MEDIUM-SIZED PROJECT PROPOSAL

REQUEST FOR FUNDING UNDER THE GEF TRUST FUND

GEFSEC PROJECT ID: 3321
IA/ExA PROJECT ID: 3765
COUNTRY: Burundi, Congo(DR), Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda
PROJECT TITLE: Mainstreaming Groundwater Considerations into the Integrated Management of the Nile River Basin
GEF IA/ExA: UNDP
OTHER PROJECT EXECUTING AGENCY(IES): IAEA
DURATION: 42 Months
GEF FOCAL AREA: International Waters
GEF STRATEGIC OBJECTIVES: IW2-CAPACITY BUILDING FOR INTERNATIONAL WATERS
GEF OPERATIONAL PROGRAM: OP9 Integrated Land and Water
IA/ExA FEE: $90,000
CONTRIBUTION TO KEY INDICATORS IDENTIFIED IN THE FOCAL AREA STRATEGIES:
Undertake innovative demonstrations for addressing water scarcity issues
Programme gaps: water scarcity ; competing water uses and integration of groundwater

FINANCING PLAN ($)		
	PPG	Project*
GEF Total		1,000,000
Co-financing	(provide details in Section b: Co-financing)	
UNDP		-
IAEA	30,000	1,350,000
Government	18,000	1,540,800
Others	6,000	
Co-financing Total	54,000	2,890,800
Total	54,000	3,890,800
Financing for Associated Activities If Any		

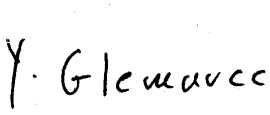
* If project is multi-focal, indicate agreed split between focal area allocations

FOR JOINT PARTNERSHIP**		
GEF PROJECT/COMPONENT ($)		
(Agency Name)	(Share)	(Fee)
(Agency Name)	(Share)	(Fee)
(Agency Name)	(Share)	(Fee)

*** Projects that are jointly implemented by more than one IA or ExA

MILESTONES	DATES
PIF APPROVAL	(actual)
PPG APPROVAL	(if applicable)
MSP EFFECTIVENESS	July 2007
MSP START	October 2007
MSP CLOSING	December 2010
TE/PC REPORT*	December 2010

Approved on behalf of the *UNDP*. This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the Review Criteria for GEF Medium-sized Projects.



Yannick Glemarec
UNDP/GEF Executive Coordinator, a. i.
Date: 8 June 2007

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ACRONYMS

COM	Nile Council Of Ministers
DSS	Nile Decision Support System
GEF	Global Environment Facility
GW	GroundWater
IAEA	International Atomic Energy Agency
IW	Inception workshop
IWRM	Integrated Water Resource Management
LVBC	Lake Victoria Basin Commission
LVEMP	Lake Victoria Environmental Management Project
MDG	Millennium Development Goals
MSP	GEF Medium-Sized Project
NBI	Nile Basin Initiative
Nile Sec	Nile Basin Initiative Secretariat
NTEAP	Nile Transboundary Environmental Action Project
SAP	Subsidiary Action Programme
TAC	Nile Technical Advisory Committee
UNDP	United Nations Development Programme
WRPMP	Water Resource Planning and Management Project

PART I - PROJECT

1. PROJECT SUMMARY

A. PROJECT RATIONALE, OBJECTIVES, OUTCOMES/OUTPUTS, AND ACTIVITIES.

1. The role that groundwater plays in surface water systems (rivers, wetlands, lakes) has not been adequately considered in most transboundary river basin management initiatives, including the Nile basin, supported by the GEF and other donors. Groundwater supports perennial water supply to many wetlands and stream base flow, which is critical for providing refuge for fauna and maintaining biodiversity. In addition, large wetland areas, such as the Sudd swamp in Sudan, are an important component in the local/regional atmospheric water cycle. In the context of the Nile, the Sudd swamps presently considered to be fed by river water and therefore a source of large evaporative water losses. However, recent studies indicate that swamps in the Nile basin may in fact be fed by groundwater. Evaporation from the swamps may, therefore, play a less important role in the water budget of the rivers and lakes. Yet, evaporation from larger swamps such as the Sudd may be a significant source of moisture for regional precipitation such as in the Ethiopian Highlands. Substantial changes in wetland surface area may also impact the atmospheric water cycle and precipitation regime as a result of changes in soil wetness and land-atmosphere interactions. Thus, information about the role of groundwater, in particular its contribution to water balances in lakes, rivers, and wetlands is crucial for determining equitable and appropriate water allocations and water resource management strategies.

