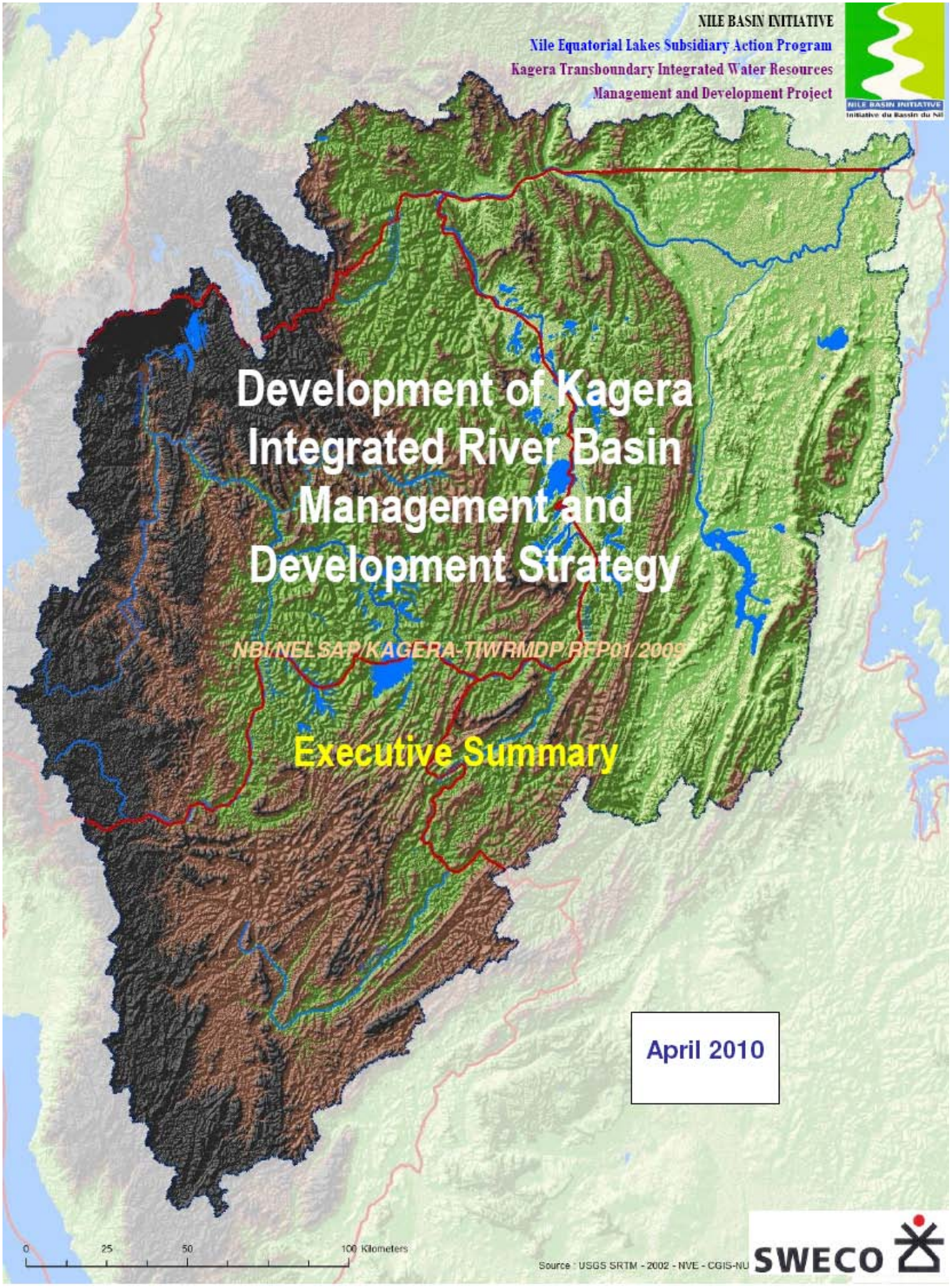

NILE BASIN INITIATIVE

Nile Equatorial Lakes Subsidiary Action Program

Kagera Transboundary Integrated Water Resources Management and Development Project

Development of Kagera Integrated River Basin Management and Development Strategy

NBI/NELSAP/KAGERA-TIWRMDP/RFP01/2009

Executive Summary

April 2010

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Source : USGS SRTM - 2002 - NVE - CGIS-NU

SWECO

NILE BASIN INITIATIVE

NILE EQUATORIAL LAKES SUBSIDIARY ACTION PROGRAM

KAGERA TRANSBOUNDARY INTEGRATED WATER RESOURCES MANAGEMENT AND DEVELOPMENT PROJECT

Development of Kagera Integrated River Basin Management and Development Strategy

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EXECUTIVE SUMMARY

SWECO International

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Contents

1. Introduction

1.1 The Kagera River basin covers the territories of Burundi, Rwanda, Uganda and Tanzania. The total catchment area of the Kagera River basin is some 60,000 km². The Kagera is the largest of the 23 rivers that drain into Lake Victoria and it carries 34% of the annual river inflow to the lake.

1.2 There are two rainfall seasons, with the longer south-easterly monsoon bringing rain between about February and May, and the shorter north-easterly monsoon from about September to November. The months of June, July, and August are generally dry. Average rainfall over the basin amounts to some 1,000 to 1,200 mm per year with high average rainfall up to 1,800 mm per year in the western mountain ranges in Rwanda and Burundi, with a descending gradient towards the east down to 800 mm per year. The average annual temperatures are lower in the westernmost and north-western mountain range at 15 to 18°C, and up to an average of 22°C in the central part.

1.3 The upper tributaries, Kanyaru and Nyabarongo are generally steep but include flatter reaches where swamps have formed. The middle and the lower part of the Kagera nalley is characterized by the existence of many lakes and swamps that attenuate the river flows.

1.4 There are an estimated 2,200,000 ha of cultivated land for agricultural production in the Kagera River basin: more than 94% of rainfed-only agriculture; around 5% marshlands agriculture without any infrastructure; about 1% marshlands irrigation with at least drainage infrastructure; and less tan 1% plains irrigation schemes, with reservoir or river water intakes.

1.5 The degradation problems affecting the sustainability of livelihoods in the Kagera River Basin include: extreme deforestation and loss of woody biomass, timber and non-wood forest products; extensive, pervasive and areas, severe soil erosion, nutrient mining and declining soil quality affecting land potential and productivity of crop, pasture/range and forest lands; pervasive biomass burning, through bush fires, burning of crop residues, cooking with firewood, reducing vegetative cover and soil organic matter; and siltation of rivers and lakes.

1.6 Soil erosion is extensive across the diverse farming systems and terrain units, with overall moderate sheet and rill erosion; and severe erosion (some gullies) on hilltops and steep slopes. Deforestation is also caused by encroachment of agriculture and increasing demands of the growing population for fuel-wood, charcoal, timber and construction purposes. Currently, the majority of the basin's population depends on locally gathered fuel-wood for their energy. Wood is also used for cooking in schools and other public institutions and for brick making and agro-processing. Erosion and deforestation has been extremely severe over the last few decades, especially in Rwanda and Burundi and it will be worse unless the problem is averted.

1.7 The current population of the Kagera River basin is estimated to be 15 million whereas the forcased population for the year 2030 is 25 million. The current mean

annual demographic growth rate is 2.7% and the fertility rate per woman is 6. Children under 15 and over 65 age group represent 45.6% and 3.5%, respectively.

1.8 Currently 8 million (52%) people lack access to safe drinking water, 10 million (67%) people lack adequate sanitation, 1.5 million (10%) people die every year from diarrhoeal diseases and the rate is nearly double (18%) for children under 5. This situation is no longer bearable.

1.9 Clusters of *driving forces* identified include: d*emographic* (population growth; migration pressures; urbanization); *economic* (water investments); *technological* (water use efficiency); *social* (poverty; inequity, health, education); *governance* (power structure; level of conflict; globalization); *environmental* (water-related diseases, soil salinization and erosion, water pollution, ecosystem health); *climate change* (temperature increase resulting in increased evapo-transpiration/ evaporation, change in precipitation, increased frequency of droughts and floods).

1.10 Even though all the listed driving forces are critical, the demographic factor is main/major deriving force providing both *opportunities* and *threats* underlying the demands placed on water and related resources. Most of the other deriving forces highly related to the *demographic factor*. The high population density and population growth rate of the peoples of the Kagera basin are amongst the highest in the world. This places significant pressures on the sustainable utilization of the water and related resources. Population pressures in the region are further compounded by large numbers of displaced peoples and the resultant internal population movements of migrants and refugees, presently continuing, and the move towards *urbanization* for those seeking improved economic opportunities in the more urbanized cities and towns in the basin. These conditions suggest that demand for water will be increasing in the future.

1.11 Majority of the rural people in the basin are very poor (few tools, poor housing, small land area, little disposable income); they are unable to invest in improved resources management or education. They have limited access to improved technologies, information and services (research, credit, reliable markets, inputs and dispensaries). In upland areas, water is scarce both for domestic use and livestock as well, and watering points are mostly in lowland areas, or is sold from kiosks at prices most people cannot afford. In large areas of the basin, fuel-wood is also in increasing short supply and alternatives such as paraffin or electricity are only accessible in the few urban centers.

1.12 The increasing human and animal pressures in the Kagera basin have led to intensification of land use and the adoption of unsustainable practices. Population pressures, insecurity and the struggle to meet short term needs have compromised the capacity of farming communities to sustain the land resources even though it is in their best interests.

2. The Future Water Resource Development Scenarios

2.1 The Need for Water Infrastructures

2.1 Investments in water infrastructure and institutions are almost always needed to achieve water security. The Kagera riparian countries will invariably need much more infrastructure and stronger institutions, with the development of each of these being greatly complicated where waters are trans-boundary. Water infrastructure is needed to access, store, regulate, move and conserve the resource. Institutions are defined broadly to include organizations and capacity, as well as governance, policies, laws and regulations and incentives, addressing issues ranging from water allocation, quality, rights and pricing, to asset management and service delivery and their performance.

2.2 The development of water institutions and infrastructure must go hand-in-hand. Infrastructure will not deliver high, sustained returns if it is not well designed and managed and managers will not be able to optimize the use of the resource without adequate (natural or man-made) infrastructure. Similarly, strong institutions and sustainable governance will also directly contribute to appropriate investment in and proper operation and maintenance of sound and reliable water infrastructure. For effective water management, institutional design needs to ensure inclusion, accountability and equity and be flexible enough to adapt to change, such as in technologies and social policies. Experience again and again demonstrates that investments in institutions and infrastructure must be made in concert, with their relative weight or priority is a question of degree only. Without the infrastructure to store and deliver water and manage flows, water managers and institutions, no matter how sophisticated, are severely constrained.

2.3 The future water resource development should address all people within the Kagera Basin through: appropriate water supply and sanitation serves; soil and water conservation measures; irrigation and drainage infrastructures (whereever it is feasible); hydropower generation (whereever it is feasible); and environmental protection at all localities.

2.4 Almost all anticipated development projects are small-scale in size but many in numbers and covering all communites. However, there also vey few large-scale projects associated with high investments in water infrastructure and institutions. Seven of such large-scale projects (as shown by Figue (a)) are included in this study so as to illustrate the impacts such projects on of the overall Kagera River Basin water resource.

2.5 The costs associated to the seven large-scale projects inclue: (a) *Direct costs:* Construction cost of dams; construction costs of power plants; maintenance costs; compensation costs; construction costs of conveyance structures (such as canals and pipes). The total investment cost for the seven large-scale water infrastuctures has been estimed to be about 1.5 Billion USD. (b) *Indirect costs:* Improvement ratio of environmental ecosystem (water quality conservation and improvement; ecosystem

conservation). (c) *Un-measured costs:* The improvement and restoration of environmental ecosystem; social costs according to the submergence and irrigation

2.6 The benefits associated to the seven large-scale projects inclue:

(a) *Direct benefits:* Municipal, industrial, irrigation water supply for 47000 ha; hydropower generation of upto 1350 GWh per year; improving water quality in the downstream area (supplying stream maintenance flow, water quality conversion and improvement); emergency water supply (a measurement for emergency water during the dry season); flood control (preventing submergence of crops and the soil-loss, preventing submergence of farm lands and burying; damage decreases of channel structures).

(b) *Indirect benefits:* Increase of land use (low-land area and use of submerged areas); deduction of manpower in the flood management; increase of water management effect (efficient use of water sources); decrease of soil inflow (deduction of management cost for water resource facilities); alternative effect of oil for generating electric power (foreign currency savings); ripple effect of related projects; effect on production, inducement of a value added, employment creation.

(c) *Unmeasured benefits :*Environmental amenity and functional improvement: improving the scenic beauty, cleaning the surrounding environment; contribution of national economy: activating economic growth, renewable energy use, resource saving; development effect of the construction and related facilities: accumulation of techniques for civil engineering execution, etc; improvement of public health and sanitation: prevention of environmental pollution (decrease of air pollution), promotion of welfare.

2.2 Assessment of Water Resources Development Scenarios

2.7 A range of development scenarios (Low development, Agricultural Development and High Development with and without Climate Change) have been selected to provide a perspective on development opportunities and their impacts. The *inclusion of a project within the development scenario does not imply any endorsement* from either the country or the Kagera Basin. The Consultant, however, claims that the range of scenarios tested is sufficient to illustrate the range of likely impacts for the next 20 years. The scenarios chosen were principally about developing the irrigation and hydropower sectors. In addition, domestic water supply as well as soil and water conservation are taken into consideration.

