NILE BASIN INITIATIVE
Initiative du Bassin du Nil

Assessment of the level of implementation of Integrated Water Resources Management In

Burundi

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1 INTRODUCTION

1.1 Location

The Republic of Burundi is located in Central Africa in the East of the Democratic Republic of Congo, in the South of Rwanda, and in the West of the United Republic of Tanzania. Its area is 27834km^2 with 7 million inhabitants. Burundi is a land locked country lying between 29^0 and $30^0 54'$ of longitude East and between $4^0 28'$ and $2^0 20'$ of latitude South. Burundi is one of the poorest countries in the world. In fact, its human development index 0.313 is among the smallest in the world in the very below HDI human average (0.448). This one ranks it with regard to the latter as the 171st out of 173. It means before Niger and Sierra Leone.

1.2 The water resources of the country

Burundi geographical and hydrological context

As far as the hydrographical level is concerned, there is an obvious interdependence between the topography and the hydrographical network. Actually there are two hydrographical systems separated by the water sharing line: Congo-Nile Crest. This one divides the water courses which are drained to the Congo basin and from that flowing to the Nile basin. It is from this Congo-Nile Crest that originate the rivers flowing to the Nile. It is the Ruvubu river and its tributaries Ruvyironza as well as the Kanyaru, flowing at the border between Burundi and Rwanda which are the most southern real Nile sources. Thus, the most southern Nile source is at Rutovu, in Bururi province. The latter is pointed out by the pyramid built in 1938 by Dr.Burkhart Waldecker, with reference to the pyramids of the Nile valley in Egypt.[1] These two hydrographical systems are themselves subdivided into small baMekouar,S.L.e.M.A.(2001).“Bill on marshes in Burundi.Online FAO legal study.“sins each. The Congo hydrological systems subdivided into the following small basins: Rusizi, Tanganyika and Malagalazi whereas the Nile basin is formed by the small basins Kanyaru, Kagera, and Ruvubu.[2] The Ruvubu river which in itself is a Nile portion so baptized in Burundi and 480 km long, has for itself a basin side of 12300km^2 . It takes its origin in the Eastern part of the Congo-Nile crest at 2500m and flows so as to join the Kagera at 2 km from Rusumo falls with an average slopping of 150m/km.[3] Its course is interrupted by cataracts. The total floating leaving Burundi in order to flow into the Nile is 2,6 billion m^3. Burundi equally has lakes. One of them is laid in the Congo basin which is Lake Tanganyika. This one collects all waters from West Congo-Nile Crest Rivers and those of Lake Kivu through Resize with the maximum depth of 1433m and an average of 700 m, it is the deepest lake in the world after lake Baikal. Its length is 677 km and 50 km wide. It is also the biggest fresh water reservoir in Africa and the second on the world level. Other lakes are in the North .The most

1 http://musemakweli.ifrance.com/musemakweli/touribu.htlm(2007).

2 Ministry of Energy and Mines (1998). National Water Guiding Plan, Basic Report, Version III: Water resources . See Planning the future, Government of Burundi**:** 99.

3 Norconsult A.S. and Electrowatt (1975).The Kagera River Basin Development, Phase II – Burundi, Rwanda, the United Republic of Tanzania: Technical report, Volume 7, Sector Study, Hydrology.

important of them are Cohoha and Rweru. Considering its geographical position , Burundi is a country with a big rainfall and an average of 1274mm/year of rain. We distinguish three pluvial zones such as : the Congo-Nile crest (2600m) with the
rainfall from 1400 to 1600mm/year, central plates (1400-1750m) with 1200mm, the Northeastern depression (Bugesera natural region)as well as that of the East (Kumoso natural region) lying between 1000 and 1500m height with a rainfall under 1000mm/year. The temperatures vary between 12 and 16^0C for the Congo-Nile crest, 16 and 20^0C for the central plates, and between 20 and 24^0C for Mosso and Imbo plains and the Northeast depressions.

Burundi hydrous assessment

The water resource is said to be satisfactory in Burundi but badly shared out in time and space. In actual fact, according to published statistics, the average rain comes to 1274 mm/year (Table 2.3). [4] However, 68% of this goes through evapotranspiration and only 31% of inward available resource remains. And this is divided into surface water (8%) and underground water(23%).They have a total flow rate of 319m^3/sec, that is,10.06 km^3/year. According to the National Water Guiding Plan,[5] the flow from sources is approximately 6600liters/sec. They still have to determine the underground water reserve as well as its right distribution in space. Yet, the established fact is that, the underground water not available at sources but in depth “depth sources” are especially involved in the alluviums of low bottoms of valleys, such as those in the sediments of Rusizi and Kumoso plains with respectively 71% and 35% of their areas.[6]

Table 2.3: Hydrological evaluation for an average year :

Rainfall	Evapotranspiration	Base flow	Surface water
1274 mm/an	872 mm/an	299 mm/an	103 mm/an
1011 m3/s	692 m3/s	237 m3/s	82 m3/s
100 %	68 %	23 %	9 %

Source: Aquastat, FAO INFO, 2005.

[4] (/www.fao.org/ag/agl/aglw/aquastat/countries/burundi/printfra1.stm; FAO 2005)

[5] National water guiding plan, Basic Report, Section III: Water Resources. See Planning the future, 1998, 99. Ministry of Energy and Mines

[6] Idem 19

Table 2.4: Distribution of water resources per basin sides in Burundi.

