
CHAPTER TEN

SHARED WATER RESOURCES

10.1 Transboundary Setting of Uganda's Water Resources

Almost all of Uganda's water resources are transboundary in nature and shared with her neighbors. This poses the challenge of Uganda making maximum use of the water resources within its territory for her socio-economic development while not compromising the legitimate right by her neighbors to the same shared resources. As a result, Uganda has been very keen on fostering close collaboration with her neighbors in the joint planning, management and development of the shared water resources.

The transboundary nature of Uganda's water resources has greatly influenced the legal and institutional framework adopted for the management of the country's water resources. This influence is also reflected in the significant number of regional water resources management and development initiatives that Uganda is involved in.

Within this transboundary context, Uganda is interested in ensuring that all its shared waters are managed optimally and equitably to derive mutual benefits for all the riparian countries. Specifically, Uganda is keen on ensuring sustainable inflows of water of adequate quantity and quality from its upstream riparians and securing an equitable share of the shared waters to support its national economic and social objectives.

The strategic framework for the development and management of water resources in Uganda recognizes two important principles. First, water is fundamental to achieving the national objective of poverty eradication through the promotion of rapid economic growth, good health, food security, and social equity. Secondly, within the regional context, cooperative development of shared water resources can serve as a catalyst for a broader range of cooperation and economic integration. Equitable use of the shared waters and utilization of the comparative advantages of the riparian countries, using water where it can most efficiently and cost-effectively produce power, grow food, and support industrialization, provides the greatest opportunities for sustainable growth and development in the region and sustainable use of the resource.

10.1.1 Uganda's major Shared Water Bodies

Uganda's major shared water bodies include the following:

- (a) Lakes:
 - ✓ Lake Victoria – Shared with Kenya and Tanzania;
 - ✓ Lake Albert – Shared with the Democratic Republic of Congo;
 - ✓ Lake Edward – Shared with the Democratic Republic of Congo

(b) Rivers:

- ✓ River Nile – Shared with Democratic Republic of Congo, Burundi, Rwanda, Tanzania, Kenya, Sudan, Egypt and Ethiopia;
- ✓ River Kagera – Shared with Burundi, Rwanda and Tanzania;
- ✓ River Semiliki - Shared with Democratic Republic of Congo;
- ✓ River Malaba – Shared with Kenya;
- ✓ River Sio – Shared with Kenya;
- ✓ River Aswa – Shared with Sudan;

10.2 River Nile Basin

River Nile is the longest river in the world with a total length of about 6700Km and a basin area of about 3 Million Km². The Nile basin is shared by 10 countries (Burundi, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, and Uganda) with a total population of about 300 million people, 160 million of whom live within the basin and rely on the Nile Waters for their basic socio-economic needs. **Figure 10.1** shows a map of the Nile Basin.

Uganda occupies a unique position in the Nile Basin as she is a downstream country with respect to Kenya, Burundi, Rwanda, Tanzania, and Democratic Republic of Congo, and is also upstream with respect to Egypt and Sudan. This position puts Uganda in a very delicate situation, which calls for very careful articulation of her interests with respect to both upstream and downstream countries. Given her unique position in the basin, Uganda has until now opted for a more flexible approach in engaging other riparian countries on complex Nile water issues as opposed to the rigid either “downstream” or “upstream” positions. This has ensured that Uganda’s national interests are safeguarded without necessarily antagonizing any of the riparian countries.

Generally, Uganda is interested in ensuring that the Nile waters are managed and developed optimally and equitably to derive mutual benefits for all riparian countries while safeguarding her national interests. Uganda is keen on ensuring the unimpeded utilization of an equitable share of the Nile waters to support her national economic and social development objectives. Of specific interest is the consumptive use of the Nile waters for irrigated agriculture and domestic and industrial purposes. Uganda is also interested in the regulation of the equatorial lakes for optimal hydropower generation and flood control.

