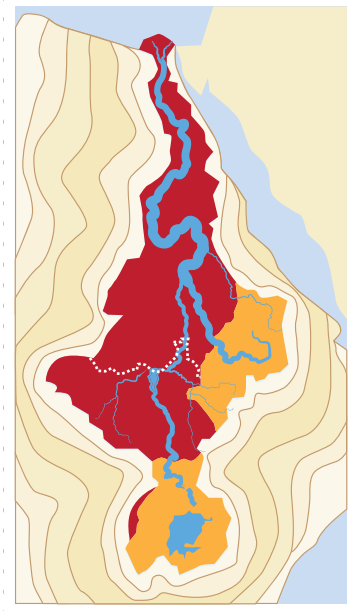
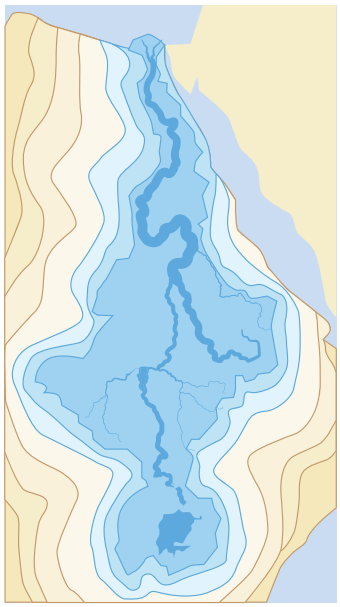
# BLUE PEACE for the NILE





Strategic Foresight Group

# PREFACE

It is my pleasure to present our report Blue Peace for the Nile. Strategic Foresight Group has been engaged with trans-boundary water issues since 2008 in Asia and the Middle East. With this report, we extend our work to Africa.

The Blue Peace approach advocates collaborative, comprehensive and sustainable solutions to trans-boundary water issues. It promotes engagement of mainstream decision makers and national leaders to address the water issue, going beyond the conventional approach over dependence on the domain ministries. It also explores how water can be used as an instrument for peace.

The countries of the Nile Basin have made commendable progress in regional cooperation under the auspices of the Nile Basin Initiative. They have also encountered difficulties and differences of opinion on some of the key legal and political issues. We hope that the recommendations made in this report will help strengthen institutional cooperation, overcome political and legal hurdles and build on technical cooperation.

This report has been possible with support from the Government of Switzerland, and particularly the Swiss Agency for Development and Cooperation (SDC) as well as the Political Directorate of the Federal Department of Foreign Affairs. We appreciate their cooperation in co-hosting a high level workshop in Zurich in February 2012, with senior government officials, parliamentarians and experts participating from Burundi, Rwanda, Kenya, Uganda, Tanzania, Sudan, South Sudan, Ethiopia and Egypt. We have also gained from insights and information shared by a large number of experts and officials in Kenya, Uganda, Tanzania, Rwanda, and Egypt in their interaction with the teams of Strategic Foresight Group during visits to these countries for field research. We had enriching discussions with officials of Burundi, Ethiopia, and Sudan at the World Water Forum in Marseilles, France, in March 2012 and Africa Water Week in Cairo in May 2012 as visits to these countries were not possible. We wish to express our appreciation to Hon. Charity Ngilu, Kenya's Minister for Water Resources and Chair of Nile-COM until July 2012, as well as the officials of the Nile Basin Initiative Secretariat for their ideas and interaction. However, the analysis and views expressed in this report are only of the Strategic Foresight Group. They do not in anyway represent the views of the Government of Swisserland or any of the governments in the Nile basin.

The report is thus a result of a comprehensive international effort, primarily with input from the Nile Basin countries. It presents an overview of challenges from a futuristic perspective. Much has been published about the past and present situation in the Nile Basin. However, it is important to examine trends and discontinuities for the next 40-50 years. It is an insight into the future that will help us to prepare policy options.

The recommendations are divided into political and technical components. While we appreciate the

groundwork laid by the Nile Basin Initiative in technical areas, a more comprehensive approach is required for institutionalising political cooperation. It is essential to create an institutional architecture which can address the current political differences and prevent future political problems. Since the future of the Nile is not only about water but also about climate, food, health, electricity, social stability and national security of all countries in the basin, it is important to engage Heads of Government in leading the process of cooperation. The report calls for an urgent and informal retreat of Nile Ministers of Foreign Affairs and Water Resources at a neutral location outside the Nile Basin to examine our recommendations.

We hope that such an informal retreat will take place soon in 2013, International Year for Water Cooperation, and that our analysis and recommendations will contribute to a constructive policy discourse in the region making greater cooperation feasible.

**Sundeep Waslekar**
President
Strategic Foresight Group

Mumbai, March 2013

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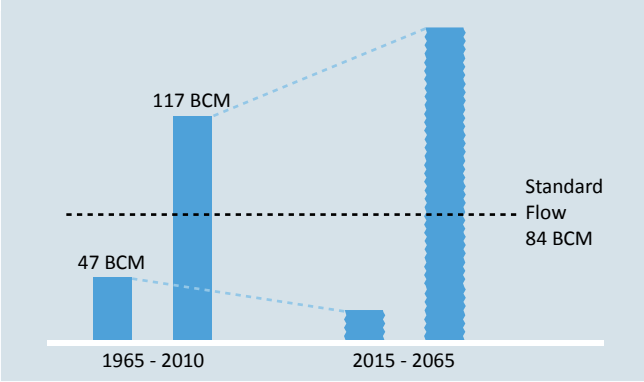
# OVERVIEW

The people of Rwanda, Burundi, Tanzania, Kenya, Democratic Republic of Congo, Uganda, Eritrea, Ethiopia, South Sudan, Sudan, and Egypt to varying degrees depend on the Nile River. The Nile River system has the White Nile originating in Lake Victoria in the South, or in Burundi if rivers that feed into Lake Victoria are taken into account; and the Blue Nile which originates mainly in Ethiopia. The two Nile Rivers merge near Khartoum in Sudan and enter Egypt as one river. The term Nile is therefore used to encompass the entire Nile system, including White Nile, Blue Nile (also known as the Eastern Nile) and tributaries, unless otherwise specified.

**The flows of the River Nile as measured at Aswan on the border of Sudan and Egypt experience very high degree of fluctuations, rendering the management of trans-boundary water very difficult.**

### Oscillations in Nile Flow




In the last 150 years, the lowest recorded flow at Aswan was 42 BCM (1913-14) and the highest was 150 BCM (1878-79), whereas the mean annual flow from 1900 to 2004 was 85.31 BCM. The flow has oscillated between 117 BCM to under 50 BCM in the half century from 1960 to 2010.

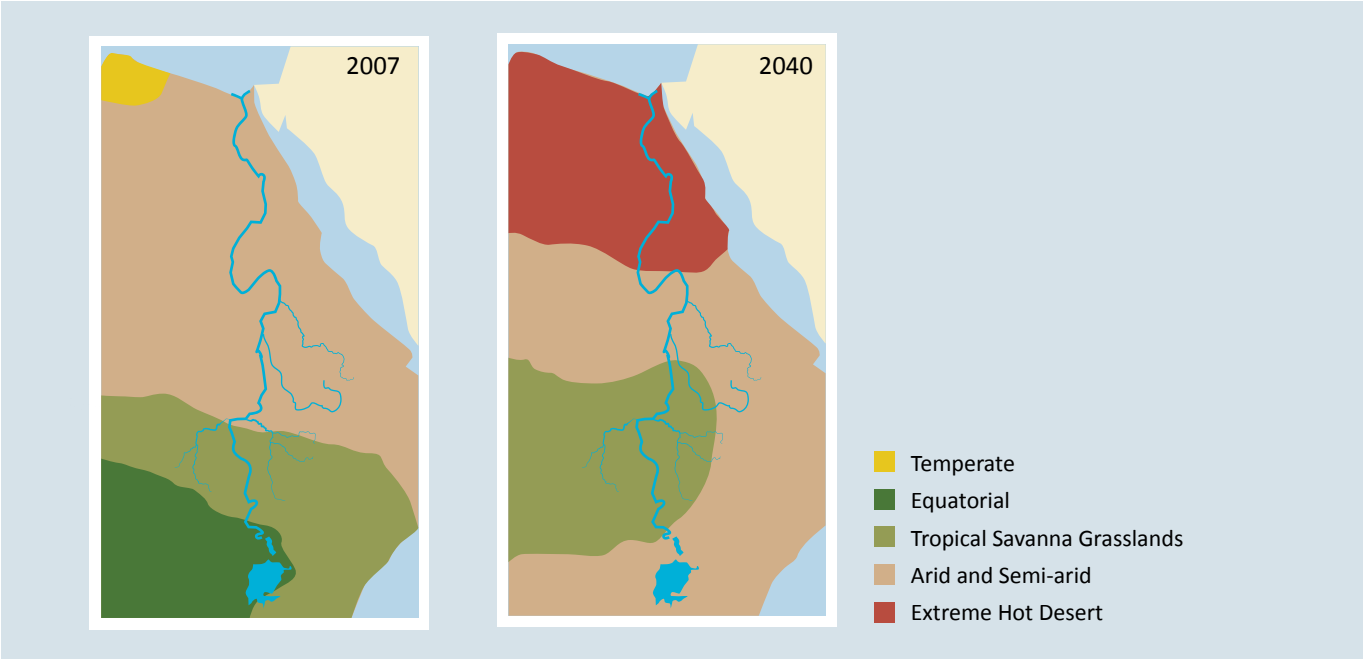
The fluctuations in the flow of watercourses are likely to increase in the twenty first century. The Nile river basin is witnessing a change in rainfall patterns with changes in seasonal periods, and shorter bursts of intense rains that are too rapid for agricultural growth. Climate change models predict increase or decrease of 15-20 per cent precipitation on an annual basis. However, most models concur that irrespective of the overall annual quantum, erratic patterns of rainfall and concentration over fewer days would affect productivity of agriculture. If the experience of Ethiopia, Kenya and Sudan in recent years is used as a basis, and also if experience from other developing countries is considered, depletion of water resources during relevant seasons for agriculture can lead to a decline in yield by up to 50 per cent.