Basin	Area in. Burundi (Km^2)	Average flow (Qm)				Base flow	Guaranteed flow (Q 95 (%)		
		Flow (km^3/s)	Specific flow $L/s*km^2$	Discharged wave(mm)	Annual volume ($1O^6m^3$)	Flow (m^3/s)	Specific Flow $L/s*km^2$	Flow (m^3/s)	Specific Flow $L/s*km^2$
CONGO	1181	182	15,4	485,7	5729	139	11,8	91	7,7
Rusizi	2684	53	19,8	623	1672	43	15,9	34	12,6
L.Tanganyika	3871	78	20,1	633	2450	60	15,4	40	10,2
Malagarazi	5262	51	9 ,7	305	1607	37	7	18	3,3
Nile	13218	137	10,4	326,8	4532	98	7,4	67	5,1
Ruvubu	10063	108	10,8	340	3420	79		52	5,2
Kanyaru	1938	21	10,7	338	655	14	7 ,2	11	5,4
Kagera	1217	8	6,7	212	257	5	4,5	4	3,2
Total Burundi	25035	319	12,7	402	10061	237	9,5	157	6,3

Source: National survey on water and sanitation coverage, DGHER, July 2001.
(Table altered from its original form by its author

2 STATUS OF WATER RESOURCES MANAGEMENT IN THE COUNTRY[8]

2.1 The major uses of water

Water management cuts across many uses. The main uses include drinking water supply, agriculture especially using irrigation, hydroelectric power generation, industrial uses, fish farming, protection of natural aquatic habitats, leisure (e.g water sports and swimming) and maritime transport. Sustainable water management must integrate and coordinate all the above and other uses, working harmoniously together with the users. This section of the report describes the status of water resources management in Burundi with particular with particular focus on water for domestic use, for agriculture, for energy, and for industry.

Drinking water supply
Drinking water supply in Burundi is the responsibility of a public establishment with autonomous management, REGIDESO. This institution, set up by the Belgians in 1939, is in charge producing and distributing drinking water supply in urban areas. According to FAO in its 2005 report available on the Web[7], the demand in water is assessed at 0.288km^3/year while internal renewable water resources are 10.06 Km^3, that is a demand of less than 3%. Notice that one could consider imported water from neighboring countries varying at 2.5 Km^3.If one adds that quantity there, the water request would be only 2.4% comparatively to the available water volume.

The total real renewable water resources per inhabitant are 1774 m^3/ year whereas water deduction per inhabitant is 46m^3. According to consensus developed by several experts around the assessment of the degree of "water scarcity", it is accepted today to speak of water scarcity when a person does not manage to get 1000 m^3 of water /year.[8] Concerning the water rate for domestic use, the statistics of 2000 show 49 millions m^3 of water, that is 17% of total rate used. According to the findings of the investigation carried out by Rural Energies and Hydraulic General Directorate (DGHER 2001)[9] the gross rate is 70% whereas the net rate is 42.9 %. Let's note that the gross rate considers all the infrastructures whether functional or not, while the net rate takes into account only those which are functional only.[10] That difference is to be attributed mainly to the war which destroyed a lot of infrastructures while others have not been repaired because of lack of spare parts or funds to renew them. With a rapid population growth of 3% the needs in drinking water consumption in urban areas double every ten years. From 22 millions in 1990, the consumption increased to 40 millions m^3 in 2000 and 70 millions in 2010. In rural areas, the growth rate of needs in drinking water is 58% every ten years. They vary from 170 millions m^3 in 1990 to 293 millions of m^3 in 2000 and 434 millions of m^3 in 2010.

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7 FAO (2005).(/www.fao.org/agl/aglw/aquastat/countries/burundi/printfra1.stm).

8 Mohamada, D.Y. (2003). « Nile Cooperation, a review of literature". Current African Issues N° 26, Nordiska Afrikainstitutet, 2003.

9 DGHER (2001). "National Survey on water and sanitation coverage"

10 Nkurunziza Pascal (2008). «Situation and socio-economic development on the basis of natural resources exploitation within the framework of the Nile Basin : the Burundian case. Bujumbura, 2008. Paper presented at NBI workshop)

Table 2.1: Drinking water rate in rural areas in Burundi

Type of water resources	Quantity		Number of people served		Service part	
	Gross	Net	Gross	net	Gross	Net
Private junction tubes	25392	21594	288246	245689	56.7	61.3
Drinking fountains	587	371	220014	154988	43.3	38.7
Population from urban areas	25979	21965	508260	400677		
Gross service rate			96.1	75.8		

Source: DGHER, National Survey in water and sanitation coverage, july 2001.(Table altered from its original form by the author).

Table 1.2: The rate of drinking water supply in rural areas.

Type of water	Quantity		Number of households served		Service part	
	Gross	Net	Gross	Net	Gross	Net
Installed sources	22280	13282	579577	360102	55	34
Private junction tubes	2479	2479	2479	2479	0	0
Drinking fountains	5717	3036	145456	83417	14	8
Wells	205	37	10110	6313	1	1
Total	30681	18834	737622	452311	70	43
Total households likely to be served			1053955	1053955		

Source: National Survey on water and sanitation coverage, DGHER, July 2001. (Table altered from its original form by the author)

The agricultural sector

The water management analysis on the agricultural level rather shows that this one is nearly non-existent. In effect, according to FAO statistics[11], only 21430 hectares are totally or partially irrigated, that is 1.6% of the cultivated area. However, it is important to note that the topography of Burundi can be subdivided into two main sets in terms of aptitude for irrigation: the Central region, the North, the North-East and the East region that form an entity aside whereas the West and South-West regions form another. While the first is rather dominated by interspersed hills by marshy valleys lying between 1100 and 1700 meters high, the second is more fitted for irrigation because it is formed by alluvial plains often accommodated into the East African Rift Valley. That is the Northern Imbo plain, in which flow waters from the Rusizi river, tributary of Tanganyika Lake. The Central Imbo, drained by the Mpanda river, South Imbo, oil palm region and Nyanza-lac plain. They total 95000 Ha for Imbo and 20000 for the Mosso.[12] The marshes make up 12000 Ha, i.e. 4.3% of the Burundian dry lands area.[13] The latter are very important for the survival of the population especially during the major dry seasons (from July to September) because constituting water stocks and muddy-clay lands containing the most fertile organic matters. However, we must

11 FAO (2005).).(/www.fao.org/agl/aglw/aquastat/countries/burundi/printfra1.stm).

12 FAO (2005). (www.fao.org/agl/aglw/aqaustat/countries/burundi/printfra1.stm

13 Idem 11

unfortunately realize a bad management of these marshes by cultural practice often disruptive of ecological balances. Thus, the manioc and the sweet potatoes farming cause a lot of water consumption often leading to the drying up of the latter. We must also observe an overexploitation of the latter taking into account the rapid population growth and in 1990, 50% of the latter were already exploited. The exploitation of these marshes requires a particular attention and must be taught in the IWRM context. In actual fact, a wild exploitation of the latter has consequential effects not only on food production generating food insecurity for the population but can disrupt the ecosystem (flora, fauna, micro-environment, etc). An inventory of the marshes has been already done in 1999 as well the guiding plan and the development scheme. These studies have been laid in 1991 with the support of the project BDI/96/001.[14] However, the marshes occupation is based on customary norms. And the rule says that it is the State that is the owner of the marshes.