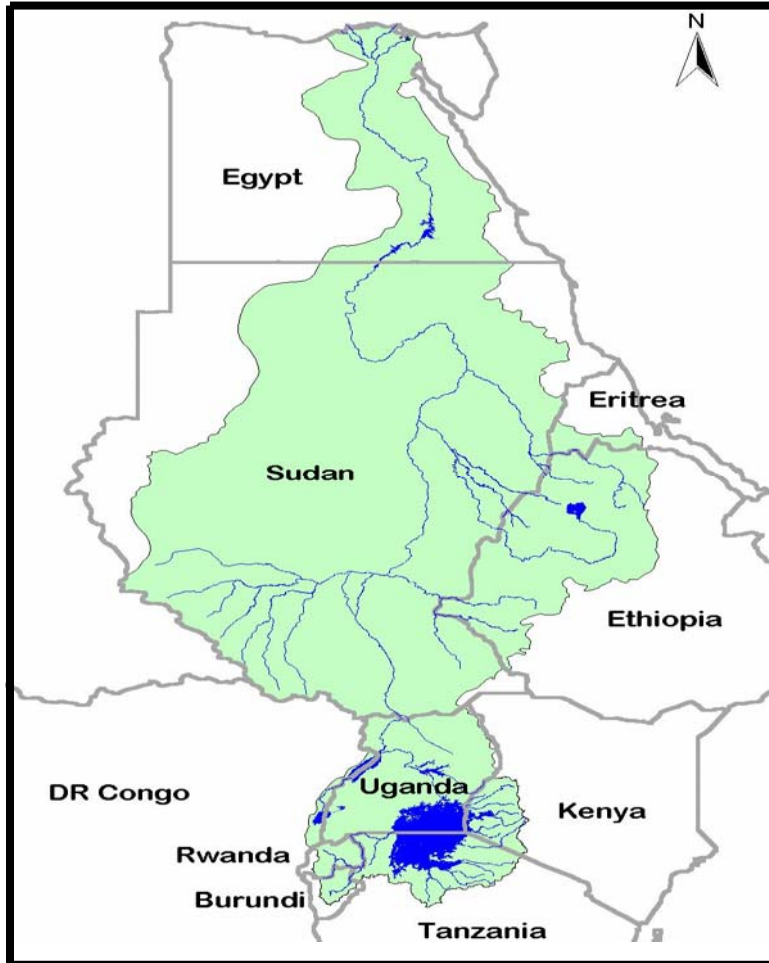


Figure 10.1: Uganda's location in the Nile Basin

Table 10.1 gives statistics related to the water resources availability and utilization for the different Nile basin countries. The table shows that, in spite of the development opportunities presented by the Nile water resources, only a few of the riparian countries use the waters on a large scale.

Table 10.1 - Water Resources availability and utilization in the Nile basin

| <i>Country</i> | <i>Population</i> | <i>GDP (Million US\$)</i> | <i>% of Total Basin Area</i> | <i>Total Renewable Water (TRW) Resources (Km³/Year)</i> | <i>Internal Renewable Water Resources (KM³/Year)</i> | <i>% of Irrigate d Land</i> | <i>Irrigation Water Withdraw al as % of TRW</i> |
|---------------------|-------------------|-----------------------------------|--|--|---|-------------------------------------|---|
| <i>Burundi</i> | 6,356,000 | 977 | 0.43 | 3.6 | 3.6 | 7.0 | 5.0 |
| <i>DR Congo</i> | 50,948,000 | 4,187 | 0.71 | 1,283.0 | 935.0 | 0.1 | 0.01 |
| <i>Egypt</i> | 67,884,000 | 81,003 | 9.06 | 58.3 | 1.7 | 100 | 93.0 |
| <i>Eritrea</i> | 3,659,000 | 672 | 0.12 | 6.3 | 2.8 | 4.0 | 5.0 |
| <i>Ethiopia</i> | 62,908,000 | 7,966 | 11.74 | 110.0 | 110.0 | 2.0 | 2.0 |
| <i>Kenya</i> | 30,669,000 | 9,971 | 1.68 | 30.2 | 20.2 | 1.0 | 3.0 |
| <i>Rwanda</i> | 7,609,000 | 2,183 | 0.68 | 6.3 | 6.3 | 0.4 | 0.4 |
| <i>Sudan</i> | 31,095,000 | 10,215 | 63.75 | 88.5 | 35.0 | 12.0 | 56.0 |
| <i>Tanzania</i> | 35,119,000 | 6,812 | 3.96 | 89.0 | 80.0 | 3.0 | 2.0 |
| <i>Uganda</i> | 23,300,000 | 8,110 | 7.87 | 66.0 | 39.2 | 0.1 | 0.2 |

Source: The United Nations World Water Development Report, 2003.

Despite the tremendous natural resources in the Nile Basin, most of the riparian countries are among the poorest in the world (four of which are among the 10 poorest countries in the world). Seven of the 10 countries have a GDP of less than US\$ 300. This situation has been compounded by a number of factors including political instability, rapid population growth, extensive environmental degradation, and increasing water scarcity in several parts of the basin.

10.2.1 The Nile Flows

The flows of the Nile are highly variable from year to year. Figure 10.2 shows the long-term variations in flows of the Nile at Jinja, Kyoga Nile at Masindi Port and Albert Nile at Panyango.