**It is expected that temperature across the Nile Basin will increase by 1.5 – 2.1 per cent by 2050. Almost the entire Nile region may become arid to semi-arid in the next 30-40 years which will significantly reduce agricultural land.**

Most of equatorial Kenya is getting drier since 1962. From 1960 to 2000, droughts have been witnessed every 2 to 3 years. Since the 1990s prolonged droughts exceeding five years have occurred regularly. The pattern in the last few decades clearly shows the gradual expansion of arid and semi-arid area initially surrounding the Nile Basin and eventually encroaching upon the basin itself. The continuation of this trend is bound to lead to the narrowing of fertile area. It will be increasingly confined close to the banks of the river with much of the remaining basin turning into an arid or semi-arid zone. The expansion of arid and semi-arid areas is concurrent with rise in temperature, which leads to increase in water need of crops, thereby effectively bringing down the crop yield per acre.

Floods and droughts have caused immense damage to the Nile River basin countries both in terms of people

## Climate Change in the Nile River Basin




affected as well as economic damage. Between 1900 and 2012, there have been almost 140 incidents of floods in the Nile Basin. More than 100 of them occurred in Ethiopia, Sudan, South Sudan, Kenya and Tanzania. During this period, more than 10 million people living in the Nile basin were affected by floods with around 4000 casualties.

Droughts in the Nile River Basin have proved to be even more fatal than the floods. Between 1900 and 2012, there were almost 70 incidents of drought. Out of them about 55 incidents took place in Ethiopia, Sudan, South Sudan, Kenya and Tanzania. Around 170 million people have been affected by droughts in the last century with half a million lives lost.

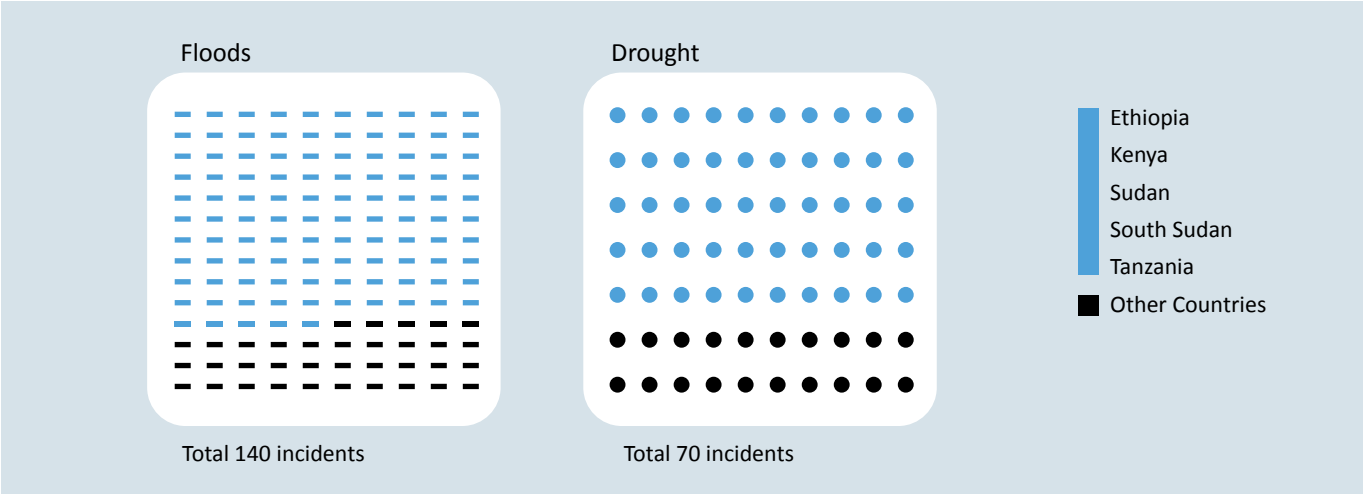
From 1970 to 2004, Tanzania, Kenya, Sudan, South Sudan, Ethiopia have had more than 10 droughts; Uganda has had 6-9 droughts; and Rwanda and Burundi have had 3-5 droughts.

**The experience of the last 30 years indicates that the five countries have greatest exposure to risks from floods and droughts in the next 30-40 years as well.**

The Nile Basin is suffering from land degradation on account of deforestation, urbanisation, and over grazing. It results in

- *Soil Erosion and Sedimentation:* Due to its topography and torrential rainfall, the Blue Nile catchment faces high rates of sedimentation as compared to the White Nile, whose sedimentation is largely retained in the Equatorial Lakes and the Sudd region. While the Nile catchment's Precipitation/ Runoff ratio is estimated at a low rate of 5.5%, the ratio of the Blue Nile catchment on its own is 20%. Sedimentation has a negative effect on reservoirs built along the Nile River Basin. It clogs the area thereby reducing the amount of water that is to be stored.
- *Desertification:* **Desertification threatens 40 to 80 per cent territories of countries in the basin.** While it is difficult to specify the precise year, sometime in the course of the twenty first century, this risk is set to threaten transformation of the Nile countries into arid and semi-arid countries. **The countries facing maximum risk of desertification are Ethiopia, Kenya and Sudan, some of the same countries that face the twin challenges of floods and droughts.**

Countries Severely hit by Flood and Drought between 1900 and 2012




- *Sand Encroachments:* Instances of sand encroachment in Sudan are increasing, whereby the entire strip of the country along the Nile especially between Delgo and Karima in northern Sudan is threatened by it. Sand dunes on the eastern bank of River Nile in Sudan and encroachments in north-central regions can threaten the river's course. Sand encroachment is also affecting the productivity of soil which has been witnessed extensively in the Gezira scheme and also in some areas of North Kordofan, North Darfur and Kannar in the Northern State of Sudan. In the Dongola-Merowe region of Sudan, the area covered by sand dunes increased from 51.2 $km^2$ to 61.2 $km^2$ between 1976 and 1996 and decreased to 35.1 $km^2$ in 2000. This decrease could be attributed to an increase in the area covered by gravel and/or coarse sand. In Egypt, active sand dunes and encroachments occupy more than 16.6 per cent of the country's total land area. Sand encroachment in Egypt is further enhanced by the erratic rainfall, active winds, and scarcity of plant cover. Some inactive sand accumulations have been noticed in the eastern side of the Nile delta and in the Sinai Peninsula.

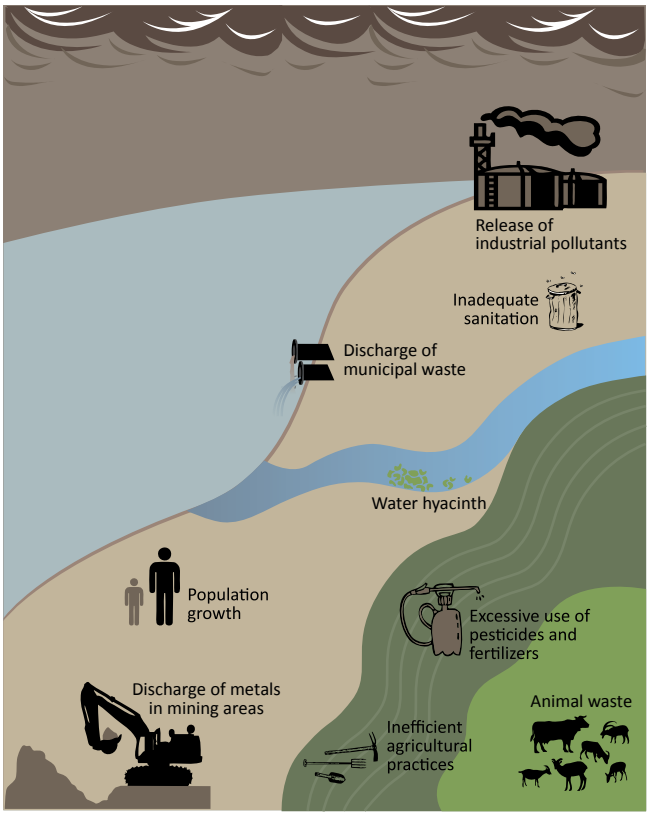
While factors discussed earlier are bound to affect the availability of fresh water in quantitative terms, each and every country in the Nile Basin faces severe challenge with regards to deterioration of the quality of water, growing pollution, in some cases spread of water hyacinth, with implications for health and development.

**The capacity for monitoring water quality is grossly inadequate across the basin, with some variation between countries, due to shortage of laboratories, shortage of equipment, trained personnel and testing facilities for all relevant parameters and absence of clear legal frameworks.** While this is the situation within countries, it is not clear how trans-boundary flow of pollutants and the process of quality deterioration can be managed.

The crisis of climate, water flows and water quality have combined to result in the weakening of food security in the region.

Beans, maize, millet and sorghum are produced locally and exported to countries within the basin. Uganda, Ethiopia and Tanzania are the largest regional exporters of food staples. Sudan, Kenya and Egypt are the largest importers of food in the region from regional, as well as international sources. Wheat, palm oil and sugar are the top imported food crops in the Nile Basin countries whereas coffee, tea, tobacco are the main exports for all countries, except Sudan and Egypt. Egypt mainly exports oranges and rice, whereas Sudan exports sesame seeds and cotton.

## Deterioration of Water Quality in the Nile

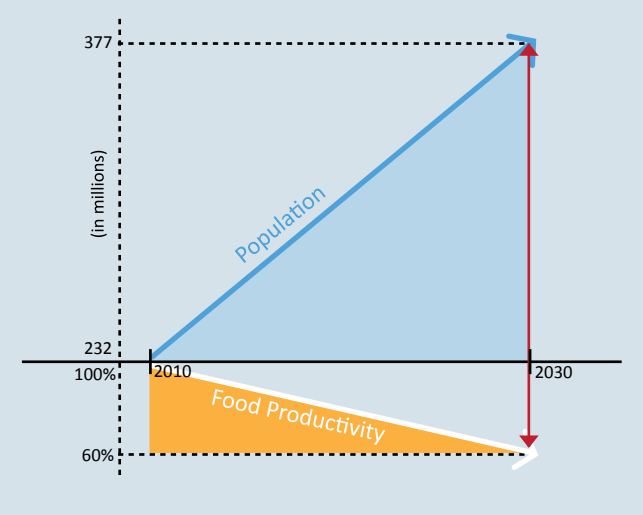



The source of imports and destination of exports is predominantly outside the basin. Wheat imports are mainly sourced from Russia, Ukraine, Argentina and USA to the Nile basin countries, whereas maize is sourced from India and palm oil from Indonesia and Malaysia. Egypt and Sudan mainly export their produce to Asia and the Middle East and also to Europe and North America in smaller quantities. Uganda mainly exports to the European Union.