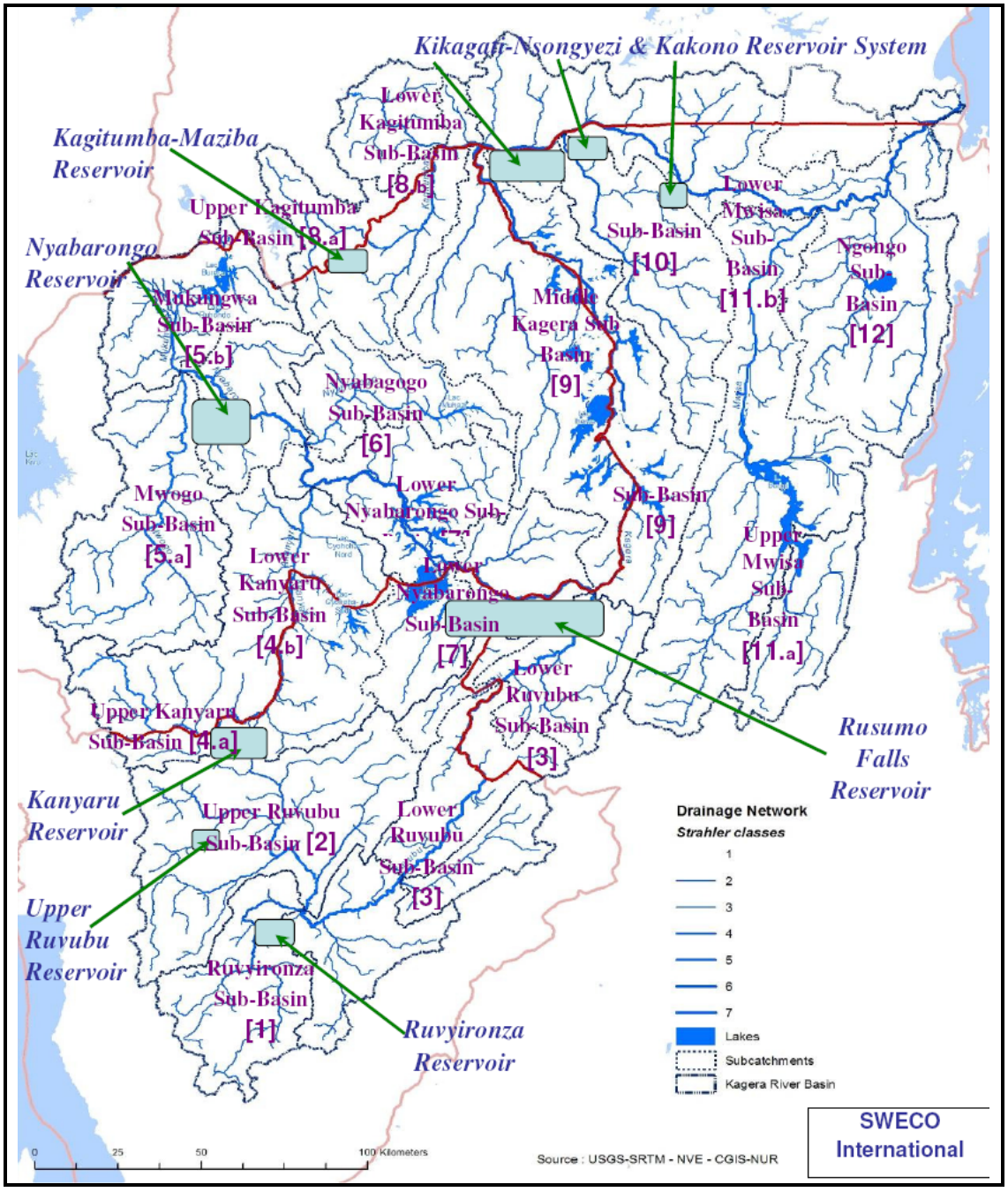

Figure (a): Location of Proposed Large Reservoirs Sites

Hydrological impacts

2.8 All development will have impact and the model reflected change in the hydrology of the river that would result from the studied developments. Decisions on what is the reasonable balance of development is a matter that can be informed by the model outputs, but requires also the economic, environmental and socio-political inputs by the country concerned to determine the appropriateness and priority of each investment. Current development of the Kagera River Basin is very limited. The natural flow pattern is essentially intact. Summary observations are: (a) The overall character of the hydrograph is maintained, (b) wherever hydropower projects are introduced, low flows are significantly increased and are higher than historically observed range; (c) high flows are marginally reduced, but within historically observed range.

2.9 Future development must be properly coordinated, and managed, to preserve the environmental flows that support the ecosystem in order to be consistent with objectives set out in the NBI and LVBC Protocol. The results confirm the importance of balanced and coordinated approach to water management. The results set out here confirm that agreement on access to the waters of the Kagera River is a precondition to provide development security at a country level, ensuring that the benefits of development in one country are not eroded by development in another. Only a coordinated approach provides assurance of sustainable development opportunities.

2.10 Summary of the overall results corresponding to the selected assessment criteria are presented in Table (a). The High Development Scenario consumes about 17 and 26 percent of the flows of Kagera at Kyaka and Mouth, respectively. However, the actual consumption could be much less than this figure. Because of the difficulty of estimating the proportion of irrigable land and the possible moisture deficiency level, the estimated total amount of water budgeted for irrigation has been estimated in a conservative manner. In the modeling process, while correction for effective rainfall has been considered, no correction has been made to balance the evaporation and evepotranspiration losses due to utilization of wetlands that are already consuming the same amount or more water prior to being irrigated. Future studies should include issues of this nature in order to accurately estimate irrigation water requirements as well as drainage infrastructure requirements.

Water supply and sanitation

2.11 In the Kagera basin, currently 8 million (52%) people lack access to safe drinking water, 10 million (67%) people lack adequate sanitation, 1.5 million (10%) people die every year from diarrhoeal diseases and the rate is nearly double (18%) for children under 5. This situation is no longer bearable. The demand will be much higher as the population is expected to increase from the current 15 million to 25 million people in the year 2030. The future demand rate per capita is likely to increase not only in quantity but also in quality. Therefore, there is a need to carry out infrastructural and institutional development to meet such future demands.

Table (a): Results corresponding to the Assessment Criteria for Scenario Analysis

Goal	Primary Objectives		Assessment Criteria: Specific Development	Issue	Indicator Description	Unit	Scenarios (Without Climate Change): S1(a)	S2(a)	S3(a)	Scenarios (With Climate Change): S1(b)	S2(b)	S3(b)
Sustainable Development	Optimal Development	1. Economic development	1.1 Increased area covered by WSC	Soil and water conserved	Incremental area	*1000 ha*	49.7	107	107	49.7	107	107
			1.2 Increased irrigated farm	Irrigated agriculture	Incremental area	*1000 ha*	150	300	300	150	300	300
			1.3 Increased hydropower production	Power generated	Incremental power generated	*Gwh / Year*	150	309	1458	150	269	1208
		2. Environmental development	2.1 Maintain water quality and acceptable flow conditions	Flow characteristics	Key lowflow characteristics	*Lowflow ratio*[1]	0.88	0.86	0.84	0.87	0.84	0.82
		3. Social development	3.1 Maintain livelihoods of vulnerable resource users	Health[2], food and income security	Impact on health, food and income security	*Beneficiaries*	1300	2390	2400	1300	2390	2400
			3.2 Increased employment generation in water related sectors	Incremental sustainable employment from water resource interventions	Incremental number of people engaged in water and related resources	*1000 p*	525	960	970	525	960	970
	4. Equitable development		4.1 Ensure that all four Kagera Basin riparian countries benefit from the development of water and related resources	Aggregate benefits by country	Summation of incremental net economic and social benefits	*Trends*	High	High	High	High	High	High

Note: *S1(a) and S1(b) are Low Development Scenarios without and with Climate Change consideration, respectively.*
S2(a) and S2(b) are Agricultural Development Scenarios without and with Climate Change consideration, respectively.
S3(a) and S3(b) are High Development Scenarios without and with Climate Change consideration, respectively.

[1] The values given are Lowflow ratios of Kagera River at Kyaka. Kagera at Mouth would have been more appropriate gauging station for this index if it had better quality data than is the case now.

[2] The Domestic Water Supply and Sanitation (DWSS) which is the major contributor to health improvement is not included in the Table. For all Scenarios, DWSS services is assumed to be achieved at the same level.

Table (b): Patterns of flow of Kagera River at Kyaka

Month	Current Flow	WSS		Scenario 1		Scenario 2		Scenario 3	
		(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Jan	489	464	462	462	457	457	450	419	408
Feb	455	430	428	415	411	400	394	382	381
March	536	511	508	469	466	411	406	382	373
April	588	564	562	548	543	503	499	454	449
May	709	684	681	672	670	644	643	612	608
June	732	708	705	622	618	554	553	536	529
July	761	736	733	708	704	670	667	659	655
Aug	700	675	672	661	658	631	628	634	632
Sept	598	573	570	554	552	526	521	543	543
Oct	553	528	525	517	514	491	483	519	518
Nov	516	491	489	486	485	464	458	463	461
Dec	542	517	514	453	446	392	384	397	376
Annual	**7178,6**	**6880,4**	**6851**	**6566,3**	**6523,3**	**6144,8**	**6086,2**	**5997,6**	**5932,3**

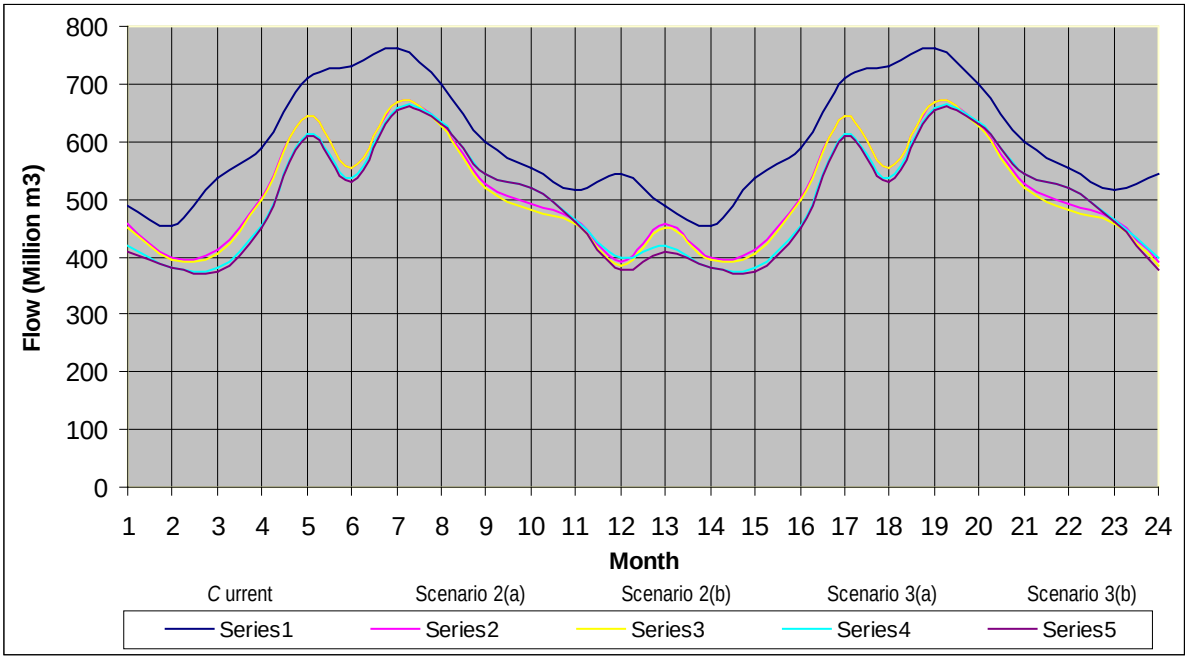

Figure (b): Patterns of flow of Scenario 2 & 3 at Kagera River at Kyaka

Table (c): Patterns of flow of Kagera River at Mouth

Month	Current Flow	WSS		Scenario 1		Scenario 2		Scenario 3	
		(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Jan	387	359	357	355	351	350	344	313	301
Feb	348	321	319	305	301	290	283	272	270
March	387	360	357	316	313	258	252	228	219
April	416	389	387	372	367	327	322	277	273
May	490	463	460	450	448	422	421	390	385
June	467	440	438	351	347	281	280	263	256
July	435	407	404	377	373	338	335	327	324
Aug	393	365	362	349	346	318	315	321	319
Sept	341	313	311	293	291	264	259	281	281
Oct	327	300	297	288	285	261	253	289	289
Nov	330	303	300	297	295	275	269	273	271
Dec	388	361	358	293	286	232	223	236	216
Annual	**4709,3**	**4380,1**	**4350,7**	**4047,5**	**4003,7**	**3616,7**	**3556,9**	**3469,6**	**3402,9**