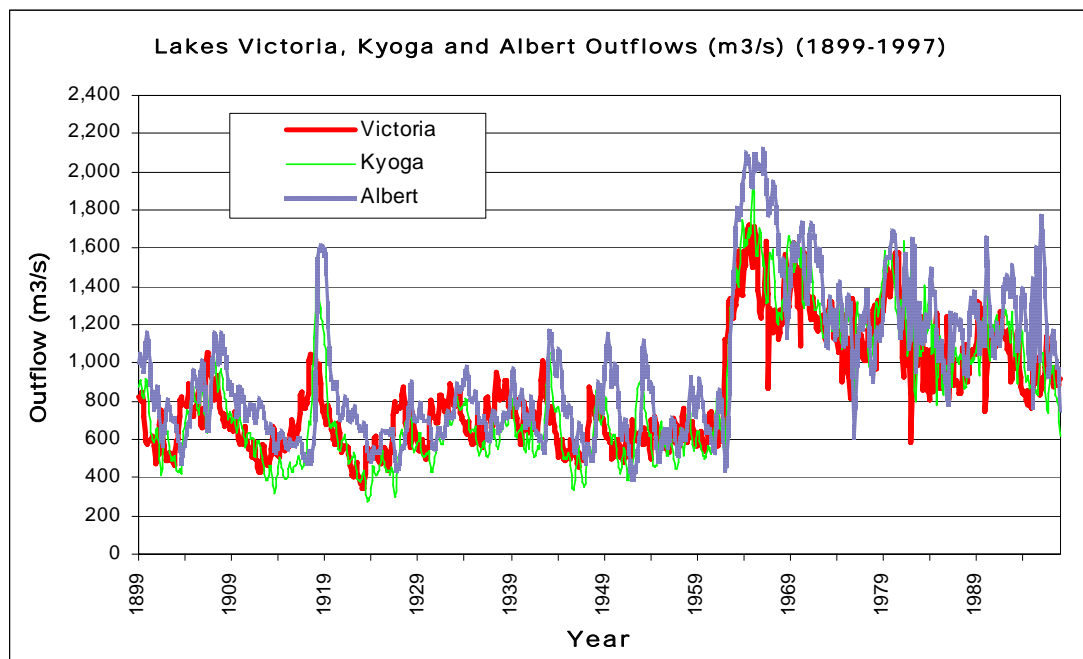


Figure 10.2 – Long-term variations in outflows of Lakes Victoria, Kyoga and Albert

The long-term average outflow from Lake Victoria has been 840 m³/s, and the range of outflows is between a minimum of 345 m³/s and a maximum of 1720 m³/s. At the 95% monthly reliability level, the flow of the Victoria Nile is of the order of 495 m³/s.

10.3 Lake Victoria Basin

Lake Victoria is the second largest freshwater body in the world with a surface area of 68,800 km² and an irregular shoreline of about 3,440 km. The lake is shared by three riparian states (Kenya 6%, Tanzania 49%, and Uganda 45%, by area), with a total catchment area of about 193,000 km² extending over five countries (Kenya, Tanzania, Uganda, Burundi, and Rwanda). The lake is generally shallow (max. depth 84 m; mean depth 40m), and is drained by a number of large rivers. River Nile, which begins its long journey to the Mediterranean sea from Jinja, is the single outlet from the lake. **Table 10.2** shows the main rivers draining into Lake Victoria.

Table 10.2 - Major rivers draining into Lake Victoria

| <i>Country</i> | <i>River</i> | <i>Average Discharge (m³/s)</i> | <i>Percentage Contribution (%)</i> |
|-----------------|---------------------|--|--|
| Kenya | Sio | 11.4 | 1.5 |
| | Nzoia | 115.3 | 14.8 |
| | Yala | 37.6 | 4.8 |
| | Nyando | 18.0 | 2.3 |
| | North Awach | 3.7 | 0.5 |
| | South Awach | 5.9 | 0.8 |
| | Sondu | 42.2 | 5.4 |
| | Gucha-Migori | 58.0 | 7.5 |
| Tanzania | Mara | 37.5 | 4.8 |
| | Grumeti | 11.5 | 1.5 |
| | Mbalageti | 4.3 | 0.5 |
| | East Shore Streams | 18.6 | 2.4 |
| | Simyu | 39.0 | 5.0 |
| | Magogo Maome | 8.3 | 1.1 |
| | Nyashishi | 1.6 | 0.2 |
| | Isanga | 30.6 | 3.9 |
| | South Shore Streams | 25.6 | 3.3 |
| | Biharamulo | 17.8 | 2.3 |
| | West Shore Streams | 20.7 | 2.7 |
| | Kagera | 260.9 | 33.5 |
| Uganda | Bukora | 3.2 | 0.4 |
| | Katonga | 5.1 | 0.7 |
| | North Shore Streams | 1.5 | 0.2 |
| | Total | 778.3 | 100.0 |

Source: COWI 2002

10.3.1 Water Balance of Lake Victoria

Table 10.3 shows the water balance of Lake Victoria. The table shows that direct rainfall over the lake surface is the biggest input into the lake, contributing 82% of the total inflow, while evaporation from the lake is the biggest output from the lake accounting for 76% of the total outflow. The contribution of runoff from the terrestrial catchments is, therefore, about 18 % only.

Table 10.3 - Average inflows to and outflows from Lake Victoria

| <i>Average 1950 - 2000</i> | <i>Flows (m³/s)</i> | <i>Percentage (%)</i> |
|------------------------------|--------------------------------|-----------------------|
| <i>Rain over lake</i> | 3631 | 82 |
| <i>Basin discharge</i> | 778 | 18 |
| <i>Evaporation from lake</i> | -3330 | 76 |
| <i>Victoria Nile</i> | -1046 | 24 |

Source: COWI 2002

10.3.2 Lake Level Variations

The long-term variations in levels of Lakes Victoria, Kyoga and Albert is Shown in **Figure 10.3**. According to available historical records, Lake Victoria levels have varied between a minimum of 10.22 m and a maximum of 13.33 m on the Jinja gauge. Between October 1961 and May 1964, the water level in Lake Victoria rose rapidly by 2.5 m as a consequence of extraordinary high rainfall. Since that time the levels have remained high, but appear to be on a declining trend. The variations in levels of Lakes Kyoga and Albert follow the same pattern as Lake Victoria, the main source of inflow into the Lakes.