**Food deficit within the basin has created need for food aid. Over 35 per cent of the population in Rwanda, Burundi and Ethiopia is food insecure and depends on food aid. About 25 per cent of Kenyans and Tanzanians lack adequate access to food and risk dependence on external aid. Conflict ridden Sudan and South Sudan's food insecurity is unclear although it is estimated that the vast majority of the population, especially in western and central Sudan and along the disputed new borders are food insecure. Egypt has been receiving subsidised food grains as a part of its bilateral security relationship with the United States.**

Food insecurity is expected to increase in the next 30-40 years due to drop in agricultural productivity by up to 50 per cent, which is expected to be caused by rising temperature, climate change, drought and reduction in rainy season to narrow and intense period (irrespective of whatever happens to the annual average precipitation levels). This can also lead to drop in food production by 30 to 50 per cent. During the same period, population of the Nile Basin will double. Therefore, per capital food availability can decline substantially, creating need for food imports and food aid.

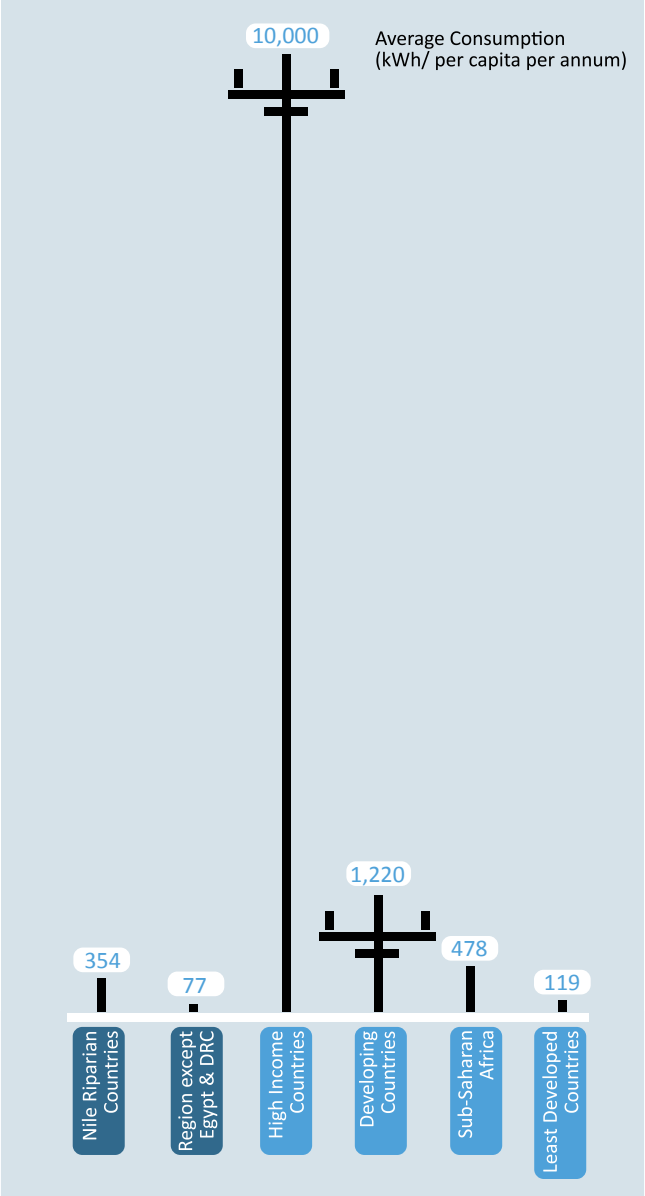
## Increasing Food Insecurity




**While some countries in the Nile Basin depend on food aid from foreign countries, they have been offering their land at extremely low rates and water almost free to foreign investors for export of agricultural produce. Thus, the water of Nile River is exported in virtual terms and used for other countries outside the basin, while the people in the basin face food insecurity.**

In order to improve food security, the countries in the region will need to improve farm productivity and expand irrigation, including drip irrigation, on a large scale. There is potential for **increasing irrigated area by almost 7-8 million hectares in upper riparian countries. But it will require financial resources to the tune of US$ 50 billion.** Most of this requirement

International Comparison of Access to Electricity




will be in the upper riparian countries.

Besides food insecurity, Nile countries also suffer from energy insecurity. As a result of extremely low electrification rates with the exception of Egypt, over 80 per cent of the region's population relies on traditional methods of fuel, firewood, charcoal, certain crops or manure.

The Nile countries plan to install additional capacity of at least 30,000-35,000 MW over the next 20-30 years, for domestic consumption and exports. Ethiopia alone accounts for 50-60 per cent of this projected expansion. **The cumulative cost of investment in power sector for the Nile countries is expected to be US$ 60 billion,** inclusive of direct and indirect costs.

A US$ 30 billion bill for Ethiopia alone is almost equivalent to its GDP for the year 2011. With per capita income under 400 dollars (barely dollar a day income) and government budgetary outlay of US$ 4 billion, there are fiscal and economic limitations on the country's ability to raise resources from within. According to some media reports, Ethiopia can fund about 20 per cent of the cost of the Grand Renaissance and other dam projects. It has to depend on other sources, including China, multilateral organisations and donor funds for 80 per cent of the financial requirements.

The other countries in the Nile basin will have to budget around US$ 1 billion annually. For many of these countries, this exceeds their total annual expenditure (as per 2010 budget) and will put them in further debt. For example Uganda, which has some of the largest future plans had total budget outlay of US$ 2.75 billion in 2010. Tanzania which has planned for over 20 Hydro power projects saw a 2010 expenditure of US$ 5.21 billion. These costs do not include the current and future regional plans to build grids and regional power lines.

Besides financial costs, there are also social and economic consequences of large dams. There are questions of settlement of affected population and respect for their human rights. Overall, the challenge of energy security is a compound challenge of power production, mobilising financial resources and addressing socio-economic issues of population in affected areas.

**At a time when the Nile Basin countries are facing critical challenges for their future, they are involved in a legal and political discord** on the proposed Comprehensive Framework Agreement for cooperation in the basin, and particularly its proposed Article 14 (b). While the CFA was drafted in 2010, there is a long history of negotiations and treaties

involving the Nile Basin countries. The legal history can be traced to the 1902 agreement on the Nile between the then colonial powers. Since then Egypt and Ethiopia have negotiated and signed agreements on the flow of the Nile. The most significant of them is the 1993 treaty signed by the heads of the two governments and deposited with the UN. It would be useful to see how this bilateral treaty relates to the multilateral CFA. The formation of South Sudan as a sovereign state may add another element to the legal challenges. The differences over legal and political issues threaten the political unity of the basin, with a risk of undermining confidence of the international aid and investment community in the basin. More significantly, it poses the risk of depriving people of the basin of the opportunity to live and grow in peace and harmony, achieving economic development and realising their full potential.

# SUMMARY OF RECOMMENDATIONS

**Premise: Political unity of the Nile Basin should be achieved and fostered through the benefit sharing approach.**

The Nile Basin Initiative represents a highly successful mechanism to promote technical cooperation between the Nile Basin riparian countries. However, it has been facing a political deadlock over the finalisation of the Comprehensive Framework Agreement (CFA) and in particular Article 14 (b) about the competing rights of riparian countries to use the trans-boundary water.

The governments of all Nile countries have expressed desire to work together and achieve political unity of the basin. This sentiment was evident in statements made by ministers attending the meeting of the Nile Council of Ministers (Nile-COM) in July 2012 at Kigali, Rwanda. Here, the term 'political unity' represents integrity of the Nile Basin as one basin with all riparian countries being members of a basin organisation as sovereign states.

Any way forward has to be based on the principle of cooperation and benefit sharing among all the countries that presently constitute the Nile Basin. The division of the Nile basin into White Nile and Blue Nile (Eastern Nile) sub-basins is not an effective option since the political deadlock is primarily between members of the Blue Nile basin countries. There can be separate organizations of White and a Blue Nile area, for promoting certain development projects, as the NBI already has through its two subsidiary action programmes. However, separate organization of technical projects should not be confused with the issue of political unity of the Nile Basin.

The enforcement of the CFA in the area under jurisdiction of present signatories is also not an effective option, since more than 70 per cent basin area, and more than 50 per cent of basin population would be out of the scope of such an arrangement. In other words, as the present 6 signatory countries of the CFA account for less than one third of the basin geography and less than half of the basin population, an arrangement confined to them would result in the Nile Basin being truncated to a small and unviable size of its real self. Therefore, while the process of CFA endorsement goes on, as desired by the present signatories, it is also important to find various mechanisms which can ensure political unity of the Nile Basin.

The Nile Basin countries require in excess of US$ 100 billion for the development of hydro-electricity (US$ 60-65 billion), irrigation (US$ 50 billion) and water infrastructure (estimates not available) over the next 20-25 years or almost US$ 3-4 billion per year. (Since estimates of projected expenditure will have some overlap, the total of US$ 100 billion is less than the sum of its parts.) More than 70 per cent of these financial resources are required by 6 countries that are the present signatories to the CFA. As economies of most Nile countries are weak as demonstrated in low per capita income, poor infrastructure and undeveloped private sector, they substantially depend on external donors, including both traditional and newly emerging donors, and multilateral organisations to raise US$ 100 billion for energy, water and food sector, which would be in addition to other human needs such as health and education. It would be impossible to raise these funds from multilateral organisations in the absence of political unity of the basin and guarantee of trans-boundary environmental impact and techno-economic assessments that political unity can deliver. It is possible to raise some funds from newly emerging donors from Asia, but it is known that Asian investments have their own limits and are linked to

specific quid pro quo. Therefore it would be difficult to expect to raise US$ 100 billion for water, food and energy sectors. If Nile Basin countries wish to bring about socio-economic development, they have to be in a position to attract international funding, which would be only possible if there is the context of harmony.

There is a fresh opportunity for achieving political unity since new governments are taking power in Egypt and Ethiopia, the two main parties, at the time of publishing this report. The process of internal political consolidation, which began in 2012 in the two countries, will go on through 2013. This offers a window of opportunity for the new governments to explore new and renewed ideas to lead all basin countries onto a path of cooperation. In October 2012, Egypt sent a large delegation of NGOs to Ethiopia and other riparian countries to initiate a new process of building good will. The efforts to reactivate ENTRO is also a positive development.

This report proposes several mechanisms to achieve and enhance regional cooperation with benefit sharing approach in the Nile Basin and also to improve domestic governance, efficiency and demand and supply variables within each of the Nile countries.