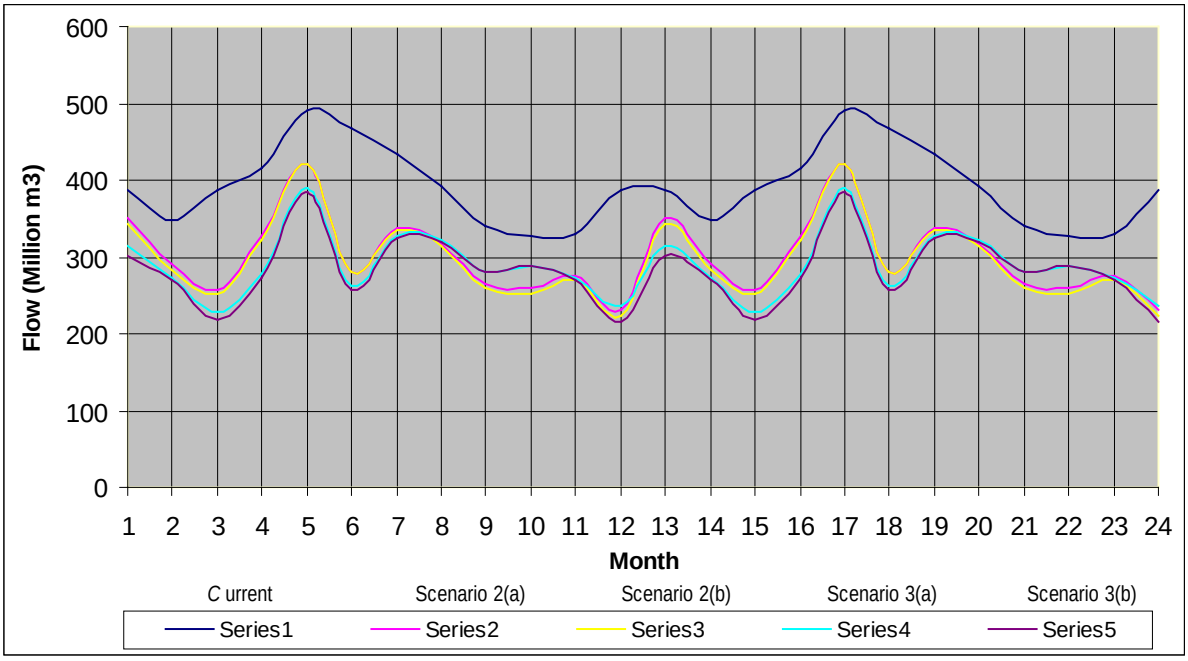

Figure (c): Patterns of flow of Scenario 2 & 3 at Kagera River at Mouth

Soil and water conservation

2.12 In the Kagera basin, most of the people live in hilly and mountainous areas. For instance, in Rwanda and Burundi over 90% of the population is engaged in subsistence farming, with extremely small farms and fragmented and fragile plots (the mean area is 0.6 ha; only 2% of holdings exceed 3 ha.). Soil and water conservation measures in these hilly and mountainous areas will certainly reduce the loss or top fertile soil and also let rain water seep into subsoil resulting in better food production. In addition, the water seeping into the ground also recharges the groundwater, which is the main source of domestic water supply. Therefore, it is recommended that soil and water conservation measures be implemented as much as possible.

Irrigation and drainage

2.13 To support national objectives of basic food security and crop diversification an increase in irrigated area is desirable and inevitable. There is currently 28 300 ha irrigated land facilitated with minimum infrastructure. The high development scenario considers 10 700 ha of irrigation resulting and increases the total area to 135 300 ha. This increases the amount of overall diverted water for irrigation by 525 Mm^3 to 547 Mm^3 per year. This will in total result in 11.1 to 11.6 percent of the annual flow of Kagera at mouth.

2.14 No matter what actions are taken, the carrying capacity of the hilly and mountainous areas has reached to their limit. It is not advisable to continue aggressively moving in the direction of subsistence cropping into more fragile and drier hilly and mountainous areas. As the population continue to grow faster than increases in food production, the options for meeting the consequent incremental demand for food needs to be considered. The excessive pressure felt in the hilly and mountainous areas needs to be relieved, to a certain extent, by implementing irrigation and drainage schemes. In areas such as Bugasera that are drought prone areas rainfed agriculture will not be reliable and therefore irrigation can provide insurance against drought as far as the sites are along the banks of the river channels. However, it should be realized that irrigation development costs will often only be justified by high value crops, others will have limited markets and will bring primary benefits to only a few of the people normally at risk. A large proportion of potentially irrigable lands are under the threat of submersion under water due to poor natural-drainage. Efforts have to be made on regulation of several low-lying areas going under inundation. In conclusion, however, since suitable irrigable areas are limited compared to water availability, irrigation development cannot, and perhaps should not, be relied upon to meet the *entire future increase* in demand for food supply. Future irrigation investment in the Kagera Basin must focus on lower cost development solutions by making better use of existing infrastructures and increasing output value per unit of land and per unit of water used. Planners should seek to establish the conditions that will promote this focus.

Hydropower

2.15 *Hydropower:* The projected hydropower in the Kagera River Basin in the various ranges is summarized by Table (a). The hydropower corresponding to the high development scenario with and without climate change consideration amounts to 1 100 and 1 350 GWh/year.

2.16 It is important to note some facts about the electricity demands and supplies:

(a) Currently, the majority of the basin's population depends on locally gathered fuel-wood for their energy. Wood is also used for cooking in schools and other public institutions and for brick making and agro-processing. Erosion and deforestation has been extremely severe over the last few decades, especially in Rwanda and Burundi and it will be worse unless the problem is averted.

(b) Only a very small proportion of the population of the region, between 2% and 9% (between 2% and 7% for the Kagera basin countries) has access to electric power supply.

(c) The current unit consumption in the region is 95 kWh/capita/year (i.e., a total of 1425 GWh/year) including all industrial and commercial consumption. This represents about one tenth of the overall average for Africa of 930 kWh/capita/year.

(d) High forecast scenario of 181 kWh/capita/year (4525 GWh/year) for the year 2030, an increase to almost double the current level in the region but still well under the current average for all of Africa (even excluding the wealthier countries).

Knowing that hydroelectric the most desirable source of energy and knowing that *hydropower development alone is not sufficient to meet long-term Kagera basin demands*, it can be concluded that focusing on the High Development Scenario is very much desirable.

2.17 *Lower Kagera Tunnel-Based Hydropower Project:* Besides the Rusumo falls, other potential hydropower developments in Lower Kagera (i.e., Kikagati, Nsongyezi and Kakono) have been proposed. Rusumo Falls and the Lower Kagera hydropower developments can share the service of a single reservoir and such arrangement will significantly reduce losses due to evaporation that would be caused by creating an additional reservoir at a location where evaporation rate is relatively high. Another alternative to the combination of Kikagati, Nsongyezi and Kakono is to divert Kagera River from Lake Rushuwa through a transfer tunnel of approximately 3.3 km length, a 16 km long reservoir acting a balancing storage and conveyance channel, and approximately 26 km long headrace tunnel and returning it to the Kagera river channel through a power station located near the bank of Kagera River at a location near Kakono. The proposed alternative will produce about three times that of the Kagera Hydropower Project at Rusumo Falls. However, this alternative requires the necessary technical (topographical, geological, hydrological, hydraulic, civil works) studies, financial and economic analysis as well as social and environmental impact analysis. Therefore, it is recommended that this alternative be included in the future feasibility level studies of Lower Kagera hydropower development project.

2.3 Investment on Water Infrastructure and Institutions

2.18 The overall investments in the Kagera River basin over the coming 20-year (2010-2030) is estimated to be about US$ 5.6 billion.

2.19 Multilateral financial institutions (MFIs) are important funders of water, through their grants, loans and guarantees. Their track record is commendable and they have great potential to do more. Although their loans cover only a minor part of current investment needs, they set the tone for others through their dialogues with government recipients and the understandings they reach. They can also mitigate risks for other players.

2.20 Donors, MFIs, NGOs, companies and others can assist, but there has to be real political "ownership" of the effort from host riparian governments of Kagera Basin as a precondition. Unnecessary constraints on their operations should be removed. Riparian countries of Kagera River basin with viable plans and projects, but a shortage of finance, should be targeted. Examples of measures that should be taken are:

(a) donors to refocus aid for water and coordinate through the DAC and others;

(b) donors to give priority to strengthening core public capabilities;

(c) MFIs to reconsider attitude to capital provisioning;

(d) MFIs and donors to resume qualified lending for water storage;

(e) NGOs with good project pipeline to be targeted for assistance;

(f) private companies (local and international) to be used as contractors and managers

2.21 Appropriate actions by seven main categories of actors: central governments from Kagera riparian countries and developing countries, sub-sovereign bodies, community organizations and NGOs, banks and private investors, aid donors, multilateral financial institutions, and members of the UN system and other international organizations should be implemented.

3. Sectoral Issues and Strategies

3.1 Water Supply and Sanitation

3.1 Development objectives of water supply and sanitation (WSS) are:

(a) Improved health of the rural and urban population by reducing water and sanitation related diseases through improved water supply, latrines and the promotion of hygienic practices of people.

(b) Improved living conditions: If water supply and sanitation facilities are improved and developed they will provide a major benefit to improve rural and urban living conditions and reduce the gap between urban and rural areas, thereby contribution to the promotion of improved agricultural and industrial production and modernization.

(c) Reduced environmental pollution from human and livestock excreta – Reducing, to the lowest level, untreated human and livestock excreta which cause environmental pollution, smell and flies and reduce organic pollution of water resources.

3.2 Immediate objectives to achieve the above development objectives that must be implemented up to *Year 2030* include: (a) all rural and urban people will use clean water of adequate quality standards with at least 50 liters/capita/day and use approved hygienic latrines through the active promotion of community participation and a demand responsive approach; and (b) universal good personal hygiene practice of rural and urban people and good environmental sanitation of communes and villages.

3.2 Irrigation and Drainage

Irrigation, food supply and drought

3.3 As the population continue to grow faster than increases in food production, the options for meeting the consequent incremental demand for food need to be considered. The Kagera river system has its headwaters in high rainfall areas and flows are relatively insensitive to droughts in agricultural areas downstream. In other areas such as Bugassera they are subject to repeated and prolonged droughts. In these and other similar drought prone areas rainfed agriculture will not be reliable to the desirable level and therefore irrigation can provide insurance against drought as far as the sites are along the banks of the river channels. In this regard, even though irrigation development cannot, and perhaps should not, be relied upon to meet the entire future increase in demand for food supply can be expected to depend to a large extent on irrigation in the future.

3.4 Increased production through irrigation development is nevertheless increasingly difficult to justify economically for the production of basic food, because of the decline in world market prices for these crops and typically high per hectare capital costs. For the foreseeable future any irrigation for the production of basic foods will only be possible if substantial reductions in per hectare capital costs of irrigation development can be achieved. Irrigation development may therefore be justified only for the production of relatively high value crops - for which markets and marketing are often

constraints - rather than for basic foods. In this situation markets, as much as the availability of suitable sites, will determine the pace of investment in irrigation, unless lower cost technologies can be devised and introduced.

Social and environmental aspects

3.5 Adverse social and environmental impacts of irrigation investments are many and varied. They include health impacts, waterlogging and induced salinization. Displacement of people from dam sites should be carried out only with adequate consultation and compensation. The consensus prevailing now is that social and environmental impact assessment is essential and as important as economic analysis in influencing the design of projects.

3.3 Dams and Hydropower

3.6 It can be concluded that, in most of the cases, the natural river gradient (or slope) of Kagera river system is not conducive for hydropower production. However, the size of flow (or discharge) is relatively high. In other words, there is a significant amount of exploitable hydropower potential provided dams are built in order to create drops and balance river flows. It should also be clearly understood that *electricity cannot be stored*, meeting the power demand at different times (short or long) depends on the water flow pattern that is directly diverted or stored in reservoirs and create a balanced flow throughout the year by compensating the dry season low flows by the wet season excess flows. In both cases, either to create power head or water flow, it can be concluded that the conditions prevailing in the Kagera Basin require building dams in order to develop hydropower potentials and also gains other water users including domestic and industrial water supply, irrigation, flood control, recreation river maintenance and (environmental) water demand supply purposes.

3.7 Effective management of the water resource is essential to sustaining the existing and future population of the Basin. As the population continues to grow so does the need for more dams especially in drought prone areas continues. While dams provide significant benefits to the society it should also realized that their impacts on the surroundings have to be properly addressed. These include: resettlement and relocation, socioeconomic impacts, environmental concerns, sedimentation issues and safety aspects. These concerns and impacts can be reduced or eliminated by careful planning, and the incorporation of a variety of mitigation measures. Besides, basin-wide planning for water management is the key element to providing optimum water supply and other benefits.

3.4 Soil and Water Conservation

3.8 Expanding population, irrational reclamation and utilization, construction without soil and water conservation measures are the main human factors causing soil and water losses. These factors, in addition to the great number of hills and mountains with relatively high rainfall in the basin, result in soil erosion.

3.9 There are three basic principles that lead to successful soil and water conservations measures:
(a) *Combining engineering measures with biological measures:* Appropriate engineering measures help create proper conditions for growing plants, but these measures are only a temporary solution for erosion control. Biological measures, on the other hand, can provide permanent control.
(b) *Combining erosion control with economic development:* Since eroded areas are usually poorer regions, high farmer enthusiasm is not expected through controlling without economic incentives/benefits. Farmers can be motivated only by combining control with local economic development. Therefore, it is necessary to integrate with some projects, such as economic agroforestry which might bring local farmers economic profits and thereby promote soil and water conservation directly or indirectly.
(c) *Combining policy measures with technical measures:* The people themselves are the leading factors in the genesis of control of soil and water losses. Strategic policies are mainly to control population growth rate, to implement soil and water conservation regulations, to establish and strengthen soil and water conservation institutions, to alleviate the shortage of energy resources and food and enhance economic development of rural areas. Tactically technical measures are mainly to take small watersheds as units and to enforce integrated biological, engineering and conservation tillage measures for controlling soil and water loss.