2. The objective of this project is to begin to fill in this gap by enhancing national and regional capacity to add a "groundwater dimension" to joint management of the Nile basin. It will complement two on-going projects that are part of the Nile Basin Initiative (GEF/WB/UNDP Nile Transboundary Environmental Action Project and the Nile Water Resources Planning and Management Project) and one on-going GEF water management project for Lake Victoria, that presently lack a groundwater dimension. A second but equally important objective will be to define an approach to groundwater planning and management that can be instituted in the Nile and could also be replicated in other international river and lake basins. This would fulfill GEF targeted learning objectives for transfer to other GEF funded International Waters projects.

3. More precisely, the development objective of the project is to *provide the scientific basis and necessary institutional and policy support for incorporating a groundwater dimension into planning and management of the Nile basin ecosystem as an essential component of sustainable development of the Nile Basin*. In support of the development objective there are four immediate objectives:

a) improve the assessment of groundwater-surface water interactions towards strengthening protection of key ecosystem resources as well as the gains from and losses to groundwater on rivers and lakes in the Nile basin;

b) enhance the characterization of the role of groundwater in wetlands and of the Sudd Swamps in the regional water cycle;

c) improve the use of water balance models in estimating basin-wide annual and monthly water balances in the Nile basin as an input to water planning and management;

d) Facilitate the inclusion of groundwater considerations into integrated Nile basin water resources planning and management activities and to ensure a common understanding of groundwater issues and analysis among the riparian countries.

4. This project will expand/scale up an on-going but nearly completed IAEA-supported groundwater project using isotopic techniques for data collection and analysis in the Nile basin. The results of the IAEA-supported project, particularly the conclusion that groundwater is an important source of water in large lakes and wetlands in the Basin, serves as "proof of concept" for this approach that will be utilized in this project. The UNDP/GEF funding will be matched with cash co-financing by the IAEA in addition to co-funding to be provided by the national governments as well as associated activities of the Nile Basin Initiative – such as the Decision Support System.

5. A key element of this project will be the building of national capacities to conduct groundwater assessments, assess new information and to incorporate it into current water management frameworks. Coordination meetings in the respective components will in most cases include a training component (supported by IAEA co-funding.) National teams will thereafter be working to apply new learning in actual activities (sampling, data collection and analysis, networking, building policy linkages etc.) representing in part, a hands on learning by doing approach.

KEY INDICATORS, ASSUMPTIONS, AND RISKS

6. Key indicators are highlighted in the log frame in Annex A. As per its development objective, this project aims to build capacity and pave the way to the mainstreaming of groundwater dimensions into the management of the Nile Basin. Expected results and indicators relate to capacity development, availability of data based on scientific assessment, proper analysis and integration of this data into water budgets, models and decision support systems and finally the initiation of policy level debates on the correlation between surface/groundwater and transboundary water management approaches.

7. There is a key assumption that sampling can be carried out in all planned areas in the basin with an associated risk that the planned groundwater assessments can not be undertaken in some areas of the basin due to lack of on the ground support from participating countries and/or due to difficulties in gaining access to remote areas as a result of political instability e.g. the Sudd Swamp areas. This will be mitigated by integrating national expert teams into the planning and execution of sampling activities as well as assessment of results. Concerning areas of instability, this will be mitigated by establishing contacts with those organizations already active in these areas e.g. in the Southern Sudan region linkages will be made with UN organizations as well as other international organizations so as to utilize the logistical network and support that has already been set up in the region.

8. There is an assumption that the project can be successfully integrated into the NBI framework. Given the extent of activities and interlinkages among the NBI activities,

there is a related risk that delays incurred within the NBI or difficulties related to the synchronization of activities of the Nile GW with those of the NBI might result in poor integration of the project. Cooperation with NBI is already well established in the frame of the IAEA's previous work related to the Nile (2003-2006) and the on-going UNDP support to the NBI through NTEAP and the cooperative framework negotiations of the Nile COM. Furthermore, NBI representatives were involved in the project formulation meeting (May 2006) as well as in the review process of this MSP. Efforts have been made to utilize existing NBI network (s) e.g. TAC representatives, to assure appropriate integration. The Nile Sec has been consulted in the preparatory process and efforts will be exerted during project implementation to schedule meetings related to the MSP together with other relevant Nile Basin meetings. Finally, rather than creating its own database and generating a separate model, the project data will be built into the Nile DSS and the modeling component will support that of the WRPMP.