In conclusion, we realize that agriculture is pluvial and less rests upon irrigation. In addition, the marshes management, although having a development scheme, the latter is in practice nearly non-existent and still less integrated in water global management.

2.2 The major uses of water

Burundi, like several other African countries, faces many problems related to water management. The latter are of political, legal and institutional nature.
On the politico-administrative level, reforming the sector is rendered difficult by numerous internal and external factors, essentially connected with the lack of adequate vision and political willingness; constant destabilization of political and administrative institutions, absence of financial means to provide for the implementation of one's policy and consequently, an almost total reliance on external donors. Moreover, we observe a "fragmentary "water resource management of water resource. Actually, water administration is carried out through different institutions with different missions or vocations according to the multi-sector use of the hydrous resource.

Thus, the lack of coordination mechanisms of actions and transversal consultations of institutions related to water constitutes a major stake unfavorable in that process of hydrous resource management.
Likewise, the institutions in charge of water management under its different aspects have often gaps on the "know how" level of its agents as well as on the designing level, and monitoring plan of water reforms. That is the reason why the legal framework for water management was created in 1992 but was unsuccessful.[15] The existence of many ministries in charge of water management leads most often to a competition in the sharing of responsibilities without considering available resources.

Another aspect is the socio-political situation characterized by a civil war that destroyed the socio-economic structures of the country and led the country to the unprecedented economic slump resulting in the collapse of all economic indicators, extreme poverty of the population and the loss of the sense of citizenship.

[14] Mekouar,S.L.e.M.A.(2001)."Bill on marshes in Burundi.-OnlineFAO legal study."
[15] NBI (2008)."The water Resources Planing nad Managements Projects (WRPM)." (IWRM).

On the legal level

When you chronologically examine the development of the legal framework of water management in Burundi, you notice that there are several legal texts dealing with water management. The latter are often legal tools organizing this or that sector of water in a fragmentary way without any transversal relation with other sectors.

As a matter of fact, we could pick out the following legal texts since the last 70 years[16]

i. The Treaty of May 12th, 1934 signed between Belgium, acting on behalf the Burundian Kingdom in the colonial period, and England. The treaty aimed at protecting the Burundian territorial waters with regard to the British willingness to control the Nile river waters;
ii. The decree of May 6th, 1952 referring to the amendment of articles 16 and 20 of the Civil Code, book II;
iii. The decree of May 6th, 1952 referring to the concession and the administration of the lake waters and water courses;
iv. The decree of May 6th, 1952 referring to the constraints related to underground water, lake waters, water way and their utilization;
v. Public Health Code;
vi. International agreement referring to the organization, the management and the development of Akagera river on August 22nd,1977 between Burundi, Tanzania, Rwanda and Uganda;
vii. The decree N° 100/26 of December 11th, 1989 referring to the creation and Organization of the National Commission for Water and Energy;
viii. The order in Council no 1/141 of November 26th, 1992 referring to the institution and the organization of hydraulic water domain;
ix. The decree N° 100/241 of December 31st, 1992 referring to the regulations of used waters drain in the urban area;
x. National Water Guiding Plan, 1998;
xi. The Environmental Code (MINATTE, 2000)
xii. The National Policy and Water Management Strategic Plan (MINATTE, 2001)
xiii. xiii. The bill on marshes management in Burundi (FAO, 2005) [17]
xiv. Action plan 2001-2010, MINATTE , 2001

Then, so far Burundi has not had any coordination legal framework for the various activities related to water management. An attempt to set up the latter took place in 1989 but it was not implemented. In fact, by its decree no.100 /226 as of the December 11th, 1989 referring to the creation and the organization of National Water and Energy Commission, the government had felt the need of setting up a body in charge of coordinating water and energy sector. Thus article 1 of the same decree stipulates: "There is created a National Commission for Water and Energy, hereafter called "the Commission" whose role is to coordinate "programs designed by the government for a harmonious development of water and energy sectors."

In its article 2, paragraph 2; it stipulates that among other documents to examine there is essentially:

16 Ministry for territory management d.l.e.d.T.(2000) "The national policy of water resource management in Burundi, Ministerial Document, 43 and appendixes

17 Mekouar,S.L.e.M.A.(2001)."Bill on marshes in Burundi.-OnlineFAO legal study."

a. The coordination of activities and the limitation of responsibilities for various executive bodies and different institutions operating in water and energy sectors (hydroelectricity, drinking water, Irrigation, fish farming, marshes draining,…

b. The legislation in relation to rendering operational energetic and hydraulic resources.

In its article 3, the decree states that the presidency of this commission falls within the competence of the Minister in charge of energy whereas the Minister charge of Environment and the one in charge of Rural Development repot to the vice-presidency. Other ministries responsible for some aspects related to water became members with the representative of consumers.

Thus this commission which represented a positive development in water and energy management did not operate and was an additional structure, i.e."abortive". That is the reason why in further legal texts related to water management, that commission is not mentioned anywhere.

2.3 Institutional framework for water resources management

As it was mentioned above, water management concerns many ministries in charge of missions which, under different aspects, are related to the sector of water. Thus, as we have already mentioned it, 8 ministries are nowadays confronted with the issue of water. Those ministries are the following:

I. Ministry of Land Planning, Environment and Public Works;
II. Ministry of Water, Energy and Mines;
III. Ministry of Public Health;
IV. Ministry of Home Affairs and Communal Development;
V. Ministry of Commerce, Industry and Tourism;
VI. Ministry of Agriculture and Livestock;
VII. Ministry of Foreign Affairs and Cooperation;
VIII. Ministry of Transport, Post and Telecommunications;

This situation enhances disorder in the management of this sector and slows down its development. Instead of observing those ministries collaborating, we rather notice competition in taking decisions, sharing responsibilities, fundraising. Thus, it would be inconceivable to think about sustainable development of that resource if such a situation continues.