3.5 Conservation Strategy on Environment and Development

3.10 Environmental problems in Kagera Basin arise from conditions of poverty and under-development. This has to do with the impact on the health and integrity of the natural resources (land, soil, water, forests, wildlife, etc.) as a result of poverty and the inadequate availability, for a large section of the population, of the means to fulfill basic human needs (food, fuel, shelter, employment, etc.).

3.11 Population is an important resource for development, yet it is a major source of environmental degradation when it exceeds the threshold limits of the support systems. Unless the relationship between the multiplying population and life support systems can be stabilized, development programs, however innovative, are not likely to yield the desired results. It is possible to expand the ’carrying capacity' through technological advances and spatial distribution. But neither of these can support unlimited population growth. Although technological progress will add to the capabilities for sustaining a large number of population the need for a vigorous drive for population control can hardly be over-emphasized in view of the linkage between poverty, population growth and the environment.

3.12 Today, large majority children, women and men suffer from under- and malnutrition. The scenario for the coming years is alarming and the people living in Kagera are likely to face food crisis unless there is a significant increase of food production on a continuing basis. Since the only option open for increasing production is productivity improvement. Also, access to food will have to be ensured through opportunities for productive employment.

3.13 Almost all lands within the hills and mountains require special treatment to restore such land to productive and profitable use. The degradation is caused mainly by water. The basin’s forest wealth is dwindling due to over-grazing, unsustainable land use

practices and the biological impoverishment of the basin is a serious threat to sustainable advances in biological productivity. Generally, erosion also erodes the prospects for deriving full economic and ecological benefits from recent advances in molecular biology and genetic engineering. Lack of opportunities for gainful employment in villages and the ecological stresses is leading to an ever increasing movement of resource-poor families to towns.

3.14 It is difficult to clearly delineate the causes and consequences of environmental degradation in terms of simple one-to-one relationships. The causes and effects are often interwoven in complex webs of social, technological and environmental factors. For instance, from a purely scientific and technological standpoint, soil erosion would result from the cultivation of marginal lands. However, from the point of view of a comprehensive environmental impact analysis, it is important to go further back and analyze the circumstances that force people to cultivate marginal lands. Viewed in this light, it becomes clear that a concern for the environment is essentially a desire to see that national development proceeds along rational, sustainable lines. Environmental conservation is, in fact, the very basis of all development.

3.15 The overriding impact of adverse demographic pressures on the resources and ecosystems due to poverty and overpopulation has to be highlighted. Unless there is a curb on population growth and a corresponding improvement in land use policies, the current trend of over-exploitation and ecological degradation is not likely to improve. Thus, the people living in Kagera basin are faced with the heed for accelerating the pace of development for alleviation of poverty which is, to a great extent, responsible for many of the environmental problems. Development has to be sustainable and all round, whether for the poor or the not-so-poor or for the village folk or for the town people. The development models followed so far need to be reviewed.

3.16 The modest gains made by the steps taken during the past few years leave no room for complacency when viewed in the context of enormous challenges. The challenges can only meet by redirecting the thrust of the developmental process so that the basic needs of the people are fulfilled by making judicious and sustainable use of the natural resources. Conservation, which covers a wide range of concerns and activities, is the key element for sustainable development. Forming a conservation strategy is, therefore, an imperative first step. Development requires the use and modification of natural resources; conservation ensures the sustainability of development for the present and in the future. The conservation strategy is to serve as a management guide for integrating environmental concerns with developmental imperatives. The primary purpose of the strategy is to build up a conservation society living in harmony with *Nature* and making frugal and efficient use of resources guided by the best available scientific knowledge.

3.6 Understanding of Sectoral Perspectives

3.17 When implementing IWRM, it is important for a particular sector to know the perspectives of other water related sectors besides its own. The same amount of water is valued differently depending on the sector because each sector treats and uses water in different own ways. Water is also valued differently depending on when and where it can be obtained, and at what quality. Accordingly, typical perspectives of selected water-related sectors specifically on how individual water-related sectors tend to think and act, how sectors relate to IWRM, and what a particular sector want to convey to

other sectors and the organizations or persons responsible for coordinating IWRM efforts are discussed.

3.18 Implementation of IWRM means proposing a plan to individual sectors (which tend to think of their own benefits as their first priority) that is close to their ideal plans, and obtains compromises by making proposals that present advantages to them. It is also important that as many sectors as possible are satisfied with the plan before a consensus is reached. For this, managers in charge of coordination should take a horizontal approach to obtain the perspectives of the coordinated sectors, so as to deepen their level of understanding. The coordinators must understand the goals of the activities undertaken by the sectors or stakeholders, and how they relate to water resources of the basin in order to appropriately implement IWRM. Furthermore, good understanding by the coordinators on the benefits of IWRM to the individual sectors will facilitate efficient, appropriate and socially justifiable consensus-building. Thus, it is important to establish a good understanding of 'sectoral perspectives' in implementing IWRM.

4. Integrated Water Resource Management Strategy

4.1 Strategies for Protection of Water Resources

Protection of water source

4.1 The fundamental objectives for managing Kagera Basin's water resources are to achieve equitable access to water resources and their sustainable and efficient use. Although they are limited and highly variable, the basin's water resources will be sufficient to support social and economic development for the foreseeable future provided they are judiciously managed, and wisely allocated and utilized. Equitable access has both a short-term and long-term dimension. It is important that the needs of present and future generations are considered in the management of water resources. To give effect to the interrelated objectives of sustainability and equity an approach to managing water resources has been adopted that introduces measures to protect water resources by setting objectives for the desired condition of resources, and putting measures in place to control water use to limit impacts to acceptable levels.

4.2 The protection of water source approach comprises two complementary strategies:
(a) *Resource-directed measures*: These measures focus on the quality of the water resource itself. Resource quality reflects the overall health or condition of the water resource, and is a measure of its ecological status. Resource quality includes water quantity and water quality, the character and condition of in-stream and riparian habitats, and the characteristics, condition and distribution of the aquatic biota. Resource quality objectives will be defined for each significant resource to describe its quality at the desired level of protection.
(b) *Source-directed controls*: These measures contribute to defining the limits and constraints that must be imposed on the use of water resources to achieve the desired level of protection. They are primarily designed to control water use activities at the source of impact, through tools such as standards and the situation-specific conditions that are included in water use authorizations. Source-directed controls are the essential link between the protection of water resources and the regulation of their use. Coherent and integrated approaches to balancing the protection and use of water resources will therefore require the collective application of resource-directed measures and source-directed controls in respect of water quantity and quality, as well as the biological and physical dimensions of the resource. Resource protection to support long-term sustainable use and development, since water resources are sometimes polluted or damaged through accident, negligence or deliberate actions. In such cases the parties responsible for the pollution or damage should be hold liable for any clean-up or rehabilitation that may be necessary.

4.3 *Responsible Organizations:*
(a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States associated with protection of water sources are responsible within their own countries; and
(b) *Principal No.2*: KRBO will be responsible for the protection of water source that have significant or cumulative basin-wide implications.

Protection of groundwater resources

4.4 Groundwater resources differ from surface water resources in that they are not confined to distinct, visible channels, move very slowly and are less prone to rapid temporal variations than surface water. Without proper monitoring and management human impacts are usually difficult to detect. As the rehabilitation of polluted or impacted aquifers is technically very difficult, lengthy and costly, a careful approach to groundwater protection is required. Because of the technical differences between surface and groundwater, groundwater management has to be considered in its own right, although an integrated approach is required if effective water resource management is to be achieved.

4.5 Resource-directed measures will continue to play an important role in the management of groundwater resources, specifically to ensure that groundwater use is sustainable. The protection of groundwater quality will, however, mainly be achieved by source-directed controls focusing on land-based activities that impact underlying groundwater bodies.

4.6 *The groundwater reserve:* Because of the contribution of groundwater to surface water flow in certain circumstances, the volume of groundwater that can be abstracted without impacting the ability of groundwater to sustain or contribute to the surface water has to be determined. This is done by determining recharge to a particular groundwater resource, assessing the groundwater contribution to (base) flow of a surface water resource and calculating the basic human needs to be met from groundwater supplies. It is also necessary to control the amount of water abstracted to protect the structural integrity of the aquifer and to protect terrestrial ecosystems dependant on groundwater supplies.

4.7 *Resource quality objectives for groundwater resources:* Resource quality objectives for groundwater resources are considered crucial for the effective protection of groundwater. Numeric or descriptive statements for a groundwater resource will be set in order to guide the use and management thereof. Typically these will relate to – groundwater levels or gradients (time and locality specific) groundwater abstraction rates; groundwater quality; spring flow; and targets for the health of terrestrial ecosystems that is dependent on groundwater.

4.8 *Responsible organizations:* (a) *Principal:* As the principal groundwater user is the water supply and sanitation (WSS) sector, it is logical to assume the major responsibility in groundwater resource protection goes to the line agencies of the Kagera riparian States responsible for WSS. (b) *Supporting*: It is expected that knowledge-based technical support will be provided by KRBO.

Wetlands

4.9 Wetlands are important features of water resource systems. If they are sufficiently protected they offer multiple benefits including a range of services such as flood attenuation, groundwater recharge and sediment control, and act as natural filters by trapping pollutants. However, they also “use” significant quantities of water through evaporation. They are biologically productive, and can be also important centres of biodiversity. Wetlands offer a range of resources for human use, such as reeds and grasses. Many wetlands have however been completely destroyed or severely damaged,

most often by draining to provide additional croplands. However, there are still very vital wetlands within the Ruvubu and Kagera National Parks which need serious protection. The protection of wetlands will be effected by the strategies and procedures prescribed for resource directed measures, and in conjunction with the riparian countries national line agencies of environmental affairs which have a key role in the protection of biodiversity.

4.10 *Responsible organizations:* (a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States associated with environmental protection are responsible for wetland protection. (b) *Principal No.2*: KRBO will be responsible for the protection of wetlands that have significant or cumulative basin-wide implications.

4.2. Strategies for Water Use

Water use

4.11 The definition of water use relates to the consumption of water as well as to activities that may affect water quality and the condition of the resource itself. Water use includes: taking (abstracting) water from a water resource; storing water; all aspects of the disposal of waste in ways that could impact on water resources; removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; making changes to the physical structure of watercourses; impeding or diverting the flow of water in a watercourse; altering the bed, banks, course or characteristics of a watercourse; certain activities that may affect the quantity or quality of water in the resource; and using water for recreational purposes. This broad definition of water use applies throughout the Kagera River Bain Integrated Management and Development Strategy (KIRBMDS).

4.12 *Compliance with conditions of water use:* All water users are required to adhere to the conditions of use attached to general authorizations and licences, and the responsible authorities are required to ensure that they do so. It will, however, be preferable for water users to comply voluntarily with reasonable conditions of use, which have been co-operatively determined and mutually agreed to by users and responsible authorities. Under these circumstances it will be necessary for responsible authorities to resort to enforcement by legal command-and-control measures only in exceptional cases. A comprehensive compliance management strategy will be developed during the course of the first compulsory licensing exercise and implemented.

4.13 *Responsible organizations:* (a) *Principal No. 1:* Line agencies of the Kagera riparian States associated with water use will be responsible for all small-scale water uses. (b) *Principal No.2*: KRBO will be responsible for large-scale water use issues that have significant or cumulative basin-wide implications (ref: Chapter 8).

Water quality

4.14 Sources of pollution are broadly categorised as point sources, such as discharges from sewage treatment works or industrial sites, and diffuse sources, for example settlements without a sewerage system, and surface runoff from agricultural land to which fertilisers are applied.

4.15 Specific actions in terms of resource directed measures that require attention at basin level in respect of water quality management include: formulation of objectives for managing sources of pollution and associated single source interventions; benchmarking water resource quality; identification of emerging threats to the water resource and prioritization for action; and establishing priorities in relation to, for instance, remediation of water resources and degraded land as a focus for regulation using source-directed controls.

4.16 *Implementing source-directed controls:* Decisions about the nature and extent of permissible water uses and developments that may pollute water resources are guided by a structured decision-making framework that balances the need to protect water resources and the need for social and economic development.

4.17 The preferred approach is to prevent the pollution of water resources. In those cases where the discharge of pollutants into water resources is unavoidable the emphasis is on minimising the pollution and its effects. Decisions to authorize such discharges are based on consideration of their social, economic and ecological impacts. Where pollution has already caused degradation of water resources, or where contaminated land areas pose a threat to water quality, improvements (remediation) will be effected as appropriate.

4.18 Each application for authorization to discharge wastes into water resources will therefore be preceded by an assessment of the probable impacts of the discharge on the water resource and other water users. In the case of hazardous wastes the aim is to prevent discharge altogether or, if this is not possible, to minimize the extent of the discharge and its impacts. For non-hazardous wastes the risk-based resource water quality objectives approach will continue to be used. This approach assumes that the water environment has a finite and quantifiable capacity to assimilate non-hazardous wastes discharged into it without violating predetermined water quality objectives in accordance with its class. The assimilative capacity will be different for each water resource and for each management class. Where, after all relevant factors have been considered, assimilative capacity is sustainably available it must be equitably shared among all water users**.**

4.19 Source-directed controls that may be applied to prevent or minimize pollution include recycling or re-use of waste, water recovery, detoxification, neutralization and treatment, and the introduction of cleaner technology and best management practices.

4.20 *Preventing pollution:* Wherever possible, source-directed controls will be promoted to prevent water resources being polluted or degraded, particularly for hazardous wastes.