2. COUNTRY OWNERSHIP

C) COUNTRY ELIGIBILITY

9. All participating countries are eligible for both UNDP and GEF funding under para 9(b) of the GEF Instrument; all countries are also participating in the GEF Nile Transboundary Environmental Action Project (NTEAP) as well as the associated NBI project on Nile Water Resources Planning and Management.

D) COUNTRY DRIVENNESS

National priorities

10. All Nile basin countries have shown their commitment to cooperation in joint management of the Nile basin by participating in the Nile Basin Initiative (NBI) approved at the level of the Nile Council of Ministers for Water Affairs; the NBI is a regional partnership supporting a 'strategic action program' with two complementary components; the 'shared vision program' and the 'subsidiary action program'. As a commitment to the NBI, riparians are financially supporting the Nile Sec, despite it being a transition mechanism. A cooperative framework, which has been on the negotiation table for the past 10 years, is nearing conclusion leading to the formal commitment by all 9 countries and the establishment of a permanent Nile organization.

11. Three countries in the Nile Basin, Kenya, Tanzania and Uganda, are participating in the GEF/WB Lake Victoria Environmental Management Project.

12. Lastly, six countries, as members of the IAEA, have demonstrated their commitment by active participation in the IAEA-supported Technical Cooperation project (RAF/8/037) on the groundwater dimension of Lake Victoria and parts of the lower Nile basin. Based on the interim results of this initiative, the countries have suggested "up-scaling" the project to refine and add a groundwater dimension to planning and management activities for several key areas of the Nile basin.

13. At the programmatic level, and in light of the close conclusion of the cooperative framework on the Nile, all countries are committed to further the understanding of groundwater both at the national and regional levels. They required capacity building in groundwater assessment to (i) help meet water demands at the national levels while (ii) reducing stress and demand on the Nile Basin and its critical ecosystems.

Relevant on-going basin-wide technical cooperation projects

Nile Basin Initiative

14. Formally launched in February 1999 by the Council of Ministers for Water Affairs of the Nile Basin States, the Nile Basin Initiative (NBI) provides a unique forum for the countries of the Nile basin to use a cooperative process to realize tangible benefits in the basin and build a solid foundation of trust and confidence. Agreed as a transition mechanism, the NBI serves as a platform for co-operation and building working relationships between riparian countries, provides an arrangement by which to move forward from discussion to action and implements the 'strategic action program'. The 'strategic action program' has two complementary components: (a) a shared vision program that consists of basin-wide projects to help create an enabling environment for action on the ground and (b) a subsidiary action program that consists of sub-basin projects to support development projects that involve two or more countries.

Nile Trans boundary Environmental Action Project

15. The Nile Transboundary Environmental Action Project (NTEAP) is the largest project in the 'shared vision program' of NBI. Its aim is to provide a strategic framework for environmentally sustainable development in the Nile River Basin and support basin wide environmental actions linked to transboundary issues. It consists of five components: institutional strengthening, micro-grants, environmental education, wetlands and biodiversity and water quality monitoring. It has total funding of US$ 43.4 million (US$8.0 from GEF/WB and 18.49 from GEF/UNDP, remainder co-finance) and has duration of five years (October 2003 to September 2008).

16. There are no identified groundwater considerations in the two relevant project components -- wetlands and biodiversity conservation and basin-wide water quality monitoring. However, the need for possible linkages has been noted as an omission because it is now recognized that both groundwater and surface water need to be considered in all aspects of water resources management and that wetlands are in most cases being at least partially sustained by groundwater. In this connection it is important to identify transboundary groundwater sampling stations, which would complement the already agreed Nile transboundary surface water sampling stations being agreed in the frame of activities of the NTEAP.

17. During the project formulation meeting, discussions were held between NTEAP staff and IAEA representatives to identify specific linkages with NTEAP activities. NTEAP proposed that groundwater data and the findings derived from water balance models would be important inputs into all four project components: (a) wetlands and bio-diversity conservation; (b) basin-wide water quality monitoring: (c) micro-grants (funds for protection of groundwater sources); and (d) environmental awareness. (See

Annex E: meeting report). During project implementation and depending on the extent to which these components have advanced, only selective, focused and productive collaboration will be pursued.