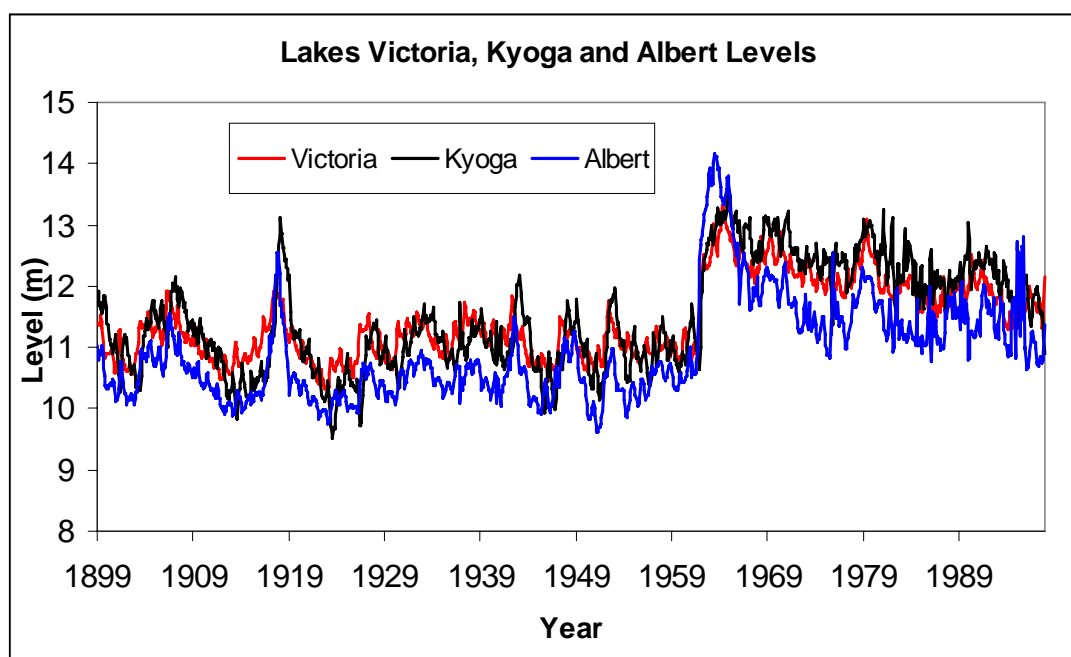


Figure 10.3 – Long-term variation in levels of Lakes Victoria, Kyoga and Albert

10.3.3 Socio-economic Potential

The total population of countries within the Lake Victoria basin is nearly 100 million, of which nearly 33 million are living in the Lake Victoria Basin. Lake Victoria is a vital natural resource with enormous potential to spur social and economic development of the riparian countries. The potential has been identified in the areas of fishery, agriculture, tourism, water supply, transport, hydropower generation, industry, and in Trade and investment. However,

this potential has not been fully harnessed resulting in high levels of poverty among the majority of the inhabitants of the basin.

10.4 River Kagera

The Kagera basin is spread over Burundi, Rwanda, Tanzania and Uganda with a total area of 59,800 Km², contributed as shown in the **Table 10.4** below. **Figure 10.4** shows the extent of the R.Kagera basin.

Table 10.4 – River Kagera Basin

| <i>Country</i> | <i>Catchment Area (Km²)</i> | <i>% of total Catchment Area</i> |
|-----------------|--|----------------------------------|
| <i>Burundi</i> | 13,060 | 22 |
| <i>Rwanda</i> | 20,550 | 34 |
| <i>Tanzania</i> | 20,210 | 34 |
| <i>Uganda</i> | 5,980 | 10 |
| <i>Basin</i> | 59,800 | 100 |

The Kagera is the largest of the 23 rivers that drain into Lake Victoria, and it carries 34 % of the annual inflow to the lake, over twice as much as the next largest river, the Nzoia in Kenya. This proportion drops to 24 % when the input of rain less evaporation on the lake surface is taken into account.

An estimated 14 million people, almost 40 % of the 35 million within the Lake Victoria basin, live in the Kagera basin. The population density within the basin averages 227 persons/Km², 30 % higher than the 174 persons/ Km² in the rest of the Lake Victoria basin.



Figure 10.4 – River Kagera Basin

10.5 Vision and Goals

Management of shared water resources is a very complex process, more so in an environment characterised by high poverty levels, high population pressures, rampant environmental degradation, and lack of trust among the riparian states. Success of such a complex process requires high levels of cooperation and commitment by all the riparians through consensus on a common set of shared values and vision.

The shared water resources management initiatives that Uganda is currently involved in are all based on a common vision agreed on by all the riparians. These visions are all focussing on the promotion of socio-economic development of the riparian countries through eradication of poverty, enhanced food security, and strong regional cooperation and integration.

10.5.1 Nile Basin Shared Vision

In order to use the shared water resources to stimulate socio-economic development in the basin, the Nile basin countries negotiated and agreed on a “Shared Vision”:

‘To achieve sustainable socio-economic development through the equitable utilization of, and benefits from, the Common Nile Basin Water Resources’.

