s) why they should be disconnected, thus giving the board a lot of difficulties when it comes to disconnections.

Mr. Chairman, all the issues outlined would be clearly understood and appreciated when a brief account on the financial position is presented.

On the plans of the board for the coming year the following issues had been targeted.

1. Itinerary for water distribution
2. Completion of un-metered customers
3. Equipping the staff with the necessary tools for performance
4. Replacement of some major parts
5. Reducing the number of public standpipes
6. Improve public education
7. Promote the sanitation aspect of the board

Let me add that these plans can only be well implemented if the new tariff is patronised with much commitment. Customers should start to cultivate the habit of settling their bills in time, avoiding illegal acts and always consult or dialogue for better solution to their problems.

Mr. Chairman, before I pick my seat, let me express my gratitude to the CWSA through the District Assembly for their numerous and continuous support to the water board and hope that the District Assembly would maintain if not improve its continuous support to the water boards in the District for clean and portable water for development. I equally wish to appeal to all departments connected to the system to keep up with their co-operation when it comes to endorsement of bills and other support that the board may request from them.

Mr. Chairman, DCE, DCD, Hon Assembly members present, Ladies and Gentlemen, I have no doubt that after this meeting all would co-operate to get the system sustained through a pragmatic approach and solutions to some of the problems for effective and efficient delivery of water to the masses and if possible extend to areas in need of pipe borne water.

On this note, I wish and on behalf of the board to welcome you all to this very important meeting and also call for positive contributions to move the system ahead. Again, let me cease this opportunity to wish every one a happy and prosperous New Year as well as Bar-kala Salla in advance.

Thank you