Nile Basin Water Resources Planning and Management (WRPM)

18. The Nile Basin Water Resources Planning and Management (WRPM) project is designed to ensure that the water resources of the Nile basin are developed and managed in a way that is equitable for all countries, optimizing mutual benefits wherever possible, and be available for future generations. It will assist countries to collectively identify and prepare multi-country water resources projects based on sound information and decision-making tools for potential investment. It has four components: (a) water policy good practice guides and support, (b) Nile basin decision support system (DSS), (c) project planning and management good practice guides and support and (d) regional coordination and facilitation. The project is funded at US$ 32.9 million project (NBTF –US$ 23.7 million) and has a duration of six years.

19. The objective of the DSS is to develop an analytical capacity that supports planning and management efforts on regional, sub-regional, and national levels in a sustainable manner. The DSS will provide a platform for sharing knowledge, understanding river system behavior, evaluating alternative development and management schemes, and supporting informed decision making from a regional perspective.

20. An essential element of the DSS is the regional river basin planning model to assist in the evaluation of alternative development scenarios and the identification of joint investment projects at the sub-regional and regional levels. An understanding of the hydrology of the various sub-systems of the Nile basin is an important first step in the development and implementation of a regional river basin planning model. One area for which there is a clear gap in hydrological information pertains to the role played by groundwater in sustaining surface water systems, i.e. rivers, wetlands and lakes. This area will be supplemented through this MSP.

21. During the project formulation meeting, discussions were held with WRPM staff to identify specific linkages with WRPM activities. The staff identified the assembling of existing groundwater data, as well as collecting new data, for key areas of the Nile basin as an important input into the river basin planning model. Without the data and modeling information generated by this project, there will be only limited and non-systematic data on groundwater available for the planning effort. Identification of the contribution of groundwater to streams, wetlands and lakes will allow for a more complete and comprehensive application of the river basin planning model. (See Annex E: meeting report.)

Lake Victoria Environmental Management Projects I and II

22. The Lake Victoria Environmental Management Project (LVEMP) phase I is addressing the major threats facing the Lake Victoria ecosystem, including over-fishing, eutrophication and algae levels, pollution, and alien invasive species like the water hyacinth. Actions include (a) regional cooperation in fisheries research, extension and management; (b) research and monitoring of water quality and

pollution, strengthening and harmonization of pollution regulatory, incentive and enforcement systems, and priority investments in waste water management; (c) monitoring and sustainable use of wetlands; (d) control of water hyacinths; and (e) management of land use in the catchment, including soil conservation and afforestation. The project is funded at US$ 79.4 million project (GEF/IBRD input of US$36.8 million) over nine years (1997-2006).

23. Although this project is holistic in nature and covers several water-related topics, groundwater issues are not being addressed under the two most relevant components -- water quality and wetland management.

24. LVEMP II is under preparation by the Lake Victoria Basin Commission for follow-up funding by World Bank/GEF. It is expected to start in July 2007 and have a duration of five years. While groundwater considerations were not included in the LVEMP phase I, the Commission plans to include them in LVEMP phase II. These considerations are: (a) groundwater development potential in different aquifers; (b) investment required and (c) capacity enhancement. Currently, only two of the above considerations, investment studies and capacity enhancement, will now be included in LVEMP II.

25. During the project formulation meeting, discussions were held with LVBC staff to identify specific linkages with LVEMP phase II activities. The staff identified the generation of essential groundwater data for use in LVEMP phase II planning activities as a priority area for linkage between the respective projects. Doing so would complement the assessment of groundwater development potential in different aquifers. (See Annex E: report from the workshop.)

<u>RAF/8/037 Sustainable Development and Equitable Utilization of the Common Nile Basin Water Resources</u>

26. This IAEA funded project aims at showing the usefulness of isotope techniques as a tool for collecting data on water balances of lakes and their interaction with groundwater systems. The results will be an improved though still incomplete understanding of the hydrology and hydrogeology of selected parts of the Nile. This project received US$ 749,000 in funding for a duration of four years (2002-2006). The experience gained in this project formed the basis for the design and costing of this MSP.