## Component A- Regional Cooperation

### 1. Informal Meeting of the Nile Ministers of Foreign Affairs and Water

Several proposals made here are politically challenging. They have potential for huge benefits, but also require high degree of political understanding and compromise. This can be best done in an informal meeting of Ministers of Foreign Affairs and Ministers of Water and Irrigation of all Nile countries. The meeting should be an informal gathering or a retreat and the venue could be outside of the Nile basin. In a formal meeting, the ministers are bound to present the positions of their countries and there is less flexibility. They are usually accompanied by senior civil service officers and they present positions which are prepared by these civil servants. In an informal meeting there is a lot of flexibility. Ministers can interact with each other in an open manner without conventional constraints. They can have discussions without being bound by treaty obligations. This makes it possible to reach common ground. It is also important that the participants in this meeting are not merely Ministers of Water and Irrigation but also Ministers of Foreign Affairs, since the latter seem to command greater political authority in Nile countries than their counterparts in Water Ministries. As Ministers of Foreign Affairs have a wider perspective of political, economic and social issues, they are in a much better position to form a view on ideas that can change dynamics on the basis of a common position. However, it is also important that the Ministers of Water and Irrigation are part of this retreat since they have domain authority.

Once a common position is identified, the ministers can channelize it into official processes and convert it into an intergovernmental treaty or a MoU. Or they may choose to recommend a summit of Heads of Government to take a final decision on their proposals. This method of informal interaction has been used by several countries around the world to resolve disputes in difficult situations. It is recommended that the leaders of the Nile Basin Countries consider this approach to examine proposals put forward in this report.

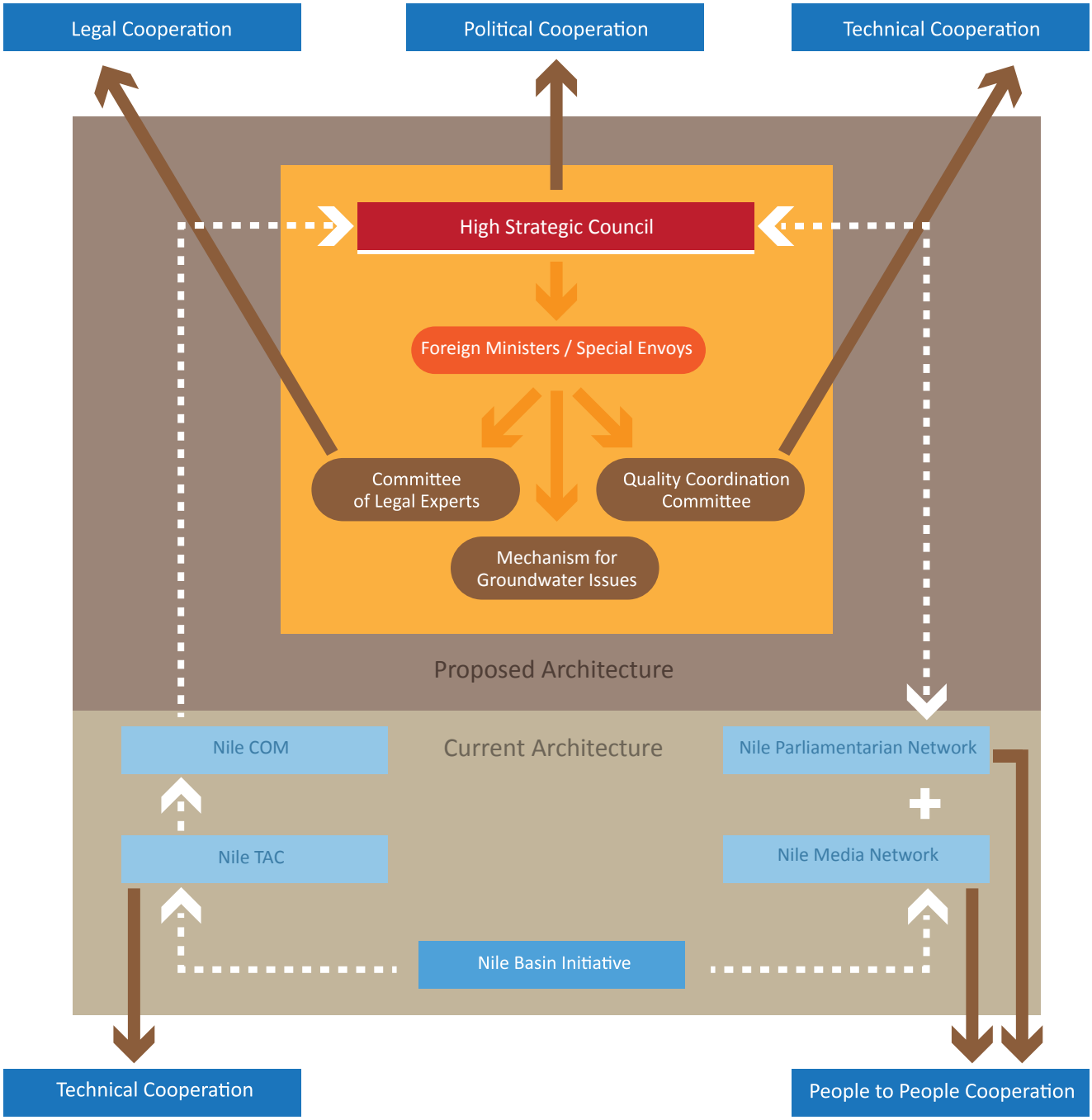
### 2. High Strategic Council should be established to address core issues and a Committee of Legal Experts reporting to the High Strategic Council should be established to address outstanding or ambiguous legal issues.

***First***, it is recommended that a High Strategic Council should be established to address difficult but significant issues which are core to the future of the Nile Basin. The Council should be at the level of Heads of Government and meet once a year. The

## New Architecture for the Nile Basin

Technical Cooperation → Comprehensive Cooperation

∵ Comprehensive Cooperation = Political + Legal + Technical + People to People Cooperation



Heads of Government should designate either Foreign Ministers or Special Envoys to meet during the year, as and when needed. The High Strategic Council should receive political input from the Nile Parliamentary Forum with the latter being restructured as explained in Recommendation 5. The High Strategic Council should receive specialised legal input from the Committee of Legal Experts on outstanding and ambiguous legal issues (Recommendation 2.2) and Quality Coordination Committee (Recommendation 3). The High Strategic Council should also receive input from the Nile Council of Ministers (Nile-COM) who in turn obtain support from Nile-TAC (Technical Advisory Committee) of the Nile Basin Initiative.

***Second***, it is recommended that an independent Committee of Legal Experts be established to consider and clarify the following and similar legal instruments with a view to remove misunderstanding, ambiguity, conflict and to promote cooperation in a manner that will enable sustenance of Nile waters, socio economic development, and environmental sustainability of the basin:

- Comprehensive Framework Agreement, which has been signed by 6 countries and not signed by 4 countries due to discord over Article 14 (b).
- The 1929 and 1959 Agreements on allocation of water share between Egypt and Sudan, which are not acceptable to other countries on the grounds that they were signed when the opponents to these treaties in the Nile Basin were colonized, and the application of these agreements to Republic of South Sudan in the context of the laws on state succession
- Bilateral treaty between Egypt and Ethiopia, signed by Heads of States of two independent and sovereign states in 1993, who are main parties in the Nile dispute, and the question of how it relates to other treaties in the Nile basin
- The application of the Convention on Biological Diversity (CBD) to the Nile Basin countries, and especially CBD signatories in the Nile Basin to examine impact and implications for ecology
- The relevance of African Convention on the Conservation of Nature and other African continental, regional or sub-regional legal instruments such as COMESA and EAC instruments to the Nile basin countries.

Such an independent committee should be established by the mandate of the High Strategic Council, or even Nile-COM if the governments determine that it would be appropriate for such a Committee to precede the High Strategic Council for practical reasons. It should have members from the basin countries as well as independent international experts from outside the basin. It should have a definite but realistic time frame to produce its recommendations.

The Committee of Legal Experts should have two purposes. It should clarify the plethora of laws which can have implications for cooperation in the Nile Basin to propose legal instruments to advance basin-wide cooperation on terms unanimously acceptable to all riparian countries. The Committee should also examine state compliance to the agreements or draft agreements which have been already signed by countries in the Nile Basin and recommend strategies for improving such state compliance.

***Third***, the governments of the Nile countries should begin informal consultations for alternative formulation of the disputed Article 14 (b) of the CFA. One formulation, had informal acceptance of all countries, **without exception of any country in the basin whatsoever** at the Nile-COM meeting in Bujumbura. It can be re-examined with a fresh conflict resolution approach.

- "not to significantly harm **current and future uses and rights** and water security of any other member states." where water security is defined as " the right of all Nile Basin States to reliable access to and use of the Nile River system for health, agriculture, livelihoods, production and environment." (Article 2(f)).

The inclusion of "current uses and rights" should address the needs of Egypt and Sudan. The use of "future uses and rights" should address the needs of the upper riparian countries, while recognising the future needs of the lower riparian countries as well.

If this precise formulation is not acceptable, it may be possible to craft another formulation either directly through informal consultations by the member countries or under the auspices of the Committee of Legal Experts proposed earlier.

***Fourth***, the Nile countries should appoint a specific arbitration mechanism. The CFA does not provide for a specific arbitration mechanism, though its provisions for dispute resolution are based on the hypothesis that the member countries could appoint or approach an arbitration body. Such a vague provision can hinder resolution of disputes. There are two, among others, effective options for appointing an arbitration mechanism.

- The World Bank, which has played critical role in the establishment of the Nile Basin Initiative, can be a designated arbitration mechanism. It may operate in ways similar to its arbitration services to the Indus Commission by receiving requests from member countries and appointing Neutral Experts or Arbitration Committees to address specific issues, as the case may be
- If for some reason, the member countries do not want to depend on the World Bank alone for this purpose, they may appoint an Arbitration Quartet composed of The World Bank, UNDP, European Union and the African Development Bank (or the African Union).

***Fifth***, the High Strategic Council can consider specific sub-regional legal and technical initiatives to address issues arising from specific projects. In 2012, Egypt, Ethiopia and Sudan established International Panel of Experts on Grand Renaissance Dam, also known as the Tripartite Committee of Experts. The Committee comprising of the three countries as well as independent external experts was expected to identify mutually beneficial options for the construction of the dam. In order for such a panel to function effectively and enable cooperation, it is essential that all parties give information in a transparent manner and uphold the principle of mutual accountability. If the Grand Renaissance Dam Tripartite Committee succeeds in achieving results, based on transparency and mutual accountability, it could be a good example for similar Committees to be formed in future.