The decree N° 100/26 of December 11th, 1989, gives coordination responsibility of the water issue to the Ministry of Land Planning, Environment and Tourism. Nevertheless, another decree, N° 149 of 10 September,2008 allocates this mission to the Ministry of Water, Energy and Mines. This provokes an institutional destabilization as far as "water" resource management is concerned. That is the reason why nowadays, coordination in water resource management is not yet definitely set. Apart from the ministries, there are other technical institutions involved in water management. They include essentially:

a. The Burundian Geographical Institute(IGEBU)

Established by the decree no.100/146 of September 30th, 1980, the Burundian Geographical Institute (Institut Géographique du Burundi "IGEBU" in acronyms) has the following

missions: collection, processing , cartography, and conservation and availing hydrologic, hydrographical, meteorological and climatologic data for the users.

It is organized into two technical departments, one for hydrometeorology and another for agro-meteorology. Nevertheless, the meteorological data collection started during the colonial period in 1920's.[18] Before the establishment of IGEBU, it was the National Centre for hydrometeorology (CNH) of the Ministry of Transports that was in charge of constituting a climatologic database.

The National Climatologic Network comprises 110 stations among which: 22 main stations, 20 thermo-pluviometric stations and 68 pluviometric stations. The parameters observed are: the rain, temperature, evaporation, relative humidity, atmospheric pressure, solar radiation, sunstroke and the wind.

As far as it is concerned, the national hydrological network comprises 54 limnimetric stations equitably distributed between the Congo and Nile basin and has been operating for a long time after the beginning of the climatologic network launched since the 1970's.The parameters measured are related to reading the limnimetric scales and the rivers'flow.

The data base GIS (Geographical Information System): The first data base GIS was designed by IGEBU in collaboration with the "Nile Basin Water Resources" project whose headquarters are located in Entebbe-Uganda. This data base comprises maps which have been digitalized by IGEBU on the basis of the topographical map represented at the scale of 1/50000th.

Tutorship :The Burundian Geographical Institute is placed under the tutorship of the Ministry of Land Planning, Environment and Tourism and had been under the supervision of many tutors if we take into account its background.

b. The company for water and electricity production and supply (REGIDESO).

It has as the main mission to produce, transport, distribute and market water and electricity in urban centres and with urban vocation. REGIDESO is under the tutorship of the Ministry of Water, Energy and Mines. It was established in 1939 by the Belgian colonization.

c. General Directorate for Hydraulic and Rural Energies (DGHER)

Placed on the tutorship of the Ministry of Water, Energy and Mines, It has as the main mission to supply rural regions with water and electricity.

Water and Sanitation Project **(PEA: Projet Eau et Assainissement)**

The missions allocated to this project are mainly: to supply with water and sanitation to the rural area. As such, it is in charge of building and rehabilitating hydrological and sanitation infrastructures as well as sensitizing and educating the population to hygiene.

d. Municipal Technical Services (SETEMU)

The Municipal Technical Services (Services Techniques Municipaux, SETEMU) has the main missions to be responsible for disposal and household waste in Bujumbura Municapality. It is placed on the tutorship of the Interior Ministry.

[18] Ministry of Territorry Development, d.I.E.e.d.T. and B.SOS-Environment (2004)."Forest, savanahs and marshes, basis of development "Newsletter N°004 of Friday the 24 th of December 2004:SOS Environment.

e. International organizations and NGOs (see IWRM Protos)

There are also international organizations (UNICEF,UNDP,ABD, FAD)and international NGOs (OXFAM,GVS,ICRC,KFW …) or bilateral organizations (GTZ) in the sector of water. Concerning the funding of the sector of water, in addition to Extraodinary Investment Budget, bilateral, multilateral and international donors offer various supports to the Government of Burundi. These include particularly: ADB, KFW, ICRC, ADF……

2.4 Integrated Water Resources Management in Burundi

The IWRM policy is premised on the "NWP" in September 2001. In fact, this partnership describes very clearly the options and strategies to use for the development of the sector of water at all socio-economic levels.[19] It also covers the following sectors: access to drinking water, access of the rural population to electricity; the improvement of rational utilization of water by the population in the agricultural and farming domains, sustainable water resource protection, the promotion of coordination mechanisms and by means of capacity building in the management of that resource. However, even if this framework of national water partnership was adopted in September 2001, it included some gaps which were underlined by national experts and that are summarized as follows:[20]

The trans-boundary policy in the framework of NWP is very much summarized. Thus, there is a great interest to complement it by talking particularly about:

a. the diversion and utilization of water resources;
b. the revision of the existing legal texts, agreements and treaties related to international or trans-boundary waters;
c. the preservation of waters quality for their downstream utilization;
d. the issue of salt waters
e. the management plan and data base for the dissemination of information spread taking into account the system of decisions support;
f. the cooperation framework which is accepted by all the partners;
g. the cooperation principles in case of national disasters, conflicts between countries,…
h. the national water partnership does not deal with law matters in relation to water management;
i. assessment and laws revision mechanisms on water management have not been taken into account as far as the NWP is concerned;
j. the water needs by the population have not been estimated enough;
k. the implementation costs have not been determined.

In addition to what is mentioned above, we should notice that the formulation of NWP did not involve NGOs, the private sector and financial backers.[21] Apart from the gaps mentioned above, at that level, the NWP has been unable to introduce the notion of "Integrated Water Resources Management"(IWRM). It is only at the impulse of Johannesburg summit held in 2002 that Burundi together with other African Nations accepted to design a policy based on

[19] Nile Basin Initiative, S.V.P., Water ressource planning and Management Project (2006). »Baseline and Needs Assessmment of National Water policies of the nile basin Countries: A Regional Synthesis. »(Water Polycy Component of the Nile basin Countries ».