27. Most of the activity to-date had focused on a water balance of Lake Victoria and the surrounding wetlands, in particular quantifying evaporation fluxes using a range of isotopic methods. The results show that there is significant groundwater input to Lake Victoria (the precise amount is yet to be determined) and that no significant groundwater losses occur. Furthermore, isotopic data show the adjacent wetlands at the fringes of Lake Victoria are sustained by groundwater and not lateral flow from the lake. Other results show that the isotopic composition of the White Nile at Khartoum can be much more depleted than that from the outlet of Lake Victoria indicating significant inflows of other water sources to the main stem. One of the larger implications of this result is that the Sudd swamps may not contribute as much

to the surface water loss by evaporation as has been assumed to-date, which is a critical issue for Nile basin management that this project aims to clarify.

3. PROGRAM AND POLICY CONFORMITY

E) PROGRAM DESIGNATION AND CONFORMITY

28. The GEF International Waters focal area Strategy (Draft March 12, 2007) has identified four global priority concerns. This proposed MSP relates to "*Strategic Program III: Addressing overuse and conflicting uses of water resources in transboundary surface and groundwater basins"*. The project will serve to demonstrate how to "mainstream" groundwater considerations into the management of river basin systems. It will show how to develop and integrate an appropriate scientific and technical understanding of groundwater/surface water interactions in the Nile System, while also working to develop the appropriate policy and management linkages with the retained development options – e.g. agriculture or power.

29. Gaining a better understanding of the groundwater dimension of the Nile will allow countries to work collectively in managing not only the shared river resources, but also in protecting groundwater dependent ecosystems (wetlands). By including the groundwater dimension, a more comprehensive integrated water resources management (IWRM) approach will be supported. This project will have high replication potential given that there are numerous freshwater system initiatives that have not, to date, appropriately included groundwater considerations into their water management activities.

30. Given the foreseen climate impacts on water resources in Africa, groundwater use, development and protection might prove to be one of the key adaptation mechanisms to cope with the climate fluctuations. By enhancing regional and national capacities in groundwater assessment, management and linkage with surface water and policy making, this project will contribute to enhancing the ecosystems', countries' and NBI's resilience to climate change.

31. Finally, the integration of groundwater dimensions into the Nile Basin might help reduce tensions between development sectors, such as agriculture and power generation by providing an alternative source of water. It also indirectly contributes to the achievement of MDG 7/target 10 – Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation – by generating information which can be used towards the development and protection of GW.

F) PROJECT DESIGN (INCLUDING LOGFRAME AND INCREMENTAL REASONING)

Sector Issues

32. Groundwater is critical in sustaining surface water flows and wetland water levels, particularly during periods of low or absent rainfall. Regionally, wetland areas serve vital developmental (e.g. water supply and flood control), ecological (e.g. aquatic habitats) and socio-economic (e.g. fisheries, tourism) functions and without groundwater, these functions will cease to be performed.

33. A conceptual model of the Nile basin identified groundwater as a small component of inflow and outflow to rivers and lakes and stated that wetlands are maintained by intermittent flooding from surface waters (Sutcliffe and Parks, 1999).[1] However, there is little or no evidence to substantiate or refute this assumption. Because the Nile has a number of dams and reservoirs on the main stem and the eastern tributaries, with releases during what would normally be periods of base flow, hydrographic analysis cannot provide explicit information on groundwater base flow.[2]

34. Isotopic analysis, however, can provide this information because it shows the explicit partitioning of groundwater and surface water. Furthermore, the extent of exchange between surface water and groundwater or residence time of river water within the alluvial groundwater system can be determined by the large differences in the isotopic concentrations between surface and groundwater in the Nile Basin system. A particular advantage of environmental isotopes over other methods is that where frequent surface water monitoring is not practical, one or two sampling campaigns can yield a significant amount of information about the water system.

35. Nowhere is the use of isotopic analysis and associated water balance models more useful and timely than in the largely inaccessible Sudd swamp area in Sudan, which is the largest wetland in Africa (30,000 square kilometers) and an important Ramsar site. Even though much remains to be understood about the hydrology and ecology of this extensive and valuable wetland, it is clear that the lakes, swamps and marshes of the Sudd buffer stream flows and thus help spread the flow of the Nile over the entire year.

36. Improved understanding of the water balance in the Sudd swamp, and other areas as well is needed because of the continuing interest in completing the Jonglei Canal, the construction of which was started in 1978. The Jonglei Canal was planned to be 360 km long, but the project was terminated due to political issues after 240 km had been constructed. It goes from Bor to the north up to the area where the White Nile and the Sobat rivers join just south of Malakal.