The Shared Vision demonstrates a high level of commitment by the riparian countries towards the Nile basin cooperation and is based on a legacy of mutual trust and confidence between the Nile basin countries. The shared vision provides the broad integrating framework within which the countries can jointly undertake ‘win-win’ water resources management and development projects and programs in order to meet their development goals. The shared vision also gives firm political commitment and legitimacy to the cooperation process and ensures ownership of the process by all the concerned parties.

A Strategic Action Program has been launched to translate the NBI’s shared vision into action. This consists of two complementary sub-programs, i.e:

- ✓ ***A Shared Vision Program (SVP)*** – Which comprises of seven basin-wide projects intended to create an enabling environment for cooperative development, and;
- ✓ ***Subsidiary Action Programs (SAPs)*** – Which are implemented by smaller groups of Nile riparian states, comprising physical investment at sub-basin level involving two or more countries.

The linkage between the “Shared Vision” and the Strategic Action Program is shown in **Figure 10.5** below.

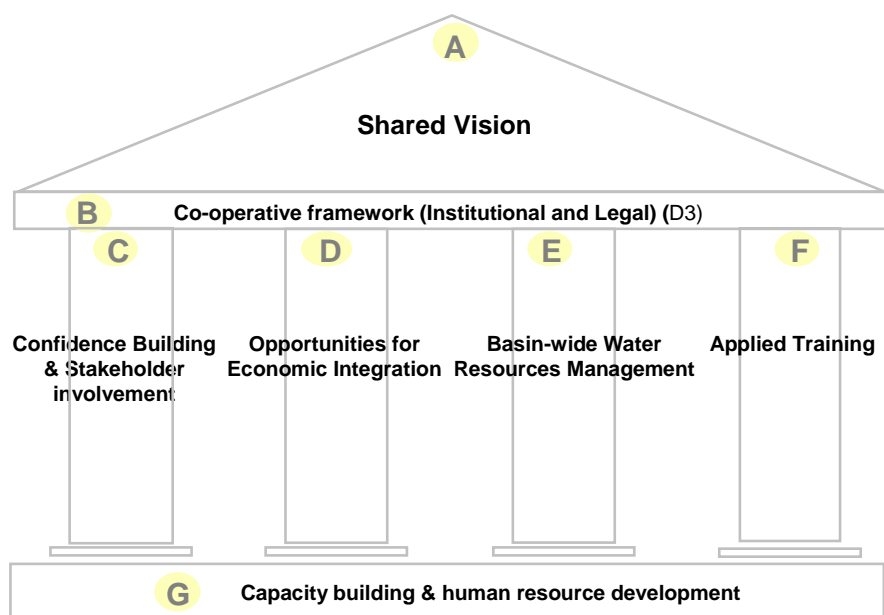


Figure 10.5 – Linkage between the Shared Vision and the Strategic Action Program

In order to ensure effective implementation of the Strategic Action Program, the Nile basin countries agreed on a set of policy guidelines, which emphasize that all intervention measures are to be planned at the lowest appropriate level. The appropriate planning level needs to involve all those who will be affected. Given the hydrological conditions of the Nile Basin, action on the ground will mainly be planned and implemented at sub-basin level.

10.5.2 Lake Victoria Basin Shared Vision

In order to promote equitable economic growth, poverty eradication and sustainable utilization of natural resources and protection of environment, the Lake Victoria basin countries agreed on a “Shared Vision”:

“To ensure a prosperous riparian population living in a healthy and Sustainably managed environment providing equitable development opportunities and benefits.”

On the basis of this mission, the basin countries jointly prepared the East African Co-operation Development Strategy (1997 – 2000) in which the Lake Victoria Basin was designated as a regional economic growth zone to be developed through a coordinated implementation process by the Partner States (EAC, 1997a). Recognizing that a healthy environment is a prerequisite for sustainable development, the EAC Partner States have also agreed to take concerted measures to foster cooperation in the joint and efficient management of and the sustainable utilization of the natural resources within the basin for their mutual benefit.

10.6 Legal Framework for Management of Shared Water Resources

The overall policy objective for the water sector in Uganda is:

“To manage and develop the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations with the full participation of all stakeholders.”

With regard to shared water resources, the policy directions draw heavily on the globally accepted principles of international water law, the key ones being:

| | <i>Principle</i> | <i>Implication</i> |
|---|---|--|
| 1 | <i>Equitable and reasonable utilisation of shared water resources</i> | This principle recognises the sovereignty of the states where the resource is located and the right of those states to use or share the resource. At the same time the principle imparts an obligation on the part of the state using the resource not to injure the interests and rights of other states sharing the resource |
| 2 | <i>Obligation not to cause significant harm to co-riparians</i> | This principle demands that, in utilizing the shared resources, riparian states are required not to cause significant harm to the interest of other states by pollution or other conduct. |
| 3 | <i>Prior notification</i> | The principle requires that each of the riparian States should notify other riparian States of planned measures or planned activities within its territory that may have adverse effects upon those other States. |
| 4 | <i>Information sharing</i> | The principle also requires riparian states to cooperate and share information regarding the development of shared water resources. It is also the basis upon which riparian states can build a reliable and comprehensive knowledge base of the shared watercourse as a basis for planning and sharing of beneficial uses. |
| 5 | <i>Community of interest in an international watercourse</i> | This principle requires that all riparian States sharing an international watercourse system have an interest in the unitary whole of the system. |
| 6 | <i>Environmental impact assessment and environmental audits</i> | This principle requires all riparian states to carry out an environmental impact assessment of any planned activity and environmental audits existing projects and economic activities in a shared basin. |
| 7 | <i>Precautionary principle</i> | This principle requires that each riparian State takes the necessary measures to prevent environmental degradation from threats of serious or irreversible harm to the environment. |
| 8 | <i>“Polluter pays” principle</i> | This principle requires that the person/State that causes the pollution, shall as far as possible bear any costs associated with it. |

The above principles have also formed the basis for the preparation of the specific cooperative legal frameworks for the management of shared water resources in the region.