[20] Idem 26

[21] idem 27

the principle of IWRM till 2005.[22] Because of that resolution, the Minister of land planning, environment and tourism addressed a correspondence N/Ref:770/179/CAB/2006 on March 10th,2006, a petition to Global Water Partnership (GWP) in order to appeal for a support of the formulation of Burundian IWRM plan. The latter was then conveyed via the Nile Basin Initiative to African Development Bank (ABD), the manager of African Easiness of Water. (AEW). Thus, an agreement referring to a donation meant for the funding of the designing of the Burundian IWRM plan between the ADB and the secretariat of the Nile Basin Initiative was signed in September 22nd, 2006.That donation was given under the responsibility of the regional office of World Water Partnership for East Africa, which was acting on behalf AEW.

Thus, the IWRM in Burundi is in the setting up and starting point phase.

2.5 Water Resources Management Issues and Challenges

The difficulties encountered in the process of water management are of many kinds. These include institutional, technico-organizational, financial and conjectural difficulties as outlined below:

At institutional level:

a. many ministries deal with water management without insuring any coordination between many sector policies ;
b. the lack of political stability which unexpectedly gives room to policies disruption of policies without any justification;
c. political changes which are very frequent provoke vagueness in the policies followed, the lack of continuity and memory in the actions carried out;
d. competition between ministries because of the lack of coordination and the search for interests;
e. interferences in policies and in their implementation characterized by the absence of a clear distinction between one another;
f. a competition in the search of financial backers which discredits the government towards the latter.

At techno-organizational level

a. The lack of highly qualified staff in the sector of water sector gives room to a deficit in planning, management and coordination of interventions. In fact there exist few agents and high officials who are qualified in that sector. This is because we notice a competent staff brain drain which seeks for a better future in developed countries;
b. Following many financial problems, technical hydraulic tools are not available in enough quality and sometimes they are outdated;
c. water infrastructures have undergone vandalism during the civil war period and therefore they need to be restored.
d. Hydrologic data collection has not been respected during that long period of civil war, thus it should be reorganised.

At the financial level

The financial means allocated to water sector cannot always meet all the needs. That is the reason why many hydroelectric projects have not been implemented. The same thing is

[22] BAD-FAE (2006)."Support to the formulation of IWRM plan in Burundi" report (IWRM).

observable in implementing the plan recommended by the NWP which needs around 10,000,000 dollars, an amount of money that the government cannot avail nowadays.

At the conjectural level

Nowadays, we notice a global climatic change that also affects Burundi. More droughts followed by flooding disrupt the agricultural production, energetic system and this has an impact in the eradication of poverty. In fact, the absence of rain affects the river flow rate, thus provoking the decrease of hydroelectric production but also leaves room to hunger because of the insufficient harvests.

Another phenomenon observed due to climatic changes in the planetary warming of which the setbacks are noticed on the health level by abundant diseases such as malaria in the areas which were not attacked a short time ago. Thus in Burundi we observe cases of malaria in the regions of high altitude whereas before this kind of disease was encountered in the regions of low altitude, namely Rusizi and Kumoso plains.

3 THE IWRM CONCEPT

3.1 Background to Concept

Water runs through and sustains all life and human activity. Without reliable access to enough water, social and economic development cannot occur. While access to safe water is one of the specific target of the Millennium Development Goals set during the 2002 World Summit on Sustainable Development, (WSSD) Klaus Toepfer, Excutive-Director of the United Nations Environment Programme, stated in his comment on outcomes from the WSSD "that water is not only the most basic of needs but is also at the centre of sustainable development and is essential for poverty eradication. Water is intimately linked to health, agriculture, energy and biodiversity. Without progress on water reaching the other M D Gs will be difficult, if not impossible"[23].

Countries need to be able to ensure reliable and readily accessible supplies of unpolluted water in order to improve health conditions, reduce childhood mortality, and advance the status of women. Water is a key ingredient in generating rural livelihoods, growing food, producing energy, encouraging industrial and service sector growth, and ensuring the integrity of ecosystems and the goods and services they provide. Water poses it own development challenges floods, droughts, and water related diseases can have a huge impact on communities and indeed on national economies. According to the 2003 United Nations World Water Development Report, between 1991 and 2000 over 665000 people died, 90% of which were water related and 97 % of the victims were from developing countries. Also, the recorded annual economic losses associated with these disasters have grown from US$30 billion in 1990 to US$70 billion in 1999[24]. So how can countries overcome these challenges and meet the water needs of people, industries, and ecosystems? How each country chooses to answer this question depends on its situation and development priorities, but in order to optimize the contribution of water to sustainable development, any answer needs to consider the numerous and complex links between activities that influence and are influenced by how water is developed and managed something that is only possible using an IWRM.

Current IWRM definitions

Integrated Water Resources Management has been defined by the Technical Committee of the Global Water Partnership as "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems."[25] Operationally, IWRM approaches involve applying knowledge from various disciplines as well as the insights (perspicacity) from diverse stakeholders to devise and implement efficient, equitable and sustainable solutions to water and development problems. As such, IWRM is a comprehensive, participatory planning and implementation tool for managing and developing water resources in a way that balances social and economic needs, and that ensures the protection of ecosystems for future generations. An IWRM approach is an open, flexible process, bringing together decision-makers across the various sectors that

[23] WSSD, 2002
[24] United Nations World Development report, 2003
[25] Global Water Partnership, 1996

impact water resources, and bringing all stakeholders to the table to set policy and make sound, balanced decisions in response to specific water challenges faced.

Basic IWRM Principles[26]

IWRM is not a dogmatic framework, but a flexible, common sense approach to water management and development. While there are no set IWRM "rules", the approach is founded on the Dublin principles, which assert that:

a. Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

Since water sustains life, effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment area or groundwater aquifer.

The notion that freshwater is a finite resource arises as the hydrological cycle on average yields a fixed quantity of water per time period. This overall quantity cannot yet be altered significantly by human actions, though it can be, and frequently is, depleted by man-made pollution. The freshwater resource is a natural asset that needs to be maintained to ensure that the desired services it provides are sustained. This principle recognises that water is required for many different purposes, functions and services; management therefore, has to be holistic (integrated) and involve consideration of the demands placed on the resource and the threats to it.

The integrated approach to management of water resources necessitates co-ordination of the range of human activities which create the demands for water, determine land uses and generate waterborne waste products. The principle also recognises the catchment area or river basin as the logical unit for water resources management.

b. Water development and management should be based on a participatory approach, involving users, planners and policymakers at all levels.