37. Proponents of the project suggest that the canal, if completed, would increase water flow into Lake Nasser by allowing the flow of the White Nile to bypass a large portion of the swamp. As a result, there are estimates that an approximate annual savings of 4 billion cubic meters of evaporative losses in the swamp could be achieved. Construction of the canal was halted in 1984 due to political instability. Even though its future completion seems presently far from certain due to resistance from the local population and environmental concerns, it was included as a possible water development option in the 2005 National Water Resources Plan for Egypt.

38. Additional information about the importance of and threats to important Nile basin wetlands are summarized in Annex F of this project document. The information is taken from the Nile River Basin 'Transboundary Environmental Analysis'.

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[1] J.V. Sutcliffe and Y.P. Parks (1999) The Hydrology of the Nile, IHAS Special Publication Number 5, Gibb Water: Reading UK.

[2] In most water balance models, all flows are lumped as runoff with no attempt to distinguish between the contribution of surface water run-off and groundwater. The use of isotopes in the water balance model equation enables a distinction between these two contributions (components).

39. In addition to sustaining important aquatic ecosystems, groundwater also plays a significant role in domestic water supply and development with, in many cases, potential for expansion. Access to clean and safe water from groundwater leads to improved health and has a direct and immediate impact on the quality of life, thus contributing to long-term socio-economic development of a country and reduction of poverty. This also highlights the need to appropriately protect groundwater resources from contamination. The importance of groundwater as a source of water supply in the countries participating in this project is described, to the extent that data were available, in the following country profiles.

40. Lastly, groundwater is used for irrigation, primarily so by Egypt among the nine countries participating in this project. To the extent that information was available, the role of groundwater in irrigation is also described in the country profiles.

Country Background

Egypt

41. *Institutional Arrangements*: The Groundwater Directorate in the Ministry of Water Resources and Irrigation is the apex organization responsible for the collection and analysis of groundwater information. There is a central directorate for the Nile River with two general directorates; one for the Nile Delta and one for the Nile Valley.

42. The objectives of Egypt's water policy are to: (a) protect surface water and groundwater from pollution; (b) regulate water demand; (c) use a holistic approach to water management that considers all water resources and use sectors; (d) locate, identify and develop new water resources; (e) raise water use efficiency by (i) promoting conjunctive use of surface water and groundwater, (ii) controlling unplanned use and depletion of groundwater; (iii) promoting water recycling; and (f) increasing water use effectiveness.

43. *Groundwater information*: An overall view of groundwater data availability can be found in the 2005 report, 'Water for the Future: National Water Resources Plan 2017' of the Ministry of Water Resources and Irrigation. Several reports on groundwater issues are cited in the Plan.

44. *Use of groundwater*: Groundwater is used for irrigation and water supply in the Nile Valley, the Western Desert, the Sinai, and the Eastern Desert. The current total quantity used is in the order of 0.7 billion m^3/year. (In comparison, Egypt extracts fresh water from the Nile amounting to 55.5 billion m^3/year). It is planned to increase this amount of groundwater withdrawn to 3.5 billion m^3/year by year 2017. Groundwater is estimated to account for 17 per cent of the raw water used for drinking water supply.

45. *Surface water and groundwater contribution to the Nile basin*: In terms of current abstraction, the most important aquifer in Egypt is the Nubian aquifer (about 87 per cent of the total groundwater abstraction in Egypt). While the Nubian groundwater is mostly fossil water, there is some recharge in the fringes by bank infiltration from the

Nile and from the infiltration of excess irrigation water. The source of this irrigation water is mostly Nile water released at Aswan. As a result, Nubian groundwater in the vicinity of the Nile is not considered to be a separate resource compared to the surface water in the Nile.

46. *Threats to groundwater system:* The quality of groundwater in the Nile basin is generally still fairly good. However, in some shallow groundwater bodies, pollution, primarily from return flow irrigation, has reduced its suitability for raw drinking water (presently, about 20 per cent of the groundwater in the Nile aquifer does not meet the standards for drinking water supply). Especially in the fringes of the Nile Valley and Delta, where there is no protective clay cap, the groundwater is highly vulnerable to pollution.