4.21 *Minimising pollution**:*** The discharge of waste or water containing waste to water resources, or the disposal of waste, will be permitted only under the following conditions:
(a) Pollution costs are, as far as possible, to be borne by the discharger (internalized), and not passed on (externalized) to the water resource or to other water users.

(b) For other water uses that may impact on water quality, such as impeding or diverting the flow of water in a water course, measures to meet resource quality objectives will be stipulated in guidelines and directives.
(c) If, in specific situations, the applicable minimum requirements or standards are not sufficient to ensure suitable water quality, standards stricter than the minimum requirements or standards will be prescribed.

4.22 Standards for discharges will be prescribed by regulation. Relaxation of standards will be contemplated only where there are pressing social or economic reasons to do so, and will be considered in situations where it is evident that:
(a) The enforcement of the measures could result in notable impairment of social or economic development or related environmental values; and
(b) The relaxation of requirements or standards could facilitate or contribute to enhanced participation and benefit-sharing arising from water use by those who were historically disadvantaged by racial and gender discrimination; but where resource quality will not be unacceptably degraded.

4.23 Whilst the overall intention is to prevent further degradation of the quality of the basin's water resources and to effect improvements where possible, limited and short-term degradation of the water quality of specific water resources could be allowed if it can be demonstrated with confidence that the degradation will not cause irreversible damage, and that pollution costs will not be externalized to other users of the resource. Decision-making in this regard will also be guided by the following principles: strict controls to protect human health will be applied; concessions will apply for a defined period of time, and relevant stakeholders must be involved in the decision-making process.

4.24 *Remediation:* Remediation strategies will be developed to effect improvement in the condition of degraded and impaired water resources, or contaminated land areas such as abandoned mines, as required by the resource quality objectives adopted for the water resource. Clean-up levels and targets, remediation approaches and measures, and the prioritization of remediation focus and effort will be dictated primarily by appropriate risk-based approaches. However, rule-based best management practice measures could be appropriate and a requirement in some cases. Implementation of the relevant financial provisions to cover remedial actions will form part of the remediation strategy.

4.25 *Responsible organizations:* (a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States associated with water quality sissues are responsible for water quality issues within the respective countries. *(b) Principal No.2*: KRBO will be responsible for large-scale water quality issues that have significant or cumulative basin-wide implications.

4.3 Strategies for Water Conservation and Water Demand Management

The principles of water conservation and water demand management

4.26 The WC&WDM Strategy is based on three fundamental principles, namely:

(a) *Water institutions should strive to supply water efficiently and effectively, minimize water losses and promote WC & WDM among their consumers*. Water institutions responsible for supplying water to users should take steps to reduce leakage in their systems, and develop and implement measures to promote WC&/WDM.

b) *Users should not waste water and should strive to use it efficiently*. Wasted water is water used without any direct benefit being derived. Inefficient use of water is water use that exceeds the accepted benchmark for the particular purpose, or water used where the derived benefit is sub-optimal.

(c) *WC&WDM should be an integral part of the planning processes for water resources management, water supply and the provision of water services.* In situations of water shortage demand-side solutions will be considered alongside supply-side augmentation options. The participatory and consultative approaches to implementing WC & WDM will extend the planning process down the supply chain to the end user by requiring water institutions and water users to share the responsibility for ensuring the efficient use of water.

Basin level water conservation and water demand management strategy

4.27 Water conservation and water demand management relate to the efficient and effective use of water and to the minimization of loss and wastage of water, and are important elements of the approach to the care and protection of water resources. Many of the provisions and requirements are thus either directly related to or refer to water conservation, for instance: resource protection measures; conditions for water use in general authorizations and licences; water pricing as an incentive for efficient use; management of land-based activities via stream-flow reduction and controlled activities; and control of invasive alien vegetation.

4.28 *Water Conservation and Water Demand Management (WC&WDM) Strategy*, and subsidiary strategies for water supply and sanitation, irrigation and hydropower production. The strategies will outline measures and interventions aimed at encouraging and supporting water institutions and water users to increase the efficiency of their water use and reduce their demand for water. They are based on the premises that, first, many water users can maintain their quality of life, and achieve the desired outcomes or products from their water use, whilst using less water and, second, that significant reductions in water use can be achieved by minimizing wastage and increasing the efficiency of water use by changes in behaviour and adopting water-saving technologies.

4.29 The strategies will not present rigid prescriptions to water institutions and users. The core objective of the strategies is to create a culture within all the water management and water services institutions and among water users. KRBO will provide support to water institutions and help them to develop and implement strategies that suit their own circumstances and which are economically coherent and financially sound with regard to the costs and benefits of the proposed measures. Accordingly, an essential component of the Basin WC&WDM Strategy is a program of communication, education, awareness creation and promotion, and the development of supportive networks.

4.30 Water demand management is not, however, concerned merely with reducing water use as an end in itself, as there are social, economic and environmental advantages to be gained from programs designed to achieve sustained reductions in water use, such as:
(a) water users are empowered to understand the value of water as a scarce resource, and to adopt a responsible attitude to its use;
(b) water is made available for allocation to other uses, either within the particular sector or for competing uses, and for the reserve;
(c) the financial security of water institutions can be improved by reducing non-revenue demand - that is, unaccounted-for water caused by leakage from supply and distribution systems, and water wasted by non-paying consumers.

4.31 *Responsible organizations:* (a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States associated with water quality are responsible for water quality issues within the respective countries.*(b) Principal No.2*: KRBO will be responsible for large-scale water quality issues that have significant or cumulative basin-wide implications.

Sectoral strategies

4.32 *Water supply and sanitation services:* An effective WC & WDM program for the water supply and sanitation services sector is essential. More efficient use of water will reduce the costs of purifying and distributing water to consumers and of the subsequent treatment of wastewater. Water services institutions will be expected to determine their own targets and benchmarks for efficient water use.

4.33 *Irrigation and drainage:* There are significant losses in many distribution and irrigation systems. Efficiency gains in the sector will make water available for other uses. The framework of action defined by the strategy will have the following outputs:

(a) appropriate measures are implemented that bring about a reduction in water wastage;

(b) water user associations and end users understand and appreciate the need to progressively modernize their water conveyance systems and irrigation equipment;

(c) water allocation processes to promote the equitable and optimal utilization of water;

(d) preventive maintenance programs are in place;

(e) sufficient irrigation information is generated and is accessible to all stakeholders;

(f) water management institutions and service providers implement audits from the water source to end users and beyond. To facilitate achievement of the objectives consideration will be given to requiring water users in the irrigation sector who apply for water use licences to develop and submit to the responsible authority a water management plan.

4.34 *Hydropower generation:* The wellbeing of this sector is crucial to Kagera Basin's economic development and it requires a high assurance of supply.There is a need for efficient use of water without impacting adversely on economic activity.

4.35 *Soil and water conservation measures:* Soil and water conservation measures play a significant role in modifying the hydrological process by increasing the groundwater

recharge. Increase in groundwater recharge results in increase of water available for potable water supply as well as increase of dry season flows.

4.36 *Responsible organizations:* (a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States associated with water sectoral management and development are responsible for application of WC&WDM principles. (b) *Principal No.2*: KRBO will be responsible for large-scale WC&WDM issues that have significant or cumulative basin-wide implications. In addition, it will provide knowledge-based technical support for line agencies responsible for sectors through training and guide manuals.

4.4 Strategies for Water Pricing and Financial Assistance

Water pricing

4.37 Three types of water use charges are identified:
(a) *Funding water resource management:* Activities such as information gathering, monitoring water resources and controlling their use, water resource protection and water conservation.
(b) *Funding water resource development and use of waterworks:* The costs of the investigation, planning, design, construction, operation and maintenance of waterworks, pre-financing of development, a return on assets and the costs of water distribution. Resource management and resource development charges are financial charges, which are directly related to the costs of managing water resources and supplying water from schemes and systems.
(c) *Achieving the equitable and efficient allocation of water:* Economic incentives to encourage more efficient use of water, water conservation and a shift from lower to higher value uses. This is an economic charge and relates to the value of water to particular users.

4.38 The objective of the pricing strategy is to contribute to achieving equity and sustainability in water matters by promoting financial sustainability and economic efficiency in water use. One objective is to ensure that the real financial costs of managing water resources and supplying water, including the cost of capital, are recovered from users. Provisions are, however, made for a range of subsidies for water users from historically disadvantaged groups to promote equitable access to the use of water resources.

4.39 *Pricing strategy for abstracting and storing water, and stream flow reduction activities:* In this component of the water pricing strategy charges apply to two consumptive uses of water that can be expressed in terms of annual volumes of water used. These are:-
(a) *Abstracting* (taking) raw water directly from surface and groundwater resources.
(b) *Storing water* - this refers to the abstraction of water from storage or, in the case of dams constructed to enhance property values or for recreational use, the initial filling and annual refilling.

4.40 *Charges for waste discharge:* This component of the pricing strategy will deal with charges for all aspects of waste discharge, as follows:- engaging in a controlled activity; discharging waste or water containing waste into a water resource; disposing of waste in a manner which may detrimentally impact on a water resource; disposing of water

which contains waste from any industry; aspects of removing, discharging or disposing of water found underground where this has an impact on water quality. The charging system will be based on the polluter pays principle and will address point and diffuse sources of pollution. The system will be designed to ensure that there is no duplication of charges between charges for waste discharge and water use charges for funding water resource management.

4.41 *Responsible organizations:* (a) *Principal:* It is assumed that line agencies of the Kagera riparian States associated with pricing are responsible for dealing the issues. (b) *Supporting*: Knowledge-based technical advise on pricing can be provided by KRBO through its various programs.

Water use charges

4.42 All charges will be specific to each of four end-user sectors, namely: municipal (water services authorities), industry, mining and energy; agriculture; and stream flow reduction activities. Charges may be different for each user sector, depending on the costs of and benefits from water resource management services, or from the use of a particular supply scheme.

4.43 *Setting charges, collecting and disbursing revenue:* Depending on the socio-economic circumstances and physical and demographic characteristics and attributes of each area, charges may differ between water management areas. After budgets have been prepared and proposed charges determined, consultations will be held with key stakeholders and the charges announced and made known to users prior to the start of the financial year in which the charges are to be imposed.

4.44 *Charges for funding water resource management:* The charges will be based on the budgeted annual costs that include the following activities, which will eventually become the responsibility of catchment management agencies:
(a) the planning and implementation of catchment management strategies;
(b) the monitoring and assessment of water resource availability and use, and resource quality;
(c) the management of water allocation and utilization;
(d) water quality management, including waste control and pollution control in respect of mines, industries, agriculture and dense settlements - charges will not include costs related to waste discharge, or the capital costs of abandoned mine rehabilitation, until a waste discharge charge system is implemented;
(e) dam safety control;
(f) water conservation and demand management, including the control of invasive alien vegetation, education and awareness creation, and control of aquatic weeds. Costs related to poverty relief activities, which do not directly contribute to improving water availability, are excluded from the charge.

4.55 *Responsible organizations:* (a) *Principal:* It is assumed that line agencies of the Kagera riparian States associated with water use charges are responsible for dealing with the issues. (b) *Supporting*: Knowledge-based technical advise on water use charges can be provided by KRBO through its various programs.

Charges for funding water resource development and the use of waterworks

4.56 Specific charges will be imposed on users of water schemes and systems which will be based on volumes of water used, and fixed and/or variable charges may be implemented. In accordance with generally accepted accounting procedures, charges for water resource development on water schemes will be based on the rate-of-return-on-assets approach, with allowance being made for the depreciation of asset value. A return on assets will ensure efficient use of capital and generate funding for new developments, whilst asset depreciation will fund the refurbishment of infrastructure at the end of its useful life.

4.57 On multipurpose water schemes, capital costs will be divided between sectors on the basis of water allocations. Charges may be different for different sectors depending on the assurance of supply required (in respect of the use of water from storage), or on peak demand rates (in respect of water received from conveyance structures such as canals and pipelines).

4.58 *Application of water resource development and use of waterworks charges:* Charges will be phased in progressively over time, and the target of achieving full cost recovery will therefore be achieved at different times for different sectors, as:
(a) *Municipal sector and Industrial, mining and energy sector:* On water schemes charges will include depreciation, return on assets, and operations and maintenance. All costs must be recovered in respect of waterworks owned by other water management institutions.
(b) *Irrigation based emerging farmers***:** The operating and maintenance charges for water supplied to emerging farmers from water schemes will be subsidized on a reducing scale over initial periods. Depreciation charges will be phased in over a further period appropriate to each case until all costs are fully recovered.

4.59 *Responsible organizations:* (a) *Principal:* It is assumed that line agencies of the Kagera riparian States associated with funding of waterworks are responsible for dealing the issues. (b) *Supporting*: Knowledge-based technical advise on funding of waterworks can be provided by KRBO through its various programs.

4.5 Strategies for Water Management Institutions

4.60 The institutional framework is one of the most important aspects of IWRMD since it determines the effectiveness of policy implementation. Institutions are also important because they are the focus for requirements to consult widely with water users and other interested persons before policies relating to the management and use of natural resources are implemented. One of the main objectives is to progressively decentralize the responsibility and authority for IWRMD to appropriate regional and local institutions in order, among other things, to enable water users and other stakeholders to participate more effectively in IWRMD. Some of these institutions will have to be created, whilst some of the existing institutions will have to be modified/changed to reflect new or changed responsibilities in terms of the new approach embodied in the Strategy.

4.61 *Responsible organizations:* (a) *Principal:* Line agencies of the Kagera riparian States will be responsible for creating the necessary institutional arrangements. (b) *Supporting*: Knowledge-based technical advise on institutional frameworks for IWRM.