### 3. Coordination of policies on the quality of water and ecological preservation of water resources and wetlands should be a priority.

Article 6 of the CFA proposes "protection and conservation of the Nile River Basin and its ecosystems" which includes improving the quality of water, protecting wetlands, saving biodiversity as well as restoration of depleted resources. The Article also advocates harmonizing regional policies across the basin to achieve this end. It appears that all countries in the Basin have no problem with this Article. It is therefore recommended that practical measures should be adapted to implement ideas embodied in the Article in letter and spirit irrespective of the future of the CFA itself. These include:

- *Co-ordination of policies related to managing eco-systems:* Harmonization of policies needs to take place at two levels. At the national level, individual countries need to streamline relationship between various ministries and departments responsible for the water quality issues. At the regional level, countries in the basin need to adjust their policies together as they are all dependent on the same water sources and their choices are bound to have impact on the entire basin.
- *Setting analogous targets:* The Nile Basin countries need to identify similar 'base line targets' to achieve, in the context of water quality as well as protection of biodiversity.
- *Economic valuation of the biodiversity:* It is difficult

but helpful to evaluate direct and indirect returns from protecting the eco-systems in monetary terms.

- *Polluters pay:* The Nile River Basin countries need to pool internal and international funds to restore extremely depleted areas. Also, they need to lay a standard for industries in terms of pollution and periodically monitor it. The riparian states need to follow the 'polluters pay' scheme where industries which cause pollution beyond the permissible limit need to pay fines or restore the area themselves.

The Nile Basin countries share similar water pollution issues, such as - oxygen demanding substances, improper sanitation, nutrient runoffs from agricultural activities, and industrial and mining related water contamination. In order to combat these problems, the following measures need to be introduced:

- Monitoring of oxygen demanding substances, COD and BOD, which warm water and reduce water transparency, thus, undermining water quality as well as sediment loads in the catchment of Lake Victoria. Additionally, monitoring contaminants which have bio-accumulation effects in water bodies and affect trans-boundary water resources, including nitrates and phosphates
- Chemical contaminants from industrial and mining activities need closer monitoring as high levels of heavy metal substances like mercury, cadmium, lead, copper, chromium among other chemicals are consumed by fish through irrigated water
- Point sites of pollution such as industrial units need mapping and monitoring using analogous terms of reference in all countries.
- Control of pesticides and fertilizer levels in water bodies is needed. The monitoring of nutrient runoffs can help curb water hyacinth without having to resort to pesticide use
- As recommended by NBI, regional laboratories can be used in the interim period until adequate water quality monitoring sites are developed in all countries
- Current initiatives for controlling water hyacinth in the Lake Victoria region should be expanded to cover as many relevant parts of the Nile Basin as possible.

It is recommended that a Quality Coordination Committee should be established to harmonise legislation, standards, and practices dealing with waste water treatment, water pollution and quality control. Such a mechanism should prepare dynamic inventory of pollutants in different parts of Nile and a public information and warning system. It is recommended that modern management techniques and technologies for the restoration of depleted water resources should be undertaken. It is further recommended that the Quality Coordination Committee should report to the High Strategic Council.

4. **While negotiations in the Nile Basin are focussed on surface water, it is necessary to craft agreements that can prevent future conflict over groundwater and also to manage the relationship between groundwater and surface water.**

The Nile Basin is estimated to have groundwater reserves of 500 BCM. As of now, less than 5 per cent of the groundwater is utilised. However, there is an increasing trend of using groundwater by digging tube wells, shallow wells, and using pumps in some of the Nile Basin countries.

**The need to address trans-boundary aquifers:** Most of the countries get their groundwater through direct precipitation/rainfall to recharge their aquifers or from fossil waters stored in their deep aquifers and through seepage or interaction with surface water. These aquifers extend across various countries. Currently, there is no law governing groundwater, specifically for that which is derived from these shared aquifers. The CFA Article 2 clause (b) includes groundwater in its definition of Nile water resources. However

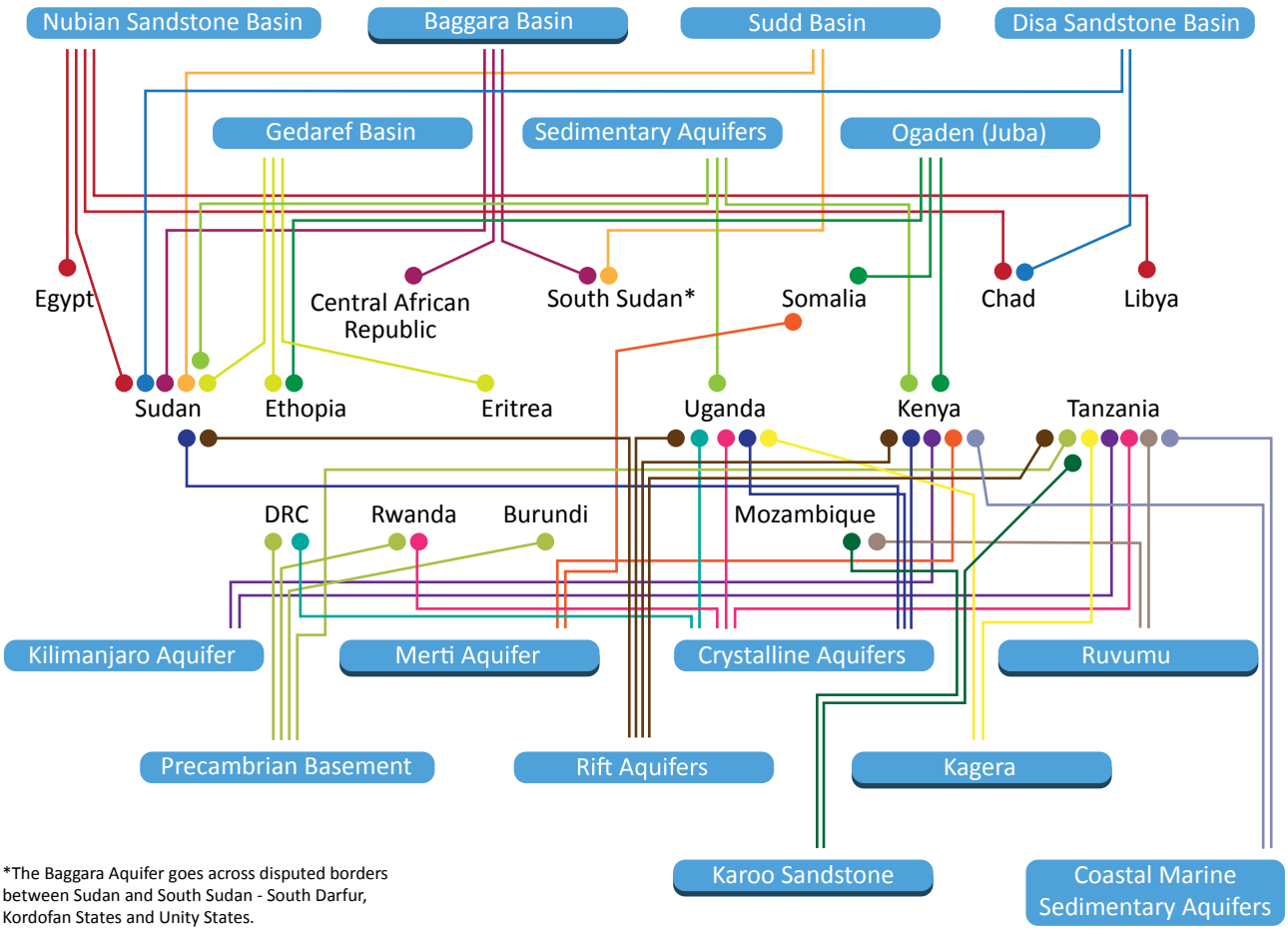
groundwater is missing in most of the political discourse. This issue might crop up in the future as dependence on an aquifer of one country might affect the groundwater levels of the other countries involved. Also, pollution by a country might affect the groundwater in the complete aquifer.

**Understanding the interaction between surface water and groundwater:** It is essential to understand the overlap between the groundwater and surface water and their effects on each other. Surface water pollution may also lead to groundwater pollution. This has been noticed in Lake Victoria where polluted water from the lake had seeped in as groundwater which is of poor quality and unsuitable for drinking purposes. In the coastal regions this overlap may lead to high levels of salinity. Over abstraction of groundwater may lead to reduction in the surface water levels. For instance, surface water levels in Lake Alemaya in the Ethiopian highlands, are gradually declining due to over abstraction of groundwater in the adjoining aquifers. It is necessary to introduce trans-boundary laws to protect the quality of groundwater. Perhaps, this can be done under Article 6 of CFA or under a new treaty on groundwater.

**5. Political infrastructure of cooperation should be created through parliamentarians and media networks.**

The process of cooperation is often difficult for common citizens to comprehend. It is therefore not enough merely for governments to explore means of cooperation in the Nile Basin. It is important to create

Transboundary Aquifers in the Nile River Basin Countries




*The Baggara Aquifer goes across disputed borders between Sudan and South Sudan - South Darfur, Kordofan States and Unity States.

a political infrastructure of cooperation by developing basin wide networks of parliamentarians and media persons.

The parliamentarians represent people and work closely with governments. Some of them may even join governments at some stage. They have legislative authority to introduce and scrutinise bills. They have extraordinary access to ministers. These assets can be utilised in the interest of basin cooperation. Currently, NBI has established NBI Parliamentarians Forum. It had two meetings in the last 10 years. However, these meetings had a few parliamentarians and a large number of civil society and technical representatives. It is necessary to have a parliamentary network, which harnesses the specific strengths Members of Parliament have. Such a network should have Nile Parliamentary groups in national legislatures, which are linked through pro-active and interested members interaction, rather than the current practice of Speakers nominating a couple of members for an occasional meeting.

The media is another important constituent of political infrastructure of any country. There is already the Nile Media Network, which provides meeting space for journalists from Nile countries. Such a network needs to be sharpened and strengthened with emphasis on the following roles:

- Agreements between governments and national media organisations for transparency and free flow of information to one another
- Creating awareness and sensitizing the citizens on water related issues which will increase their involvement and support to the cause of cooperation and improved governance
- Increasing access to information regarding new technologies
- Conscious efforts by media to promote investments in the water sector
- Reaching agreement on reducing mutual hatred and hostile sentiments towards one another
- Reaching agreement on not spreading rumours against one another
- Exchange of media persons to check and verify facts related to issues of misunderstanding.