10.6.1 Legal Framework for the sustainable management of the Nile waters

Treaties regarding the management of the waters of the Nile Basin date back to 1929 when Great Britain and Egypt signed an agreement under which no irrigation, power works or other measures were to be constructed or taken on the Nile and its branches or on lakes from which it flows in the Sudan or in countries under British administration except with the previous agreement of the Egyptian government. The Agreement was followed by the 1959 Agreement on the Full Utilization of the Nile Waters, which was signed between Egypt and Sudan. The 1959 Agreement apportions the waters of the Nile between the two signatory states.

Given the new political dispensation in the Nile basin, the Nile Basin countries, in 1995, embarked on the process of negotiating and developing a new Nile Basin Cooperative Framework Agreement for the sustainable management and development of the shared Nile water resources. This process is still ongoing and it is envisaged that once these negotiations are successfully concluded, the resulting agreement will supersede all the existing Nile water agreements.

10.6.2 Protocol for the Sustainable Development of the Lake Victoria Basin

This protocol was signed by the three East African States (Uganda, Kenya and Tanzania) in November 2003 and is supposed to be ratified by the three states by November 2004 for it to become effective. The protocol puts in place a comprehensive legal framework for the sustainable management and utilization of the water resources of the Lake Victoria basin.

Besides the above protocol, several other specific legal instruments have been signed between the Lake Victoria basin states for the management of the basin's natural resources. These include among others:

- ✓ The 1977 agreement setting up the Kagera Basin Organization (KBO) for the integrated development of the Kagera River basin;
- ✓ The 1994 Convention establishing the Lake Victoria Fisheries Organization (LVFO) for the sustainable management of the Lake Victoria Fisheries resources;
- ✓ The 1994 agreement for the establishment of the Lake Victoria Environment Management Program (LVEMP);

10.7 Institutional Framework for the Management of Shared Water Resources

The lead agency for management of shared water resources in Uganda is the Directorate of Water Development. The institutional framework for the management of shared water resources, therefore, follows the existing water sector institutional framework described in Chapter 3, Sections 3.4.

However, besides the national level institutions, specific regional institutions have been established by the riparian countries to manage the shared water resources. The most notable of these include:

10.7.1 The Nile Basin Initiative

The Nile Basin Initiative (NBI) is a transitional institutional arrangement set up in 1999 by the Nile basin countries to oversee the implementation of the Nile River Basin Action Plan pending establishment of a permanent legal and institutional framework for the Nile Basin. The NBI consists of a Nile Basin Council of Ministers responsible for water affairs (Nile COM), which is the top policy organ of the NBI; a Technical Advisory Committee (Nile TAC) comprising of two senior government technical officials to advise the Ministers; and a Nile Secretariat which provides administrative support to the Nile COM and Nile TAC. The NBI institutional set-up is shown in **Figure 10.6** below.

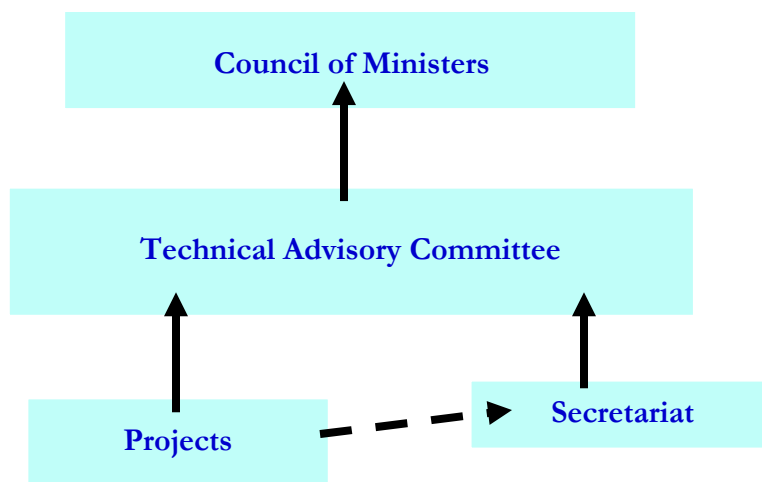


Figure 10.6 - Nile Basin Initiative Institutional set-up

10.7.2 The Lake Victoria Development Program (LVDP)

The current institutional set-up for the Lake Victoria Development Program (LVDP) is shown in **Figure 10.7** below. It is envisaged that upon ratification of the Lake Victoria

Protocol, the Lake Victoria Basin Commission will be established to replace the current institutional set-up.