4.6. Strategies for Water Monitoring and Information

The need for monitoring and information systems

4.62 The availability of reliable data and information on all aspects of water resources management is fundamental to the successful implementation of the Kagera River Basin Strategies. No proper decision on any matter can be made unless it is informed by reliable, relevant, up-to-date information. Information for decision-making should reflect the integrated nature of water resources, in which the quantity and quality of surface and ground water are all inextricably interrelated. For instance, decisions about the licensing of proposed water uses require data and information on, among others: the management class of the resource and the associated reserve and resource quality objectives; international obligations that have to be satisfied; the quantity of water available in the resource and its quality; the extent and nature of other lawful and authorized uses from the resource; the potential for efficiency gains through managing demand; and the potential for augmenting supply by dam construction.
If there are information deficiencies in any of these aspects, the decisions reached will not necessarily be optimal. The Kagera River Basin information system for water services will be linked to information systems for water resources in all of the riparian countries. Kagera RBO must be empowered to require any person to provide data and information on either an *ad hoc* or a regular basis for tits monitoring and information systems, to facilitate the management and protection of the basin's water resources. Regulations may be written in this respect. Water management institutions are also obliged to make information on any water-related matter held in the national systems about which the public needs to know available to the public, particularly if it concerns an actual or potential disaster, or an emergency situation.

Monitoring systems

4.63 Line agencies of riparian countries and KRBO should be mandated to establish monitoring systems for water and related resources to collect appropriate data and information that is necessary to assess: the quantity, quality and use of water in water resources; the rehabilitation of water resources; compliance with resource quality objectives; the health of aquatic ecosystems; atmospheric conditions that may influence water resources; and other data and information that may be necessary.

4.64 The national line agencies already operate a number of climitological and streamflow gauging stations that collect some of the required data and information. However, the systems were developed and are being operated largely in isolation from one another. Spatial coverage is incomplete and as a result little or no information is collected in some areas. Problems are also being experienced with the quality and reliability of information. The dissemination of and access to information is not as effective or as comprehensive as it should be.

4.65 Line agencies and KRBO will be addressing these shortcomings by amalgamating all existing and planned monitoring and assessment systems into a coherent and structured monitoring, assessment and information system. Monitoring systems may be

grouped into logical subsystems, each comprising three functional components: data acquisition; data storage, maintenance and dissemination; and data analysis, information generation and reporting.

4.66 Improvements in efficiency and effectiveness are expected through sharing logistics and infrastructure in data collection and storage, by adhering to common standards and guidelines, and by refining analytical techniques to maximize the information derived from available data.

4.67 An important component of the monitoring and assessment strategy will be to develop co-operative and collaborative relationships between the national line agencies of the riparian countries, KRBO and other organizations that also operate water-related monitoring, assessment and information systems.

4.68 *Resource requirements for monitoring:* The establishment of the proposed monitoring systems *(surface and groundwater water quantity and quality monitoring)* will require resources - staff, funding, physical infrastructure, instrumentation and information technology equipment - in order to produce desirable performance. The training of water resources management practitioners will also need a significant investment, especially where new technologies are introduced.

4.69 *Responsible organizations:* (a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States associated with water resource monitoring are responsible for monitoring within the respective countries.(b) *Principal No. 2*: KRBO will be responsible for large-scale water resource monitoring that have significant or cumulative basin-wide implications.

Information systems

4.70 It is required to establish a Basin's information system, including: a hydrological information system: a water resource quality information system; a groundwater information system; and a register of water use authorizations

4.71 A mainframe-based Hydrological Information System which is a server-based commercial system - that is already in use in several other basins - will be established. Such a system is basically user-friendly, has extensive graphics capabilities, supports data analysis, can provide a range of information and makes use of GIS mapping to display systems and networks. It can be used as an independent system by, for instance, hydrological practitioners providing services to water management institutions. It can also be used as an integrated, web-enabled system with inter-connections between KRBO and catchment management agencies.

4.72 KRBO can be involved by establishing water quantity and quality monitoring systems and thereby storing, processing and disseminating the results. Such a system facilitates the consolidation of monitoring activities to reduce or eliminate duplication through the auditing of monitoring schedules and quality assurance of the monitoring process.

4.73 *Responsible organizations:* (a) *Principal*: KRBO will be responsible for establishing the required bsin-wide information system. (b) *Supporting*: It is expectecd that line agences will be providedin the necessary support to the KRBO.

4.7 Strategies for Water Disaster Management

Water-related disasters

4.74 One of the objectives of Integrated Water Resource Management and Development (IWRMD) is to contribute to public safety and security in water matters. Water-related disasters take many forms and range in the extent of their influence. They threaten life, health and livelihoods, especially among the poor, and damage valuable infrastructure. (a) Floods occur naturally as a result of highly variable climate. They often cause loss of life and destruction of dwellings in communities living in the flood prone areas. Floods damage roads and bridges, inundate valuable agricultural land and destroy crops. Extreme rainfall events, often accompanied by high winds, not only cause floods, but also damage property, especially the less substantial dwellings in poorer communities. (b) Droughts can occur at any time, anywhere in the basin, and often last for a number of years. They reduce the availability of water to all sectors of society, but their effects are particularly severe where people do not have access to piped potable water, or where they rely on run-of-river flows for their water supplies. Droughts prejudice food security by affecting production from rain-fed and irrigated agriculture, and disruptions in electricity generation and industrial output can have negative economic consequences. (c) Another threat is the pollution of water resources from spills of hazardous or toxic materials. These can render water unfit for use and damage the ecological functioning of water resources. Bacteriological pollution can cause outbreaks of diseases such as cholera. Communities that are not serviced by water supply schemes, and draw water direct from streams and rivers, are particularly vulnerable to the effects of pollution.

Disaster management

4.75 Dealing with disasters diverts resources from and retards the pace of social and economic development. There are clear advantages in preventing disasters or mitigating their effects.
(a) increasing preparedness for disasters and improving response capacity among all sectors of society by, among other things, disseminating relevant information and undertaking programs of awareness creation, education and training;
(b) reducing the probability of disasters occurring and reducing the severity of the consequences when they do occur; and
(c) reducing the vulnerability of communities, especially the poor and disadvantaged, to the hazards and threats posed by disasters. To achieve these objectives it is proposed that risk reduction strategies should be incorporated in all development planning and actions undertaken Development plans will be prepared within the framework of coherent and integrated disaster management frameworks. Responsibility for development of the frameworks will lie with disaster management centers established to co-ordinate all disaster management activities.

4.76 *Responsible organizations:* (a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States associated with disaster management are responsible for monitoring within the respective countries. (b) *Principal No.2*: KRBO will be

responsible for large-scale disaster management that have significant or cumulative basin-wide implications. In addition, the role of KRBO in disaster management is discussed by the following paragraphs.

4.8 Strategies for Water Anticipated Program of Implementation Activities

Development of physical infrastructure

4.77 National line agencies of the riparian countries will continue to investigate the necessity for the construction of a number of major government waterworks comprising dams and, where necessary, associated infrastructure such as pumping stations, pipelines and canals, to meet projected future water needs. The mandated government agencies will continue to be responsible that all development projects will be screened through social and environmental impact assessments as well as economic feasibility studies.

4.78 *Responsible organizations:* (a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States associated with development of physical infrastructures are responsible for implementation of the strategies the respective countries. (b) *Supporting*: KRBO will provide major knowledge-based technical and management support for development of jointly owned physical infrastructures (by two or more riparian countries) that have significant or cumulative basin-wide implications. In addition, KRBO will provide knowledge based technical support to development of physical infrastructures of various nature.

Operational activities

4.79 Operational activities relate to all ongoing activities required for the protection, use, development, conservation, management and control of Kagera Basin's water resources. There are two broad groups of activities: routine operational activities; and commissioning or establishment activities.

4.80 *Routine operational activities*: This group comprises activities that will be routinely undertaken include: the reconciliation of water requirements and water availability; the planning and design of capital works; the operation and maintenance of bulk water supply systems and schemes; control of water use; water conservation and demand management; the setting of tariffs and the collection of revenue; the collection, storing, analysis and dissemination of water-related information; dam safety control; and the control of invasive alien vegetation.

4.81 *Commissioning/establishment activities:* This group comprises activities which will be undertaken only once and will have a finite (although in some cases rather long) duration. These are referred to as commissioning or establishment activities and they are intended to create an environment in which the efficiency and effectiveness of water resources management can be progressively improved. They are of considerable magnitude and neither financial nor human resources are available to undertake them simultaneously in all water management areas. Accordingly, they have to be prioritized to reflect the needs and circumstances in each area. The activities included in this category are: compulsory licensing; the establishment of catchment management agencies; the delegation of operational responsibility for physical infrastructure and

transfer of the ownership of infrastructure to water management institutions; the establishment of new water user associations; and the establishment of new monitoring networks and information systems, and the expansion of existing ones.

4.82 *Responsible organizations:* (a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States associated with operational activities are responsible for implementation of the strategies the respective countries. (b) *Supporting*: KRBO will provide major knowledge-based technical and management support for operational activities that have significant or cumulative basin-wide implications.

4.9 Complementary Strategies

Capacity building in IWRMD

4.83 One reason that the implementation of the Strategy will take place progressively over time is that Kagera Basin's financial and human resources are, at present, inadequate to implement all of its provisions at once across the basin. It is imperative to ensure that sufficient capacity is created in the water sector to implement and sustain the implementation of Kagera IWRMD Strategy.

4.84 IWRMD is a relatively specialized activity that now requires competencies in a wider range of disciplines than was previously the case. The training, re-training and development of the potential of people who currently work or will in future work at all levels of all organizations and agencies involved in the water sector is recognized as being a critical determinant for the achievement of wise and efficient water resources development and management in the Kagera River Basin.

4.85 KRBO and line agencies will be playing a prominent role in this initiative. The focus will be on people: the creation and development of their skills, knowledge and attitudes required to support the development of the infrastructure, institutions, knowledge and information management, and financial management necessary to undertake IWRMD. There are already some encouraging developments in this regard, with new, specialized courses being offered at post-graduate level at a number of tertiary institutions in the riparian countries.

4.86 Furthermore, in line with the general requirement for social and economic transformation, all capacity building initiatives must address representivity in terms of ethnic, gender and other social aspects. An important component of the capacity building strategy will be the promotion of networking among education and training service providers and users. In this regard, KRBO will provide institutional support and seed funding to encourage the creation of networks to promote effective co-operation between universities, research institutions, and the public and private sectors.

4.87 *Responsible organizations:* (a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States associated with capacity building are responsible for capacity building in IWRMD within the respective countries. (b) *Principal No. 2*: KRBO will be responsible for capacity building in IWRMD that have significant or cumulative basin-wide implications. In addition, it will be responsible for capacity building within KRBO and provide support for line agencies in the form of training in IWRMD.

Public consultation

4.88 There are a number of sections in the Strategy that require future formal public consultation on proposed initiatives to implement the Strategy's provisions. All comments received in response must be taken into consideration. For water users and other stakeholders to effectively contribute to water resources management they need to be aware of the issues and difficulties, and have an understanding of what is required. However, while some water users and other stakeholders are often very well informed, others, particularly in poorer, historically disadvantaged communities, may not be able to participate effectively in consultation procedures without additional support. A comprehensive stakeholder analysis, aimed at determining the capacity of users and stakeholders to participate, is therefore a key part of any consultation program.

4.89 KRBO and national line agencies will undertake public consultation exercises in a way that enables all stakeholders to participate effectively. Whereever it is needed, special help will be offered to ensure that they understand the issues under discussion, and can participate in an informed and meaningful way. KRBO will develop guidelines for public participation in IWRMD issues to ensure a consistent approach throughout the basin. It is anticipated that all water management institutions will adopt these guidelines for their consultative processes.

4.90 *Responsible organizations: (*a) *Principal No. 1:* It is assumed that line agencies of the Kagera riparian States are responsible for public consultation within their respective countries. (b) *Principal No. 2*: KRBO will be responsible for public consultations that have significant or cumulative basin-wide implications. It will also provide knowledge based guidelines on public participation related to IWRMD.

Research

4.91 The importance of research to IWRMD cannot be over-emphasized. Research is fundamental to understanding Kagera Basin's water resources and will contribute to the development of many of the techniques and tools used for IWRMD. New challenges in the basin's water resource arise continuously and require new understanding and new tools and techniques. To meet these challenges, KRBO will support researches that will deal with issues affecting water resources of Kagera basin.

4.92 The KRBO's approach is to support research and development through IWRMD-centred key strategic areas such as:
(a) *water resource management*, an integrating key strategic area that considers issues of equity and sustainability in the management of water resources;
(b) *water-linked ecosystems*, which addresses the protection of water resources;
(c) *water use (industrial and domestic) and waste management*;
(d) *sustainable water use for agriculture*, which address the sustainable use of water in their respective user sectors;
(e) *soil and water conservation* in the context of integrated rainfed agriculture, and
(f) *water infrastructure and water use for hydropower production*.

4.93 KRBO will also support the transfer, dissemination and application of knowledge through a fifth key strategic area, *IWRMD-Centred Knowledge*, an integrating key strategic area that addresses the mechanisms needed to ensure the effective

dissemination of research results and products to water resources managers and other prospective users in an effective format.

4.94 To ensure that research results are also relevant to the broader objectives of IWRMD: the relevance and applicability of research in each key strategic area are maximized by addressing the relationships between: water and society; water and the economy; water and health; and water and the environment.