In case of the parliamentarians as well as the media, there is no need to reinvent the wheel. Existing organisations and networks can be strengthened and reoriented for better results.

**6. In the long term, the Nile Basin countries can aspire to develop regional cooperation with the Nile and its tributaries as a 'regional common'.**

The Nile Basin countries can consider establishing Nile Regional Economic Community. Water is required for irrigation (agriculture), hydro-electric dams (industry), urbanisation, trade, transit and other economic needs. If cooperation in water is integrated into broader regional economic cooperation, it will be possible for parties to appreciate the development needs of one another.

The role of a Regional Economic Community (REC) in Africa has been such that it has helped to develop a level of trust between the countries by working towards economic as well as political integration. The Southern African Development Community (SADC) for example was established to focus on areas of "transport and communication, agriculture, energy and human development". However, over the course of time, its role expanded into "attracting investment into natural resource management, sharing of energy, conflict resolution to cooperation". SADC now has a mandate on Water. In the case of SADC, REC was first established and the vision for water came later. In the case of Nile Basin, technical cooperation in the water sector has already been launched in the form of the Nile Basin Initiative but it can be expanded to cover other aspects of regional integration. Whether a region starts with water or adds water at a later stage in its continuum to evolve a process of cooperation, it is important to note that water is an integrated part

of regional economic dynamics, and not a resource to be utilised in isolation.

The Nile member countries are already members of two regional economic bodies. Countries such as D.R. Congo, Egypt, Ethiopia, Eritrea and Sudan are members of the Common Market for Eastern and Southern Africa (COMESA) while Tanzania is a member of the East African Community (EAC). Rwanda, Burundi, Kenya and Uganda are members of both the organizations with South Sudan expected to join soon. Thus, the Nile member countries have been positively disposed towards institutionalised economic cooperation in Africa. They can draw from their experience of the two organisations, or indeed their analysis of regional cooperation agreements in other parts of the world, to envisage, shape and structure regional economic cooperation agreement in the Nile Basin.

The main difference between the proposed Nile REC and COMESA and EAC is that the latter two, like SADC, are driven by trade and industry agenda, whereas the Nile REC could be driven by water cooperation agenda.

Cooperation in water requires significant trade-offs. Shares of water can be negotiated in exchange for transit, hydro-electricity, agriculture and economic development opportunities. Cropping patterns can be developed on the basis of comparative advantage of natural resource endowment, supported by regional free trade in food and agricultural commodities. The Nile Basin countries should consider establishing a Regional Food Trade Network to formalise informal trade, reduce artificial food scarcity, create regional food buffer stocks, and facilitate judicious balance between food crops and cash crops, as well as drought-resistant crops and water-intensive crops on a regional basis. The NBI has already made small beginnings for regional power trade. The countries are negotiating power trade even outside the formal projects of NBI. Their willingness to explore this avenue demonstrates huge potential for cooperation, trade and joint investments in power sector. The countries can jointly develop eco-tourism opportunities. Once regional cooperation in water, hydro-electricity, tourism and agriculture grows, trans-boundary cooperation in banking and communication will automatically expand.

Such regional cooperation is only possible if the River Nile and its tributaries are treated as a Regional Common by all governments and people in the region. This will mean ensuring sustenance, quality and flow of the river in the best interest of all people and environment of the entire basin.

## Component B- Domestic Governance and Efficiency of Water Sector

7. **Cooperation in meteorological data management, particularly for early warning of floods and drought has proved to be easy to achieve. It should be strengthened and extended to hydrometric data management as a confidence building measure.**

***First***, the Eastern Nile region (primarily Egypt, Ethiopia, Sudan and South Sudan) has always been prone to extreme floods and droughts. Floods are commonplace between July-September, with devastating impact on urban centres. There is a good network of meteorological monitoring stations and practice of institutional cooperation with external space agencies at the national level in these countries. There is also good cooperation between them on early warning data management.

NBI's Eastern Nile Technical Regional Office (ENTRO) in Addis Ababa is coordinating the Eastern Nile Flood Preparedness and Early Warning Project (FPEW) by facilitating meetings and information sharing sessions among the Blue Nile countries regarding river flows, flooding, flood risk maps, weather patterns and emergency preparedness. The objectives of the project are "to establish a regional institutional

basis; to strengthen the existing capacities of Eastern Nile countries in flood forecasting, mitigation and management; to promote regional cooperation and last but not the least, to enhance the readiness of Eastern Nile countries for implementation of the subsequent phases of the project."

In the Lake Victoria Basin of the White Nile, there is Drought Monitoring Centre at Nairobi in Kenya. The functions of the centre include acquiring and managing climate data, monitoring, early warning of extreme climate events, capacity-building, information sharing, and creating new tools, among others.

Despite the existence of institutional infrastructure in Blue and White Nile areas, and extensive cooperation with international organisations both floods and droughts occur regularly with large scale impact on people and environment. It is therefore necessary to improve the efficiency and coordination of the existing data centres and ensure their effective use for the benefit of people through community participation in their work and legislative support for this sector.

***Second***, it is necessary to develop similar national networks and cooperation in data management with regards to hydrometric monitoring stations, including both quantitative and qualitative data on water resources. Currently, there is active cooperation between Egypt, Sudan and South Sudan with a large network of hydrometric stations managed by Egypt. This needs to be extended to other countries. As the first step, it is necessary to prepare a status report on the current hydrometric monitoring capacity of the Nile Basin, identifying specific deficiencies and proposing ways to address them. Since cooperation in quality monitoring requires special effort, this issue is treated separately as an independent recommendation.

8. **All efforts should be made to augment steady and reliable sources of water through canals mitigating effects of evaporation and evapo-transpiration. Waste water treatment, reforestation, watershed development and other techniques that are environmentally sustainable should be promoted.**

***First***, augmentation of water by reducing effects of evaporation and seepage should be explored. A large quantity of water gets evaporated or lost in seepage in the swamps in the Republic of South Sudan and Sudan. Supply-side proposals to create 18 BCM of additional water are already under discussion.

- Jonglei Canal Project: Stage 1-4 BCM, Stage 2-3 BCM
- Bahr El Ghazal Project: 7 BCM
- Machar Project: 4.4 BCM

These proposals need further examination. If they can add value, their implementation needs to be expedited. However, it is also important that the issues of bio-diversity preservation and environmental sustainability are adequately addressed. Since both the implementation and non-implementation of these proposals carries heavy opportunity costs, a decision that balances human, social, economic and ecological interests needs to be taken by the countries directly involved in the projects.

***Second***, reuse of water, rainwater harvesting and treatment of waste water needs to be explored. The reuse of water in agriculture is already practised in some parts of the basin. The expansion of this technique across the basin can be examined. Waste water treatment has maximum scope in industrial and urban areas. Also, in industrial and urban settings capturing and harvesting of rain water can be explored, as being increasingly practised in different parts of the world. Rainwater harvesting is particularly relevant in the Nile Basin because of seasonal nature of rain in many parts of the basin. Rainwater harvesting can be done at a small level in housing societies in cities or at a larger level by communities.

***Third***, in coastal areas small and solar run desalination and brackish water conversion plants

can be established. There is a fascination for large desalination plants in some parts of the world and the Nile Basin countries might be tempted to purchase them but this option has limited application due to heavy financial and environmental costs. It may be possible to establish small plants for desalination or treatment of brackish water which run on solar energy. This can help overcome financial and environmental challenges.

***Fourth***, reforestation can help raise the level of ground water. In the Nile Basin deforestation is taking place at a fast pace, obviously varying from one place to another. It is important to undertake reforestation on a large scale. Nile Basin needs a coordinated reforestation policy.

***Fifth***, well designed soil water conservation strategies are required. They should encourage participation of farmers through associations of small farmers. Care must be taken to construct right kind of bunds as per the density of rainfall. Vegetation, ground cover and check dams should be used where appropriate.

***Sixth***, systematic watershed development can help augment water resources for agriculture. There are many techniques of watershed development.

It is important to assess which specific technique would be optimal for a particular district, depending on the type of soil, terrain, rainfall and other factors. It would be helpful for each Nile country to develop a systematic watershed development strategy and determine most relevant techniques.

**9. All efforts should be made to improve efficiency and governance of the water sector, particularly on the demand side, in individual countries – since domestic actions have an impact on overall water resource balance of the Nile Basin.**

***First***, it is important to improve water efficiency of agriculture and rural areas since agriculture is the main consumer of water in the Nile Basin as in most developing countries. This can be done in various ways, including the following:

- Understand water deficits arising from higher evapotranspiration than precipitation. For instance Rwanda's Irrigation Master Plan studied the relationship between precipitation and evapotranspiration (P/PET) in order to determine areas with higher evaporation which would require irrigation projects for agricultural expansion in order to find the most viable uses of these projects
- Use 'Water Footprint' concept as a tool to calculate real water use in agriculture (and also for industrial as well as commercial use). The tool helps to determine economic costs of efficient and inefficient water use. Determine whether water footprint calculated is environmentally and economically sustainable in the long run
- Construct anti-salinity barrages to improve the quality of water in the river
- Use drip irrigation wherever possible
- Maximise the use of drought-resistant crops, such as drought-resistant maize and rice developed in developing countries.

***Second***, it is important to reduce the unaccounted for water particularly in industry and urban areas. In several countries in the Nile Basin, significant portion of water is lost in conveyance. These include pipeline leakages, irrigation leakages as well as thefts. It is difficult to obtain reliable statistics of conveyance losses, which range from 30 to 50 per cent in different cities in different countries in the Basin.

In some countries water thefts have increased since the drought of 2011. For instance, disconnections of water pipes by thieves who collect and sell water, mugging and some petty thefts of water have become common occurrences in urban slums which lack sufficient access to piped water. As water theft is viewed as a petty offense, there is little judicial consequence of these actions.

Thus, improvement of water infrastructure to improve demand management will also require:

- Setting up water efficiency standards for water supply systems and industrial sector
- Upgrading and modernizing water supply and distribution systems particularly as a buffer during droughts and periods of water scarcity
- Improving energy efficiency in water pumping for urban domestic pipelines
- Minimizing non-revenue water such as controlling illegal connections, conveyance losses, unbilled water connections. In major cities with pipelines suffering from undetected leaks, the installation of remote sensing technologies to detect leaks could go a long way in reducing water losses
- Encouraging partnership between the government, municipal authorities and the civil society in order to increase community's water efficiency and security as well as food security.

Third, the Nile Basin countries will need to address the difficult and unpopular subject of water pricing and draw their own conclusions which are socially, economically and politically sustainable.