The participatory approach involves raising awareness of the importance of water among policy-makers and the general public stakeholders. It means that decisions are taken at the lowest appropriate level, with full public involvement and consultation of users in the planning and implementation of water projects.

Water is a subject in which everyone is a stakeholder. Real participation only takes place when stakeholders are part of the decision-making process. The type of participation will depend upon the spatial scale relevant to particular water management and investment decisions. It will be affected too by the nature of the political environment in which such decisions take place.

A participatory approach is the best means for achieving long-lasting consensus and common agreement. Participation is about taking responsibility, recognizing the effect of sectoral actions on other water users and aquatic ecosystems and accepting the need for change to improve the efficiency of water use and allow the sustainable development of the resource. Participation does not always achieve consensus, arbitration processes or other conflict

[26] Dublin Principles, 1992

resolution mechanisms also need to be put in place. Governments have to help create the opportunity and capacity to participate, particularly among women and other marginalised social groups. It has to be recognised that simply creating participatory opportunities will do nothing for currently disadvantaged groups unless their capacity to participate is enhanced.

c. Women play a central part in the provision, management and safeguarding of water.

This pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources.

Acceptance and implementation of this principle requires positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programmes, including decision-making and implementation, in ways defined by them.

It is widely acknowledged that women play a key role in the collection and safeguarding of water for domestic and in many cases agricultural use, but that they have a much less influential role than men in management, problem analysis and the decision-making processes related to water resources. The fact that social and cultural circumstances vary between societies suggests that the need exists to explore different mechanisms for increasing women's access to decision-making and widening the spectrum of activities through which women can participate in IWRM.

IWRM requires gender awareness. In developing the full and effective participation of women at all levels of decision-making, consideration has to be given to the way different societies assign particular social, economic and cultural roles to men and women. There is an important synergy between gender equity and sustainable water management. Involving men and women in influential roles at all levels of water management can speed up the achievement of sustainability; and managing water in an integrated and sustainable way contributes significantly to gender equity by improving the access of women and men to water and water-related services to meet their essential needs.

d. Water has an economic value in all its competing uses and should be recognised as an economic good.

Within this principle, it is vital to recognise first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Many past failures in water resources management are attributable to the fact that the full value of water has not been recognised and has led to wasteful and environmentally damaging uses of the resource. The recognition of water as an economic good is central to achieving equitable allocation and sustainable usage. Water allocations should be optimized by benefit and cost, and aim to maximize water benefits to society per unit cost. For example, low value uses could be reallocated to higher value uses such as basic drinking water supplies, if water quality permits. Similarly, lower quality water can be allocated to agricultural or industrial use.

3.2 How IWRM concept is understood in Burundi[27]

To meet national sustainable development goals and tackle water challenges, Burundi has made investments in water infrastructures pipelines, boreholes, treatment plants, irrigation systems and hydropower plants throughout the country. Although Burundi has developed essential instruments for the water sector which include the Water Sector Policy Document, National Water Master Plan, Regulatory Framework and Legislative Instruments, most which were prepared with donor support. However, Burundi is still plagued by deforestation and poor agricultural practices leading to reduced retention periods, surface runoffs and soil cover losses. Conflicts over water are increasing as the population level rises and the use of different poor methods in agricultural production changes water flows in the streams and rivers. And, at the same time water-borne diseases have become the main cause of morbidity, where poor sanitation compounds health problems in both urban and rural environments. If such hazards that have seen per capita income in the region fall drastically are not checked, sustainable livelihoods cannot be guaranteed. This is why the preliminary results show that the IWRM concept is not yet sufficiently understood in the country. At the end of 2005, Burundi water partnership confirmed at a two-day inaugural workshop in Bujumbura, that Burundi faces, critical challenges which delay the adoption of IWRM concepts.

The instruments elaborated and related to water have never been implemented due to the fact that they were not prepared with the collaboration and participation of the country stakeholders and there is no ownership by the wider stakeholder groups in the country. Although basic documentation on the policy environment exists, but they are not implemented due to poor institutional arrangements, lack of coordination and poor ownership of the instruments. The fragmentation in the water sector spills over to non-state actors such as NGOs, bilateral and multilateral co-operation agencies. The various stakeholders in the sector act in isolation and in a individualistic manner. Where collaboration exists, it is ad hoc, abstract and dependent on the goodwill of the individuals rather than organizations concerned. The actual situation is marked by overlaps, inefficient use of scarce resources, and competition even in the areas where responsibility should be shared.

3.3 The right emphasis: focus on the means or the end?

The correct emphasis is that we must not only focus on development of water resources but that we must consciously manage water development in a way that ensures long term sustainable use for future generations. Management is used in its broadest sense with emphasis on stakeholder participation and decision making at the lowest appropriate level. A basic strategy is to emphasize the development and involvement of **multi-stakeholder groups** at all levels and support and facilitate processes in which these groups become fully integrated into and active in the management of water resources. In most societies, Burundi included **gender** relations are socially constructed in ways that uphold men's authority and dominance over women. Special considerations will be made to address this traditional gender imbalance and to make women equal and meaningful participants and beneficiaries of the programme.

Emphasis should also be given to strike a balance between the use of resources for livelihoods and conservation of the resources to sustain their functions for future generations. The IWRM program will strive to ensure that water resources development is undertaken in an **environmentally sustainable way** and that vital ecological systems are not compromised. Links will be made to **environmental conventions** and National Action Plans to be prepared or under preparation for example Biodiversity, Land Degradation/ Desertification and Climate Change.