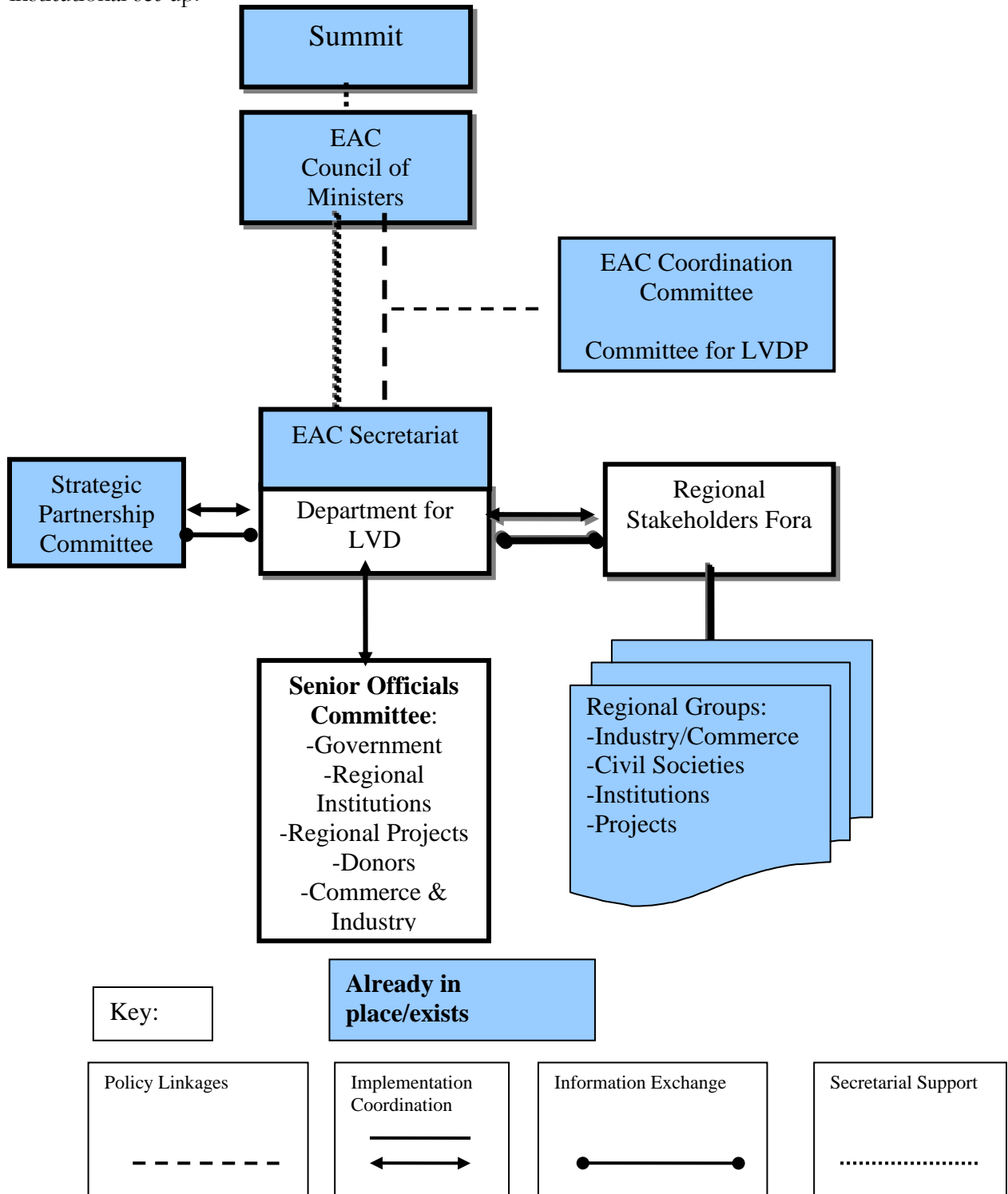


Figure 10.7 – LVDP Institutional set-up

10.8 Ongoing Programs and Projects

There are a number of ongoing shared water programs and projects in which Uganda is involved, aimed at promoting sustainable management and development of shared water resources in the region. These are summarized in **Table 10.5** below.

Table 10.5 – Shared Water Projects and Programs

| <i>Project</i> | <i>Brief Description/Status</i> | <i>Funding Agency</i> |
|--|--|--|
| <i>Nile Basin Initiative Shared Vision Program</i> | <ul style="list-style-type: none"> ✓ Implemented by the 9 Nile basin countries and comprises of 7 projects in the following areas: Environment, Applied Training, Agriculture, Hydropower, Water Resources Management, Socio-economics, Confidence Building. ✓ Most of the projects are to commence by December 2004. | Consortium of Donors coordinated by World Bank |
| <i>Nile Equatorial Lakes Subsidiary Action Program (NELSAP)</i> | <ul style="list-style-type: none"> ✓ Implemented by 6 countries (DR Congo, Burundi, Rwanda, Kenya, Tanzania and Uganda) and comprises of 6 projects in the following areas: Fisheries management, River basin management, Hydropower, Agriculture. | SIDA, NORAD, African Development Bank |
| <i>Lake Victoria Environmental Management Program</i> | <ul style="list-style-type: none"> ✓ Implemented by Uganda, Kenya, and Tanzania and comprised of 10 components i.e. Fisheries Management and Research, Water Quality and Ecosystem Management, Wetlands Management, Land Use Management and Pollution Control, Catchment Afforestation, Water Hyacinth Control, Capacity Building, Micro-projects, and Municipal and Industrial Waste Management. ✓ Phase 1 of the project commenced in 1997 and is to be completed in 2004. Phase 2 is under preparation. | World Bank, GEF, SIDA |
| <i>Nile Basin Water Resources Projected</i> | <ul style="list-style-type: none"> ✓ Implemented by the 10 Nile basin countries, including Eritrea with technical support from FAO. ✓ Major areas included; Development of the Nile Basin Decision Support System (Nile DST), Upgrading of the Hydrometric monitoring system in the basin, strengthening of water resources databases, Capacity building in Legal, Institutional and GIS skills. ✓ Project commenced in 1996. Phase 3 of the project is scheduled to commence in December 2004. | Government of Italy. |