**10. The Nile Basin countries should learn from successful examples of other countries in Africa and elsewhere in the world and adapt best practices to their specific requirements.**

The experience of other countries in water governance, conservation, river restoration, quality control, and River Basin management systems in Africa, as well as elsewhere in the world would be of help to the Nile River countries to expand their knowhow and enhance capacity to respond to their challenges collectively and constructively.

The Nile Basin Initiative in the past has undertaken a 'knowledge exchange study tour' to the Senegal River Basin to learn the role of the Senegal River basin organization (OMVS) and identify certain best practices.

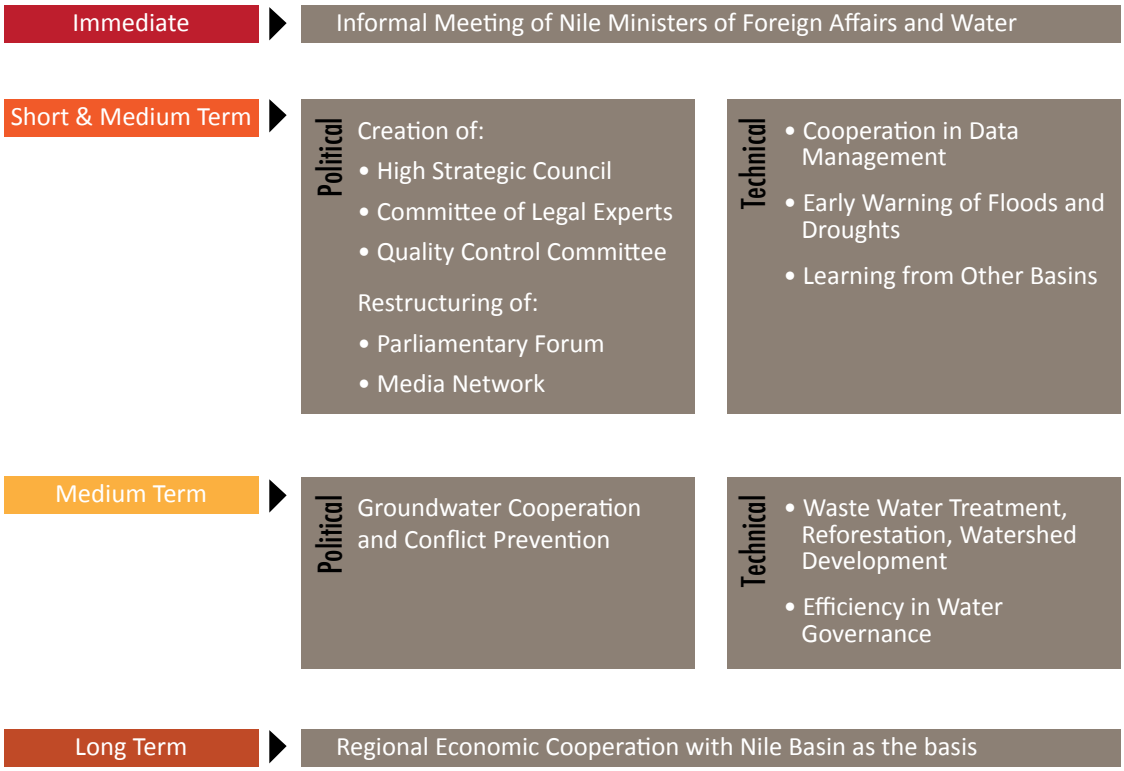
The Nile Basin countries may use the auspices of African Ministerial Council on Water or International Network of Basin Organisations to establish access to some of the countries and basins where they wish to undertake learning journeys.

They may also directly approach countries and regions known for best practices in different aspects of national governance or trans-boundary cooperation of water. For instance:

- Senegal River for trans-boundary water management
- Rhine River for trans-boundary water management
- Southern African Development Community for regional cooperation principles
- European Union (in context of Directive Framework 60) for cooperation in quality control
- South Korea for restoration of rivers
- Singapore for urban water management and waste water treatment
- Indus Water Commission for arbitration mechanism in case of disputes
- Israel for drip irrigation and mitigation of conveyance losses
- Mekong for cooperation in data management.

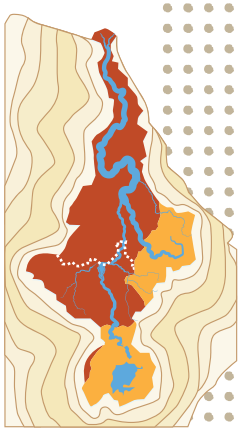
Many of the examples cited above are from developing countries. It is possible to consider other examples from which the Nile countries can benefit. It would be also helpful to learn about new technologies – in particular those using solar energy – in various aspects of water management.

## Process for Enhanced Cooperation



# BACKGROUNDER

## Discharge Scheme in the Nile Basin

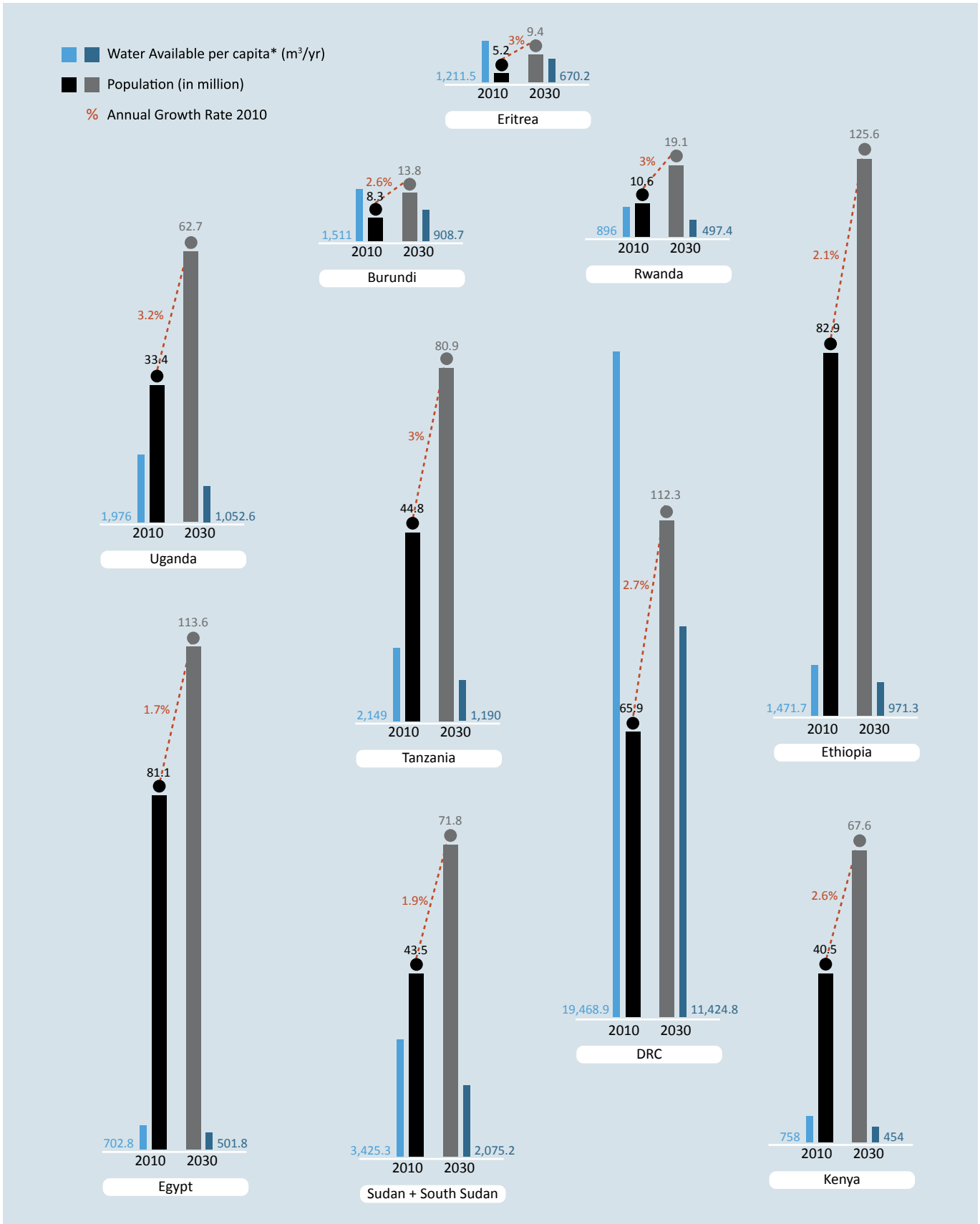



## Water Resources of Nile Countries

| Country | Total Renewable Water Resources (BCM/yr) | Nile Share in Total Water (BCM/yr) | Water to Non-Nile Basin (Internal and trans-boundary river basins) (BCM/yr) |
|---|---|---|---|
| **Rwanda** | 9.5<br>*SW = 9.5*<br>*GW = 7 (overlap of 7)* | 3.47 | 6.03<br>(Congo basin, internal sources) |
| **Burundi** | 12.54<br>*SW = 12.54*<br>*GW = 7.47 (overlap of 7.47)* | 3.37 | 9.17<br>(Congo Basin, internal sources) |
| **Tanzania** | 96.27<br>*SW = 92.27*<br>*GW = 30 (overlap of 26)* | 6 | 90.27<br>(Congo basin, internal river basins) |
| **Kenya** | 30.7<br>*SW = 30.2*<br>*GW = 3.5 (overlap of 3)* | 9.62<br>(including Mara River, Kenya/Tanzania) | 11.08<br>(internal, sources) +<br>10<br>(from Ethiopia's Omo-Gibe basin) |
| **Democratic Republic of Congo (DRC** | 1,283<br>*SW = 1,282*<br>*GW = 421 (overlap of 420)* | 2.19<br>(to Semlike) | 1,280.8<br>(Congo Basin) |
| **Uganda** | 66<br>*SW = 66*<br>*GW = 29 (overlap of 29)* | 29.48<br>to Victoria Nile<br>(4.83 - Uganda torrents to Lakes) + (Contribution from DRC, Kenya, Tanzania, Rwanda, Burundi = 24.65)<br>36.52<br>(retained in Uganda) | - |
| **Eritrea** | 6.3<br>*SW = 6.2*<br>*GW = 0.5 (overlap of 0.4)* | 0.6<br>(from Tekeze) | 5.7 |
| **Ethiopia** | 122<br>*SW = 120*<br>*GW = 20 (overlap of 18)* | 72.99 | 49.01<br>16.1 –to Omo-Gibe Basin<br>30.9– internal sources |
| **Sudan + South Sudan** | 149<br>(Internal = 64.5)<br>*SW = 84.5 + 62.5*<br>*GW = 7 (overlap of 5)* | - 34.96 (retention in the Sudd and evaporation)<br>57 (to Egypt)<br>57.04 (retained in Sudan and South Sudan) | - |
| **Egypt** | 57<br>*SW = 55.5*<br>*GW = 1.5* | 57 | 16<br>(reuse of water) |