[27] Appraisal report on the formulation of Burundi IWRM Plan, 2006

3.4 IWRM Implementation challenges

The case for IWRM is strong, many would say uncontestable. The problem for most countries is the long history of unisectoral development. Major challenges to implementation include the following:

a. **As the Global Water Partnership puts it** "IWRM is a challenge to conventional practices, attitudes and professional certainties. It confronts entrenched sectoral interests and requires that the water resource is managed holistically for the benefits of all. No one pretends that meeting the IWRM challenge will be easy but it is vital that a start is made now to avert the burgeoning crisis."[28]

b. **IWRM is, above all, a philosophy.** As such it offers a guiding conceptual framework rather than a concrete blue print. Implementing IWRM does not for example require that a new super Ministry be created. What it does demand is that people try to change their working practices to look at the bigger picture that surrounds their actions and to realize that these do not occur independently of the actions of others. It also seeks to introduce an element of decentralized democracy into how water is managed, with its emphasis on stakeholder participation and decision making at the lowest appropriate level.

c. **Implementing IWRM requires negotiating differences,** this implies change, which brings threats as well as opportunities. There are threats to people's power and position; and threats to their sense of themselves as professionals. IWRM requires that platforms be developed to allow very different stakeholders, often with apparently irreconcilable differences to somehow nonetheless work together.

d. **IWRM requires reform challenge –** in view of the existing institutional and legislative frameworks, implementing IWRM is likely to require reform at all stages in the water planning and management cycle.

e. **Step-by-step process challenge - i**mplementation of IWRM is best done in a step-by-step process, with some changes taking place immediately and others requiring several years of planning and capacity building.

f. **Changing attitudes – fortunately a**ttitudes are changing though. Officials are becoming more aware of the need to manage resources efficiently. Officials now see too that the construction of new infrastructure has to take into account environmental and social impacts and the fundamental need for systems to be economically viable for maintenance purposes. However, they may still be inhibited by the political implications of such a change. The process of revising water policy is therefore a key step, requiring extensive consultation and demanding political commitment.

3.5 Recommendation for improvement of the IWRM concept

An overall IWRM plan is required to envisage how the transformation can be achieved and this is likely to begin with a new water policy to reflect the principles of sustainable management of water resources. To put the policy into practice is likely to require the reform of water law and water institutions. This can be a long process and needs to involve extensive consultations with affected agencies and the public. Bringing some of the principles of IWRM into a water sector policy and achieving political support may be challenging, as hard decisions have to be made. Because of these hard decisions it is not surprising that major legal and institutional reforms are unlikely to take place until serious water management problems have been experienced. In some cases, IWRM may be seen as a threat to donor-supported capital investment programmes. Some decision-maker may tend to be more concerned with increasing supplies through new infrastructure rather than with water efficiency or managing water demand. Indeed they fear that the new agenda of IWRM will lead to a reduction in capital investment for such projects.

[28] Global Water Partnership, 1996

4 MPLEMENTATION CHALLENGES

A brainstorming session on IWRM t21he Burundi revealed that there is a positive drive towards the adoption and implementatio21n of Integrated Water Resources Management in the national development objective. The sec21tions below provide excerpts of the discussions.

4.1 General level of recognition of linkages between IWRM and poverty reduction

This survey report shows how the integrated management of water resources and water-related services can help to reduce poverty in the contexts of public health, land use, food production, livelihoods, industrial development, urban planning and environmental protection. Its aim is to show how integrated water resources management (IWRM) fits within broader pro-poor governance dimensions; to highlight overlooked connections between access to/use of water and poverty; to explore how a changeover to the IWRM approach is an important ingredient of strategies for poverty reduction; and to examine some of the modalities of IWRM at national levels and their specific implications for poverty reduction.

Burundi has already some draft documents instruments support for IWRM implementation. The only thing needed is to update them through appropriate fora in order to address stakeholder participation issues in the broadest sense.

While the current situation can be described as a starting stage the following may be used for assessment:

- Sector-specific institutions, laws and policies
- National budget allocations (and sub-national transfers)
- Mainstreaming within other sectors
- Decentralisation
- Capacity development
- Coordination
- Stakeholder engagement
- Communication and public affairs

Considering each indicator above, the country leads institutions to water resources planning, development and management. We can mention the existence of technical institution such as REGIDESO for urban electricity and water supply and DGHER for Rural water supply. Regarding laws and policies, relevant documents have been elaborated but with insufficient stakeholders inputs. Those documents were not practically due to lack of government's commitment and were not endorsed by the communities. To be applicable, many challenges are not solved yet regarding the problem of coordination; all decisions are taken at a high level with less awareness and without adequate communication strategy and linkages amongst water and other sectors or within the sector. Summing up the above indicators, Burundi is expected to be at initial phase. The IWRM planning process is somewhat addressed but the implementation is now starting with the support of ADB funds from 2005. The other important handicap is non-existence of specific IWRM projects and funding strategy for sustainable water resources development

4.2 General level of recognition of the importance of IWRM as an important tool for water resources planning, development and management

This issue can be measured by current efforts in support of IWRM with respect to :

I. relevant policies, legal and institutional frameworks as well as national strategies for water resources management;
II. Compliance with international obligations and regional initiatives that strive for sustainable utilization of water resources to the benefit of the communities.
III. Capacity Building (ATP – IWRM with examples from Training at Msc level, PhD level and some IWRM-short courses for water professional.

Some relevant examples are outlined below:

a. Level of Mainstreaming of IWRM principles in national policies and plans.

i. From 2007, the Government of Burundi has institutionalised a Ministry in charge of water which may lead activities related to water sector;
ii. Implementing Policies, laws and Water Sector Development Strategy/Water Development Plans;

b. Level of Mainstreaming of IWRM considerations in the legal framework

Efforts being made in support of IWRM in the country include:

i. Unwitting IWRM implementation i.e. people undertaking IWRM approaches under local solutions without knowledge of the basic principles of IWRM;
ii. Some major trans-boundary efforts with co-riparian countries (e.g. joint projects, conflict resolutions) amongst/between Rwanda, Congo and Burundi for hydropower generation many years ago.

c. Level of Mainstreaming of IWRM considerations in the institutional framework and implementation/ enforcement mechanisms.

In the past few years, Burundi has developed relationship on IWRM issues. This can be appreciated through the Basin organization such as:

i. African Minister's Council on Water – builds political will and awareness raising for IWRM, where the minister of water, Energy and Mines is the leading chairman;
ii. Nile Basin Initiative with shared vision program, Kagera Basin Organisation, Lake Victoria Environment Management Program etc
iii. Institutional frameworks development that captures IWRM approaches. Institutions such as Water User Association provide ground for improved water resources management;
iv. Water management units in institutions (different levels).