| | | |
|--|---|--|
| <i>Transboundary Agro-Ecosystem Management Project for the Lower Kagera Basin</i> | <ul style="list-style-type: none"> ✓ Implemented by Rwanda, Tanzania and Uganda with technical support from FAO. ✓ Its objective is to protect ecosystems in the lower Kagera basin through the productive and sustainable use of biodiversity resources and agricultural ecosystems. ✓ Project commenced in 2003. | GEF |
| <i>The Nile Basin Discourse (NBD)</i> | <ul style="list-style-type: none"> ✓ The NBD was created to mobilize civil society in the development of the Nile basin. The NBD has facilitated the establishment of National civil society forums in all the Nile basin countries. | IUCN |
| <i>The Lake Victoria Development Program</i> | <ul style="list-style-type: none"> ✓ Implemented by Uganda, Kenya and Tanzania, with the possibility of Rwanda and Burundi joining in the near future. ✓ Addresses all the key socio-economic development activities in the Lake Victoria basin. | Various donors including SIDA, World Bank, ADB, etc. |

10.9 Shared Water Resources Management Issues and Challenges

10.9.1 Issues

The key shared water resources management issues of relevance to Uganda include:

- (a) **Hydropower** - Overall, hydropower is relatively little developed in Uganda, but power demand is increasing rapidly and the availability of electricity is limiting development. There is substantial potential for increased development of reliable, low-cost power, for example through expansion of hydropower production and through exploring opportunities for regional power trade. There is, therefore, need to promote optimal development, management, and use of the shared water resources of the equatorial Nile for hydropower production.
- (b) **Irrigation** - Agriculture, which is of great economic and social importance, is by far the largest potential water user in the region. Improvements in agricultural practices and water use efficiency are key factors in ensuring food security in the region and Uganda in particular. There is, therefore, need to prepare and implement a plan to develop and use water resources in Uganda for modernization of agriculture.
- (c) **Environmental concerns** - The major environmental issues related to shared water resources include land degradation, water quality deterioration, aquatic weeds infestation, drainage of wetlands, floods and droughts. There is need for joint collaboration in the protection of the shared water resources from environmental degradation.

- (d) ***Institutional Capacity*** - Strong national and regional institutions are an important element in achieving sustainable management and development of the shared waters and enhanced regional cooperation. There is need to build capacity in the national and international aspects of water resources planning, management and development.
- (e) ***Participation and public awareness*** – Effective stakeholder participation and increased public awareness is a pre-requisite for sustainable management and development of shared waters. There is, therefore, need for putting in place mechanisms for effective stakeholder participation in all water resources management and development activities and comprehensive communication strategies for sustained public awareness on salient water resources issues.

10.9.2 Challenges

- (a) ***Conflicting interests*** – One of the greatest challenges in shared water resources management and development is dealing with the conflicting interests from the different riparians. For example, in the Lake Victoria basin, whereas Kenya and Tanzania are interested in inter-basin water transfers to meet their domestic, industrial and irrigation water needs in the water scarce parts of their countries, Uganda on the other hand is interested in the uninterrupted flow of water into Lake Victoria to support its hydropower production at Owen Falls Dam. This, therefore, calls for joint basin-wide planning and implementation of “win-win” projects.
- (b) ***Mistrust among the riparians*** – High levels of mistrust among the riparians can be a big set-back to any development efforts in a shared basin. There always exists suspicion and ill-feelings among the riparians in what the other riparians could be doing with the shared waters! This is reflected in the reluctance by the riparians to share data on the shared water resources and information on planned and existing development projects in the individual countries.
- (c) ***Fragmented and incompatible national water resources management and development plans*** – In most cases, each riparian country has its own national water resources management and development plan which does not take into consideration the broader basin-wide management and development issues. This often results in implementation of conflicting development projects, duplication of activities and wastage of resources. There is therefore need for joint basin-wide planning and implementation of “win-win” projects with more emphasis being put on the “sharing of benefits”.
- (d) ***Environmental conservation*** – It is obvious that poor water resources management practices in the upstream countries can result in serious environmental issues for the downstream countries too. The challenge is always how downstream countries can influence the way activities are implemented in the upstream countries and how to ensure that the upstream countries contribute towards the cost of environmental restoration activities in the downstream countries.

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