4.95 A key cross-cutting objective of the KRBO is to support the development of human resources in IWRMD. Accordingly, involvement in research is recognized as an important vehicle for building and developing expertise among water resource practitioners. Every research project is therefore required to incorporate a strong element of capacity building.

4.96 *Responsible organizations:* (a) *Principal No. 1:* It is assumed that higher learning and research institutes of the Kagera riparian States dealing water and related resources are responsible within the respective countries. (b) *Principal No. 2*: KRBO will be responsible for coordinating and supporting researchs that have significant or cumulative basin-wide implications.

5. KRBO and Its Role in the Implementation of the KIRBMD Strategy

5.1 The role of the KRBO

5.1 The implementation of Kagera Integrated River Basin Management and Development (KIRBMD) Strategy needs a Kagera River Basin Organization (KRBO) besides the Line Agencies of the riparian countries.

5.2 KRBO will persue water sharing among competing uses and users; water protection to ensure access for present and future generations to acceptable quality water; and water supply to all citizens in a fair and equitable manner. KRBO will follow the following four principal objectives of IWRM as applicable at the level of Kagera River Basin:

(a) to promote a dynamic, interactive, iterative, and multi-sectoral approach to water resources management, including the identification and protection of potential sources of freshwater supply, that integrates technological, socioeconomic, environmental and human health considerations;

(b) to plan for the sustainable and rational utilization, protection, conservation and management of water resources based on community needs and priorities within the framework of national economic development policy;

(c) to design, implement and evaluate projects and programs that are both economically efficient and socially appropriate within clearly defined strategies, based on an approach of full public participation, including that of women, youth, indigenous people and local communities in water management policy-making and decision making;

(d) to identify and strengthen or develop, as required, the appropriate institutional, legal and financial mechanisms to ensure that water policy and its implementation are a catalyst for sustainable social progress and economic growth.

5.3 The most pressing priority for all the Kagera riparian countries is to achieve higher levels of economic and social development. The proper use and development of water and related resources will be a key driver in this regard. This will require a strong partnership of the basin's stakeholders which can effectively link development and natural resource conservation. The riparian States' goals for sustainable economic growth and development are inextricably linked with poverty alleviation and environmental protection. Due to potential basin-wide and transboundary impacts, as well as potential impacts on the lives of the basin's people, the KRBO has roles to play in irrigation water management, hydropower, flood management and mitigation, drought management, and environmental management. However, the scope and depth of actual involvement by the KRBO in these areas varies greatly due to the scale of typical projects and ongoing activities of other organizations.

5.4 The role of the KRBO in serving the joint interests of the riparian States is to promote sustainable development in the Kagera River Basin. The primary value-added of KRBO as an International River Basin Organization is to focus on the joint and basin-wide issues, including development scenarios, identification of important joint and basin-wide projects and programs, and the analysis of implications (economic,

social and environmental) of ongoing and proposed developments in the basin including the cumulative impacts of national developments. In this role, the KRBO will work to find long-term solutions to common problems in the region.

5.5 The mission of the KRBO will be achieved through an Integrated Water Resources Management (IWRM) approach within the framework of the Nile Basin Initiative and the LVBC Protocol which combines the value-added capabilities of the KRBO, namely, knowledge management and capacity development, a framework for regional cooperation, and environmental monitoring and protection. These capabilities support the promotion of sustainable development in the Kagera River Basin.

5.6 With its unique mandate, knowledge base and expertise in the areas of water and related resources management together with its effective regional cooperation framework in these areas, KRBO is particularly well-placed to provide guidance and support to sustainable development. In particular, the KRBO will focus its efforts on:

(a) basin-wide projects and programs, initially including the four riparian states of the Kagera Rive Basin;

(b) transboundary projects or suites of complementary projects, between two or three or all the four riparian states; and

(c) national water and related resource projects, or land and water policies, with significant or cumulative basin-wide implications.

5.7 Given this emphasis, KRBO will avoid dispersing its efforts over a large number of small projects that have no significant impacts. Through the BDPP, KRBO has an important role in registering all developments in the basin. This will enable:

(a) comprehensive development and analysis of scenarios; and

(b) analysis of implications of projects, including the cumulative effects of national developments.

5.8 KRBO will also play a role in the screening of suites of smaller projects in a broader basin context, hence assisting in identifying and prioritizing projects to be further developed by national agencies and their donors. The role of KRBO in promoting sustainable development will remain limited to the functions for which it has value-added and capacity as compared with other key development partners in the region. However, there are clear roles for KRBO which can enhance project quality with an emphasis on joint and basin-wide projects.

5.9 Three broad issues were identified as central to the development of the Short & Medium Strategic direction:

(a) tangible results focused on poverty reduction through sustainable development;

(b) creating ownership and value-added with a broadened interpretation to include better integration of KRBO and national development plans; and

(c) adopting an integrated water resource management approach which is necessary for the KRBO to jointly promote development and conservation to ensure sustainable cooperation for the utilization of the Kagera's common resources.

5.2 Short and medium term strategic directions of KRBO

5.10 Three broad issues were noted as important for the development of Short and Medium Term Strategic Direction: (a) tangible results by focusing on poverty reduction through sustainable development; (b) establishing ownership and value-added; and (c) adopting an integrated water resource management approach:

Goals

5.11 The overall Short and Medium Term goal of the KRBO is to support the riparian States for: *Effective use of the Kagera's water and related resources to alleviate poverty while protecting the environment.* KRBO will support the riparian States to contribute to the alleviation of poverty in the Basin through more effective use of the Kagera River's water and related resources with an aim to protect the environment and prevent conflict. The potential areas for cooperative development include soil and water conservation, irrigation, hydropower, flood management and mitigation and drought mitigation and preparedness, fisheries, domestic water supply, and tourism. However, this range of areas for cooperation neither specifies a limit nor a target for KRBO activities. All efforts to increase development will be undertaken in balance with an aim to protect the environment. Development planning will be conducted in a manner to optimize the multiple-use by and the mutual benefit for all riparian countries, while keeping potential harmful effects to a minimum. The Short and Medium Term Strategic Plans will focus on the following four goals based on strong commitment on the part of riparian States, donors and stakeholders.

5.12 *Goal 1: To establish an effective organization, capable to promote, in partnership with other institutions, basin-wide development and coordination:* The knowledge base under this goal encompasses the KRBO Decision Support Framework as a central basin planning tool. Capacities will be strengthened through a program approach under the KRBO Integrated Training Program. There are considerable resource development and capacity building needs for this goal to be realized and scheduling and costing will need to be well-integrated into Program approaches. The outcome of this goal will be that:

(a) a Kagera River Basin Organization (KRBO) is established and strengthened;

(b) KRBO bodies, NKCs and Line Agencies are able to manage water resources applying the IWRM principles using KRBO's basin-wide GIS and knowledge management system.

5.13 *Goal 2: To enhance effective regional cooperation:* This goal will entail the development of dispute resolution and compromise mechanisms such as co-management, public participation, stakeholder involvement and institution building. In an organizational perspective the KRBO will establish links with existing and emerging sub-basin organizations. The outcome of this goal will be increased use of the KRBO by the riparian States as the key mechanism for joint planning, cooperation, and resolution of transboundary water-related issues.

5.14 *Goal 3: To promote coordinated, sustainable, and pro-poor development:* This goal will be implemented using the KRBO Strategic Directions on Integrated Water Resources Management as a guideline for sustainable development of the Kagera Basin's water and related resources. IWRM concepts and principles will therefore be fully applied in a planning process which is participatory and pro-poor for providing the

development opportunities. The planning process will be information system (IS) based and use the KRBO Decision Support Framework, which will include a water balance assessment for the basin. The outcome of this goal will be a significant increase of sustainable development based on basin-wide planning guided by the IWRM Strategic Directions, for poverty alleviation and more effective water use.

5.15 *Goal 4: To support sustainable pro-poor development development efforts:* This goal will be supporting identified sustainable development options, which the riparian countries can pursue, to benefit the people of the basin by contributing to alleviating poverty and increasing livelihood security through enhanced and sustainable income generation. The outcome of this goal will be increase in quantity and quality of basin-wide sustainable developments that have significant contribution for poverty alleviation.

5.16 *Goal 5: To establish and promote basin-wide environmental and socio-economic monitoring and impact assessment systems, recommendations, and policy guidelines:* The environment includes physical, biological and social features of the Kagera River Basin, considering the economic and social condition of the people of the Kagera River Basin and the effects of their dependence and impacts on the biological resources such as fish and forests and physical resources such as soil and water. Within its work towards this goal the KRBO will also develop, maintain and make accessible a basin-wide environmental and socio-economic knowledge base as part of IS-based knowledge system of KRBO. The outcome of this goal will be operational basin-wide environmental monitoring and impact assessment systems.

5.3 Implementation Strategy

Organizational and managerial strategy

5.17 Organizing and managing the KRBO successfully will largely depend on the effectiveness of the the Advisory Council which links between Standing Joint Executive Committee (SJEC), NELSAP, LVBC, the National Kagera Committees (NKCs) and Donor Consultative Group and the KRBO Secretariat. The proposed Advisory Council composition is given by Figure (d).

5.18 The proposed KRBO organizational structure is given in Figure (e). The general organizational structure of the Secretariat will have three Divisions and Administrative Support. Individually, the three Division Directors will be reporting to the Chief Executive Officer (CEO) and each will be headed and managed by a senior riparian officer. The three Division Directors, together with the CEO, will form the Senior Management Team (one from each country) of the KRBO Secretariat. The KRBO will remain open to and regularly consider future revisions to the KRBO's organizational structure.

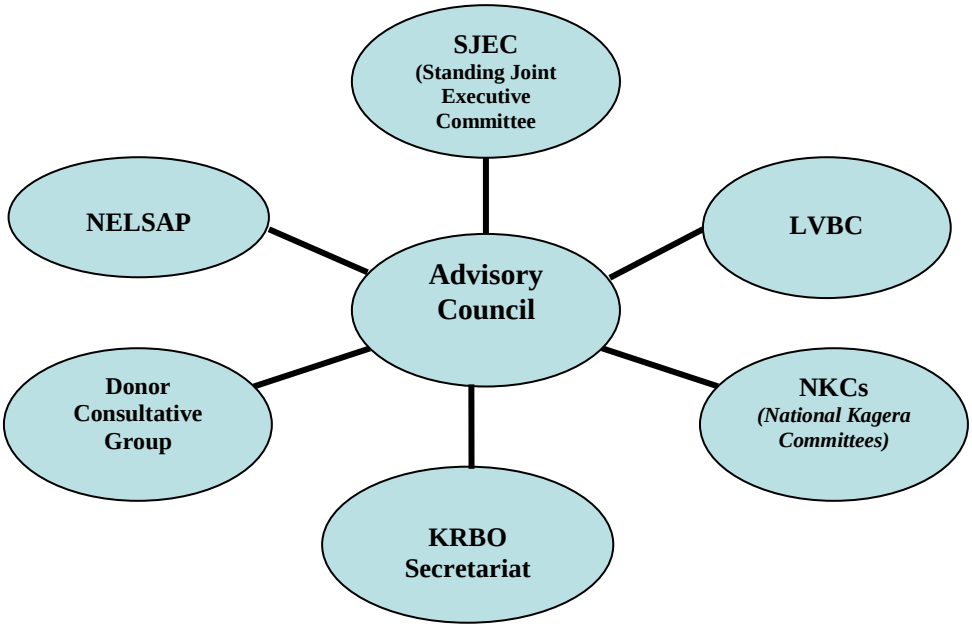

Figure (d). Advisory Council of KRBO

5.19 The KRBO's Gender Strategy is based on the acknowledgement that gender is a critical element for integrated water resources management. This is to ensure that development options respond equitably to the needs of men and women. Incorporating women into decision-making processes also increases the degree of social acceptance development decisions receive. Moreover, a gender perspective in development ensures that the needs, capacities and vulnerabilities of men and women are fully recognized and addressed. Tthe KRBO will focus on mainstreaming gender perspectives internally and externally. Such effort should be reflected in more comprehensive gender guidelines and policies being developed and disseminated. Moreover, annual reviews of progress on gender mainstreaming should be undertaken and reported in appropriate meetings and publications. The KRBO should identify opportunities and report on progress for enhancing gender equity and awareness within its organizational structure at all levels. Additionally, the KRBO Secretariat should encourage the NKCs to give attention to gender issues including equity in staffing. All Programs should include a gender element within their strategies which aims to increase gender mainstreaming both within projects and among staff. It is important that research and project designs include gender needs and impact assessments, where appropriate, for various development options. To be effective, the Gender Strategy must have the commitment and support from top-level officials and managers at the KRBO.