4.3 Challenges related to the Implementation of IWRM in Burundi

Challenges:

a. Institutional and legal framework challenges:

i. From 2007, Burundi has institutionalized one Ministry in charge of water but responsibilities still are not well defined and characterized by distribution of competences among several ministries.
ii. Decisions and interventions are undertaken in the water sector without consultation and coordination among the various relevant institutions.

iii. Burundi has no clear water policy; coherent water planning that takes into account an effective water management.
iv. The non-application of the existing legal instruments affects the quality and the quantity of water resources.
v. Bilateral donors and international financial institutions are moving away from project and programme financing to general budget support for national governments.
vi. Shifting to general budget support requires mechanisms to ensure that budget allocations adequately cover "public goods," those are critical effective water resources management, such as policy formulation, legislation, institutional and capacity development, infrastructure development, database centre and research technology

b The need to adopt IWRM approaches to effectively address climate change and other critical challenges

i Burundi does not have an authority in charge of monitoring and controlling the use of water resources.
ii The country lacks a reliable database in water sector.
iii Natural resources degradation affects agricultural, forests and aquatic productions and therefore reduce water table.
iv Limited knowledge on water management as well as the non-effective implication of all the beneficiaries leads to mismanagement of the resource.
v This is the reason why Burundi water partnership and IWRM strategy is expected to improve the current situation and therefore at this point is very important.

c Technical cooperation challenges

i At the national and local administrative level, there are no sufficient skilled human resources in water management.
ii The country is facing financial resources and the private sector is not active in water management and do not invest in the sector of water.
iii Farming systems are not appropriate for guaranteed food security, irrigation is done at a small scale and all these factors lead to soil degradation and infertile land.
iv Water partnership is expected to be a key strategy for Climate change as the most important challenge facing the global community as well as Burundi community.
v Climate change will have significant, even dramatic, increasing variability in rainfall, more frequent and intense floods and droughts (N-E part of Burundi) and more rapid rates of desertification.
vi Burundi Water Partnership has an opportunity to help make adaptation to climate change an integral part of current and future water resources management approaches.
vii There is an urgent need for regionally-relevant practical advice and guidance on WRM strategies that address adaptation to climate change by building alliances with partners and fostering synergies between global and regional programs.

d Capacity building Challenges:

There is need to improve knowledge on sustainable water resources management approaches and practices generated and shared through a robust and professional global, regional and national communication platform.

Moreover, Burundi water partnership can serve as a core pillar for training facility, strengthen stakeholder participation and building people's ability to disseminate knowledge, to manage water projects, to raise funds needed to address the sustainable water challenges that they face.

5 CONCLUSIONS AND RECOMMANDATIONS

5.1 Conclusions

After having examined the situation in the water sector, our findings can be summarized as follows:
The decree N°100/26 of December 11th, 1989 establishing a National Commission on Water and Energy in order to co-ordinate activities in that sector ;
The National Water Guiding plan in 1998;
Politics and water strategic plan;
IWRM Programs 2007-2009

However, although texts were put in place in order to attempt the co-ordination of activities in the sector of water, our conclusion is that they were not followed.

Besides those texts are sometimes incomplete and give a little answer to the national policy of integrated water management. That is how some gaps are observable on the legal and institutional level and on the technico-organizational level.

In effect, on the legal level, there remains a necessity to design a policy that is in line with IWRM. Gaps persist with regard to the legal plan notably in what concerns the management of trans-boundary water, setting up quality water standards, setting up the quantities and the price of water and by activity sector, reviewing the laws so as to adapt them to that policy, clarification of the needs and demand in water for the population, the budget for that policy, etc …
On the institutional level we notice a rather fragmentary management of that resource, a lack of vertical and horizontal consultation, technical institutions whose means do not allow to meet the requirements of their missions, competition for responsibilities instead of a harmonious collaboration.
The frequent political instability causes a break off on the conceptual level that becomes a hindrance in the implementation of projects.

On the technical and financial levels, we record;
a deficit of qualified staff in water management as well as in planning and coordination of interactions;
a brain drain in that sector;
an incomplete technical material and an uncertain data bank, a discontinuous in its stock and in its interpretation;
financial means below the needs and in permanent search of eternal support the guarantee of which is not always insured;
On the level of understanding the concept “IWRM” our populations are still ignorant, sometimes including the decision makers;
As an « economic good » water is badly understood, hence little respect in its management ; there is a lack of sensitization of the rulers and of the grassroots;

Definitely it appears that considering the legal, institutional, technico-organizational and financial instruments, the IWRM is still at the stage of formulation in Burundi. Thus, it has not been possible to mention case studies since IWRM does not exist in real facts.

5.2 Recommendations

To practice an « IWRM » policy, one needs to read all legal texts referring to water in order to make them coherent, harmonious and convertible into practice. Besides, we should make another step to adapt them to the new global IWRM strategy. Setting up the latter must require the support of all the layers of the population as well as political and technical institutions. The NBI vision, which is a trans-national vision with a search for equitable share among all the Nile Basin countries, must necessarily prevail. Spacific recommendations include:

a. A vertical and horizontal organization in water resource management at the national level must assert itself and trans-boundary harmonization enter in the irreversible process of cooperation.

b. Water being a source of life and the first factor of struggling against poverty. Burundi must make sure it has a complete mastery of its policy by allocating it enough financial means.

c. Among the problems that threaten that commodity which tends to be rare considering the demographic pressure and increasing industrialization, there is climate change. The recommendation is that the University trains specialists in that matter so as to better understand the phenomenon and take adequate measures in good time.

d. The State of Burundi should support PAGIRE in his work of setting up installation strategies of the « IWRM » policy.

e. A permanent evaluation to insure the implementation of that policy should be done internally as well as externally. “IWRM” should be taught to children in primary schools already and in secondary schools.

f. Furthermore, measures should be taken notably:
   - To give equipment to the Geographical Institute of Burundi (IGEBU)
   - Set up hydrological and meteorological data base;
   - Harmonize water national plans in the Nile Basin ;
   - Design quality standards of water;
   - Train Specialists in Hydraulic and Environment ;
   - Set up a Capacity Building Plan for people in the water sector;
   - Set up a control and evaluation mechanism making it possible, if necessary, to update the National Water Guiding Plan.