*Abbreviations used: SW = Surface Water, GW = Ground Water*

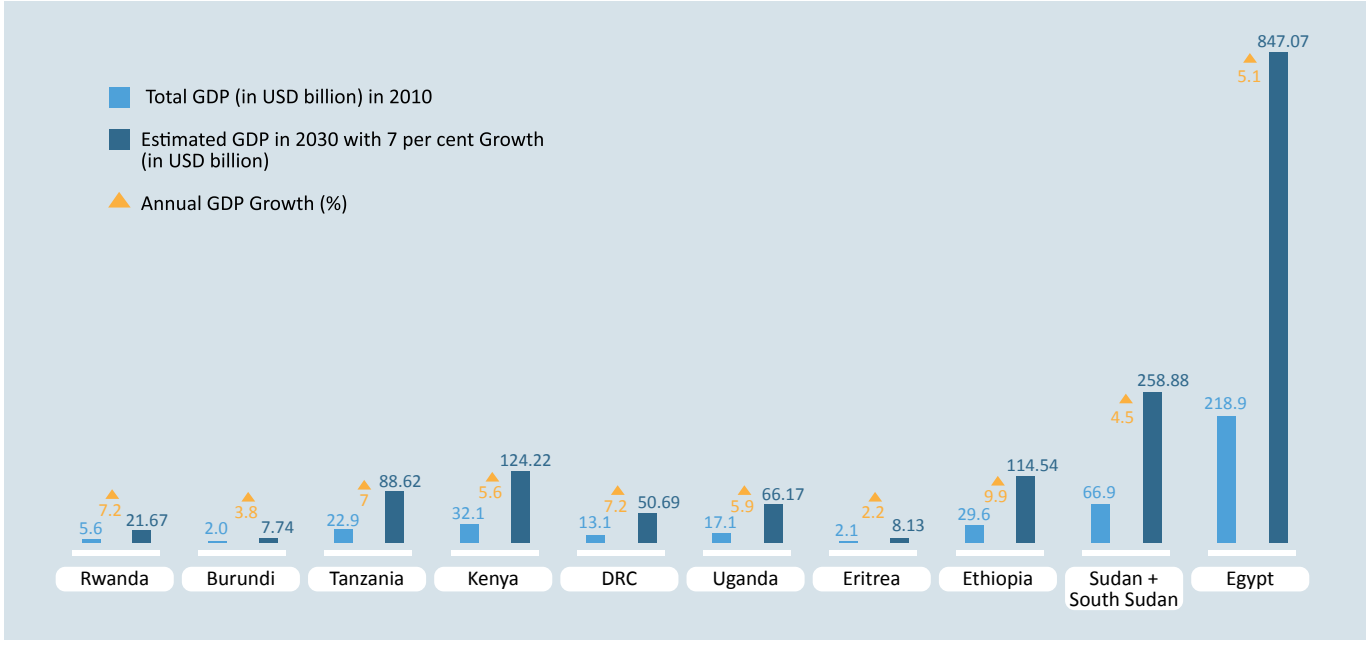
## Changing Population and Availability of Water



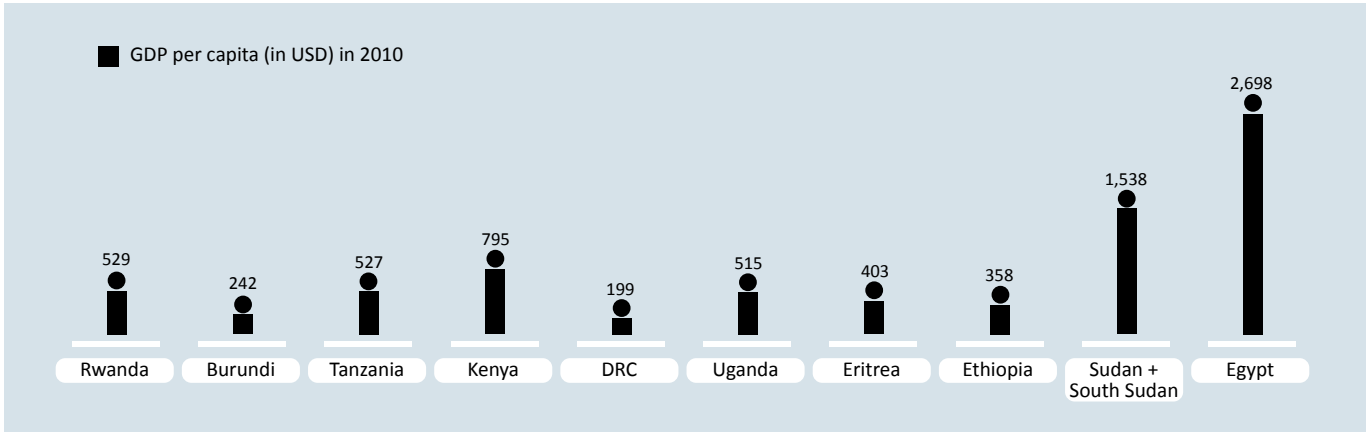

** There are limitations of using per capita availability of water in discerning future water availability*

Per capita availability is generally calculated by dividing total annual renewable water resources with population. While this could provide an accurate picture for countries with no dependency on external water resources, it does not provide an accurate depiction for countries with trans-boundary water resources. Taking into account the dependency ratio of the countries provides a much more realistic depiction of future water resources. For instance, Uganda has a 40.9 per cent dependency ratio for its total annual renewable water resources (Rwanda, Burundi, Tanzania, DRC and Kenya contribute runoff into Lake Victoria). This will be impacted when increased water demand in upstream nations results in reduced water runoffs into Uganda. Egypt which originally had a 98 per cent dependency ratio has been able to bring down its dependency by increasing alternate water resources but still has a 76 per cent dependency ratio (55.5 BCM out of 73 BCM).

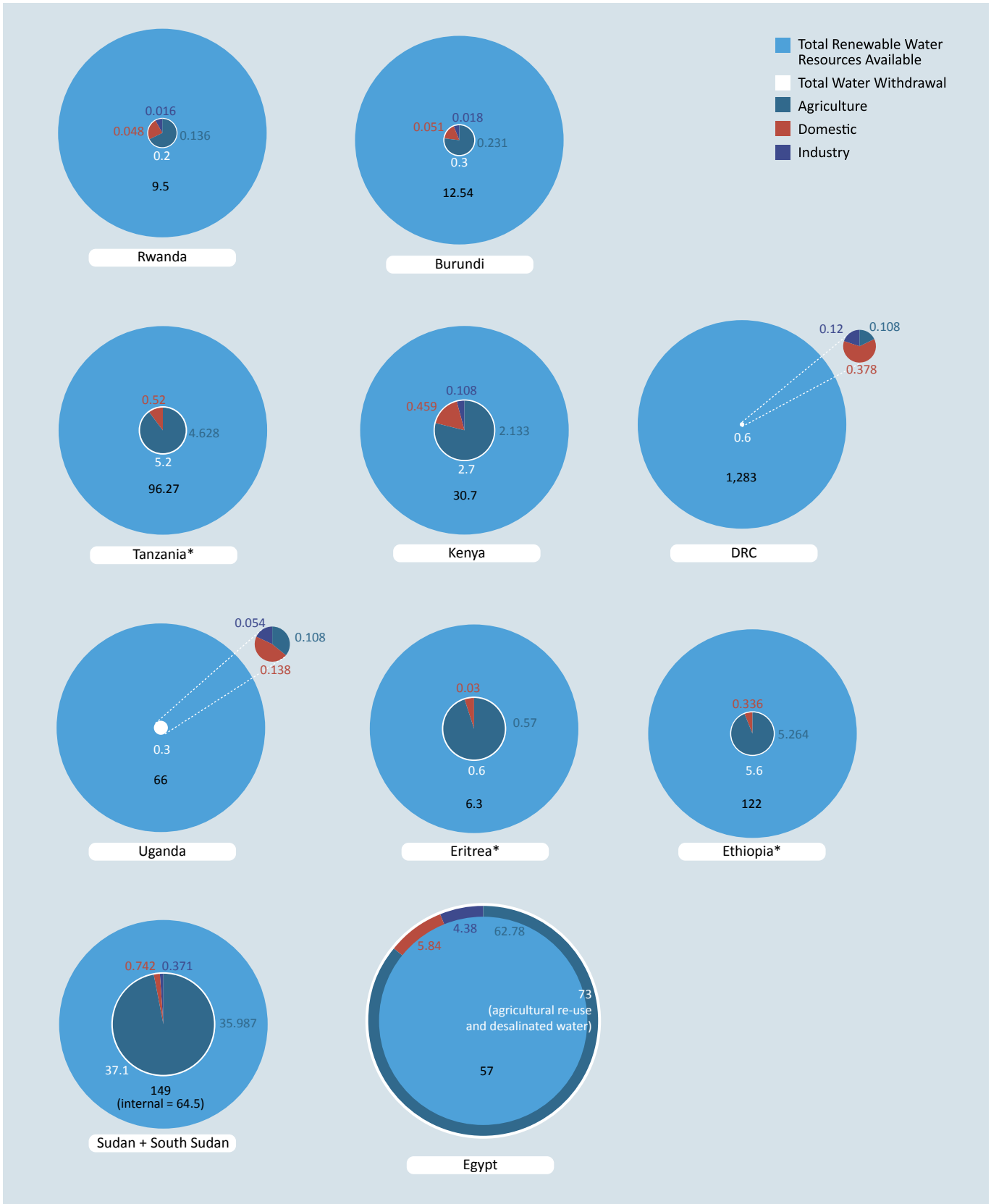
## GDP Growth




*Note: Annual Growth Rate of 7 per cent for 2030 has been used as it is a foreseeable sustainable rate of economic growth in the region.*



## Water Withdrawals (BMC/yr)




** Figures for industry not available.*

## Population and Area of the Riparian Countries in the Nile River Basin