Funding approach for KRBO activities

5.20 The approach of the Short and Medium Term Strategic Direction orients KRBO funding towards two main types of support:
(a) Support for sustainable development of water and related resources in the Kagera River Basin. This support is managed under the KRBO Technical Cooperation Budget; and

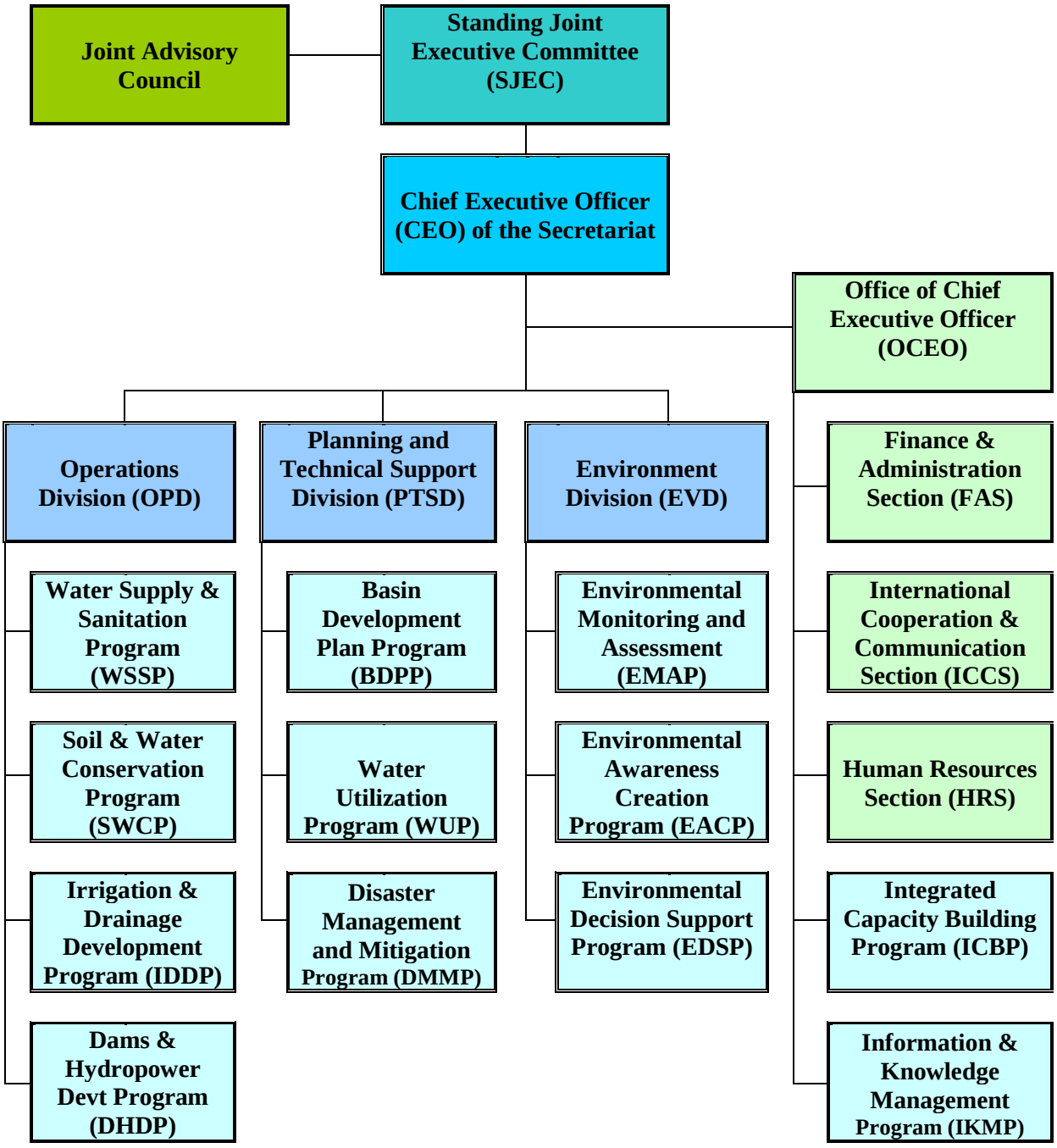

Figure (e): Organizational Structure KRBO

(b) Support to strengthening the KRBO as an International River Basin Organization. This support is managed under the KRBO Regular Budget. The funding strategy aims to achieve sustainability of the KRBO's essential functions through contributions the riparian countries as well as through other financial mechanisms including cost sharing with donors. The KRBO uses two separate budgets. The *Regular Budget* and the *Technical Cooperation Budget.*

5.21 The *Regular Budget* covers all costs of KRBO Secretariat "essential" services. The Regular Budget provides for the functions that the KRBO as a River Basin Organization should offer; such as international cooperation activities, program management and administration costs, core technical services and support to the NKCs. The Regular Budget mainly covers personnel costs related to KRBO regular posts. Regular posts conduct the central corporate functions of the River Basin Organization. These include senior management, finance and administration, technical coordination, fundraising, international donor and stakeholder relationships, and an increasing number of technical services. Regular staff will drive the strategic planning so that programs are highly effective and focused. Staff members require strong management skills and expertise as they will perform policy and strategy development, planning, program and project design and management, and evaluation. The riparianization policy of the KRBO for its professional staff positions will also allow for a gradual expansion of long-term technical services provided under the Regular Budget. An increasing number of technical functions will therefore be established through regular posts within the Regular Budget. The Operating Expense Budget (OEB) is a part of the Regular Budget. It does not include Regular Staff positions supported by donors.

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5.22 The *Technical Cooperation Budget* covers all program activities in which KRBO plays an execution or co-execution role. This includes the costs of program coordinators and chief technical advisors. The Technical Cooperation Budget houses the KRBO-executed technical assistance through projects required to address the development programmes in the Kagera Basin. The Technical Cooperation cash expenditures will be 100 percent funded by Donors and are mainly used for personnel, subcontracting and training activities. Riparian States provide significant in-kind contribution to KRBO technical assistance. The development and maintenance of the knowledge base and GIS as well as the production of maps, technical reports and promotional documents will be included in the Technical Cooperation Budget. The Technical Cooperation Budget covers the program posts. Program posts coordinate and execute the program activities within the various divisions. The number and type of "program posts" will vary at any time depending on the availability of project support from donors and other investors. This will require a more flexible approach to executing the KRBO operations as the number of program posts will fluctuate with donor agreements and greater use of outsourcing to country agencies, consulting companies, universities and other service providers. Funding of program posts will form a part of the agreement between the KRBO Secretariat, partners from riparian States, donors and other funders. The Technical Cooperation Budget is designed to expand and contract according to the volume of activities implemented by the KRBO under its established programs for the sustainable development of water and related resources in the Kagera River Basin. Sustainability considerations for the Technical Cooperation Budget are relevant in terms of program and project design, but not in the KRBO budget perspective. Staffing levels under programs, in terms of contracts and liabilities, will be limited in accordance with the duration and budgets of agreements and projects.

5.23 Essential functions of a world-class river basin organization need to be seen in the context of capacities of governments, much as any other organizational development

process in developing countries. In the foreseeable future the present capacities will require international expert input and thus budgetary support by donors to these essential functions. In the medium-term, therefore, donor support to the Regular Budget will be required mostly to finance international positions. While the KRBO riparian States need a world-class organization to build up capacity to peacefully develop and manage the Kagera, the costs for such an enterprise are beyond their capacity and budgetary realities.

5.24 Acknowledgement of the KRBO as a long-term capacity building engagement of donors also requires a commensurate analysis of the engagement and ownership of riparian States. Their financial engagement, naturally, meets limitations, much as in any other technical cooperation project. This financial limitation, however, cannot be equated with a limited commitment to or ownership by the countries of the KRBO. However, as the countries of the Kagera River Basin become more economically developed they will be able to contribute more to the running of the Secretariat. In the interim, a sustainable funding approach will need to explore opportunities for increased revenue generation based on a three-tiered funding model comprising of:
(a) KRBO riparian State contributions; (b) program service charge; and, (c) any other source of income such as service provisions.

Towards budget aid for KRBO activities

5.25 Over the Short and Medium Term strategic period, the KRBO will work with donors to develop new and appropriate budget aid mechanisms. Programs will be financed through flexible financial contributions to program goals rather than being implemented in isolation as donor funded projects. Within the Short Term, donors are expected to provide financial support through the following mechanisms:

(a) funding of a specific project which falls within a KRBO program component;

(b) financial contribution to a specific KRBO program as a whole;

(c) financial contribution in support of the overall KRBO program;

(d) financial contribution to specific staff positions;

(e) secondment of staff.; and

(f) provision of synergetic services through KRBO cooperation projects with partners.

5.26 Riparian States will contribute both through in-kind inputs in programs and through annually increasing riparian States contributions. Donors will be encouraged to support programs either entirely or by investing in projects that have been identified as strategically important to the program. This program support approach has the added advantage of being more flexible in responding to priority needs and in organizing activities in a more efficient way.

5.27 Supported by program strategies and through the BDPP, the KRBO will more pro-actively involve the Joint Committee and help guide donor contributions by identifying priority needs in line with country and donor interests and which are consistent with IWRM principles. The KRBO will create a Multi-donor Water Management Trust Fund, which will allow more flexible and demand-driven mobilization of expertise in order to respond to specific requests from countries. Estimated average annual and total 20-year budgets for KRBO programs and administration is estimated to be about US$ 144 million.

Monitoring and Evaluation

5.28 The Strategic Direction aims KRBO to have made major progress towards:

(a) Being acknowledged as a leading International River Basin Organization operating by the best practice principles of sustainable development and management of the basin's resources and in organizational processes and practices;

(b) Being accepted as a "centre of excellence" for information and knowledge backed by excellent analytical and management systems pertaining to the water-related and environmental resources of the basin;

(c) Compiling a list of feasible and justifiable development projects that reflect the social and environmental aspirations of the riparian countries, and grouping priority projects into a basin-wide Kagera Program;

(d) Building awareness and understanding throughout the basin of the KRBO as a world-class International River Basin Organization that contributes to poverty alleviation and sustainable development.

5.29 An essential component for the implementation of the Strategy is the development of a suitable system for the monitoring and evaluation (M&E) of the KRBO's progress and performance toward attaining the goals and objectives expressed in this document. It is recommended that immediately following adoption of this Strategy the KRBO programs be directed to develop M&E systems with indicators to illustrate each program's progress and contribution toward attaining the goals and objectives in this Strategy. Similarly, it is important that the KRBO and its stakeholders arrange for an evaluation of the performance of the KRBO system and institutions on a regular basis. The purpose of such an evaluation is to identify institutional constraints in the operation of the KRBO in order to develop constructive and mutually acceptable solutions to achieve the effective and efficient operation of the KRBO. Such an evaluation should be conducted by an independent body. However, to reflect country ownership, the Council and Joint Committee should guide the design of the monitoring and evaluation system including terms of scope and composition of the evaluation team.

5.30 The Joint Committee shall hold the overall responsibility for ensuring the implementation of the Strategy. The KRBO CEO and the Senior Management of KRBO Secretariat will hold the responsibility for taking and initiating required actions to ensure effective implementation of this Strategy. In particular, shortly after final approval and adoption, the CEO should make arrangements for the development of an effective and detailed monitoring system and Results Framework to measure and report on progress in implementing this Strategy. It may also be advisable to have an independent mid-term review conducted to ensure the Strategy stays up to-date and to facilitate development of the consecutive five-year Strategic Plans.

5.4 Strategies for KRBO Funding

5.31 The objective of the resource mobilization strategy is to institute measures which will attract more resources to the implementation of the Strategy. In order to achieve this objective KRBO needs to follow the following strategic directions:

(a) building beneficiaries confidence;

(b) build donor confidence;

(c) position KRBO strategically;

(d) expand the donor base, and

(e) develop appropriate mechanisms for awareness creation.

In order to implement its mandate KRBO has to utilize appropriate and innovative methods for resources mobilizations for achieving each of these strategic directions areas.

5.32 The goals of the KRBO Strategic Direction specify an important role in all areas of river basin management. They also call for a greater focus on the KRBO Programs through the role of promoting and coordinating planning and sustainable development at basin scale. An appropriate KRBO has to be established as soon as possible and start showing significant efforts in consolidating an integrated program approach. The program approach considers KRBO activities as part of comprehensive programs supporting basin-wide strategies of the KRBO member countries. Based on an increased contribution from Kagera riparian countries and continuous support from the donor community, the KRBO implements activities within a portfolio of 12 Programs. In addition, a Multi-donor Water Management Trust Fund will be created in order to provide strategic and flexible support to KRBO program development and implementation.

5.33 KRBO Programs are driven by the principles of Integrated Water Resource Management and Development (IWRMD) and need to be administered through fully integrated programmatic structure of the KRBO. The totality of programs supports the Kagera Partnership Program: a Regional Cooperation Program for Sustainable Development of Water and Related Resources in the Kagera River Basin owned by the riparian countries. Projects that are identified and prioritized through the Basin Development Plan will support and ultimately form the Kagera Partnership Program. With close involvement of the funding agencies, Line Agencies, and the KRBO Secretariat, the Kagera Partnership Program will be executed and implemented by the Member States in partnership with donors, development banks, and the private sector. KRBO will implement basin-wide supporting activities mainly focusing on enabling projects. Programming of KRBO activities will be linked to the Basin Development Plan. Priority basin-wide and transboundary water resources related projects will be supported by KRBO programs in a manner to contribute to the achievement of the KRBO's goals and objectives.

5.34 Donors are likely to provide financial support through the following mechanisms:

(a) funding of well-defined actions which fall within KRBO program components;

(b) financial contribution to a specific KRBO program as a whole;

(c) financial contribution to the KRBO Water Management Trust Fund;

(d) financial contribution to specific staff positions;

(e) secondment of staff;

(f) provision of synergetic services through KRBO cooperation projects with partners; and,

(g) funding of the Operational Expenses Budget.

5.35 Riparian States need to contribute both through in-kind inputs in programs and through annually increasing riparian State contributions. Donors would be encouraged to support Programs either entirely or by investing into projects that have been identified as strategically important to the Program. This program support approach would have the added advantage of being more flexible in responding to priority needs and in organizing the activities in a more efficient way. The KRBO should aim to also obtain financial contributions in support of the overall KRBO program portfolio.