47. *On-going and planned projects to assess groundwater*: A UNDP/GEF MSP, 'Action program for the integrated management of the shared Nubian aquifer', started in June 2006; Egypt is one of the four participating countries. Egypt is also participating in the on-going IAEA regional groundwater project of the Nile. The Eastern Desert Groundwater Project is a UNDP/GEF pilot project looking into groundwater in deserts and the potential for channeling flash flood waters for their recharge.

Ethiopia

48. *Institutional arrangements*: The Ministry of Water Resources is responsible for overall formulation of water policy and strategic plans. Groundwater and surface water resources assessment and development are carried out by legally accredited institutions such as the Department of Hydrology in the Ministry of Water Resources; The Ethiopian Geological Survey; several local and international NGOs; regional water bureaux etc. The regional water bureaux are under the regional governments Mines-Energy and Water Departments. Capacity Building under the international donation program has also initiated independent institutions, the major one being the National Institution for Groundwater Studies and Training supported by the Japanese Government.

49. *Groundwater information:* Initiation of groundwater study dates back to 1960s when the United State Bureau of Reclamation initiated hydrological gauging stations and produced the first basin scale Master Plan Study on surface and groundwater resources of the Blue Nile Basin. Following this, other Master plans for major river basins in 1970s generated important regional information on the Awash and the Rift Valley drainage basins. One of the prominent works is the UNDP project on the Ethiopian rift geothermal waters. Other independent geological studies resulted in geological maps of specific interest, the most prominent of which is the geological map of Ethiopia compiled and prepared by Kazmin in 1973. Using pre-existing geological and hydrogeological information and new field data, a general hydro-geological map and report on water resources of Ethiopia was prepared by the Ethiopian Geological Survey in 1990. Large-scale hydrogeological maps at 1:250 000 and accompanying reports have also been prepared by the Ethiopian Geological Survey for areas of particular interest.

50. *Use of groundwater*: Groundwater provides more than 80 per cent of domestic water supply in the country. Almost all the major cities (population size from 50000 to 3 500 000) of the country (Addis Ababa; BahrDar; Diredawa; Harar; Mekele; Nazareth; DebraZeit; Jimma; Awassa) and industries located therein obtain 30 to 100 percent of water supply from groundwater. In some localities (e.g. the alluvial valleys bordering the rifts) groundwater abstracted via drilled wells is being used for irrigation purposes. The previous master plan studies and ongoing investigations have identified areas where groundwater can be used for irrigated agriculture. The areas include the alluvial aquifers bordering the rifts; the volcanic aquifers underlying the Ada plain south of Addis Ababa and the foothill of the Choke mountain chain occupying much of the Central Blue Nile basin where several cold springs emerge.

51. *Surface water and groundwater contribution*: The Ethiopian plateau is estimated to contribute more than 65 per cent of annual flow and 80 per cent of the summer flood of the Nile. Three tributaries emerge from the Ethiopian plateau to later join the Nile. These are the Baro (Sobat), the Abay (Blue Nile) and the Tekeze (Atbara). The former feeds the Sudd swamp. Groundwater contribution to the surface waters of the Blue Nile or vice versa is not known.

52. *Threats to groundwater system*: Documented threats to groundwater system include pollution in urban areas by industrial and domestic effluents and nitrate pollution of cold springs and wells due to lack of well head protection. Threats by agricultural activities (pesticides and herbicides) are not documented. The impact of over exploitation has been locally documented (e.g. the rapid shrinking of Lake Alemaya due to abstraction of groundwater from adjacent aquifers.)

53. *On-going and planned projects to assess groundwater*: (1) JICA is currently investigating groundwater potential in areas between Butajira and Ziway (Ethiopian rift); (2) UNICEF is undertaking several activities in water resources development; rehabilitation and sanitation; (3) the French Government is sponsoring an assessment and modelling of groundwater in the Rift Valley volcanic aquifers of Ethiopia; Kenya and Djibouti; (4) Ethiopian government study of the volcanic aquifers of the Ada Plain to use groundwater for irrigation and (5) the "Ethiopian Groundwater Resources Assessment Programme (EGRAP)". A national workshop supported by the IAEA was held in October 2000 and brought together a number of stakeholders to discuss the country's future strategy for water resources development. It was decided to create a 12 year national master plan entitled: "Ethiopian Groundwater Resources Assessment Programme (EGRAP)". In this context, three IAEA-supported projects on groundwater identification using isotopes, on groundwater and geothermal assessment of the Afar depression and bordering highlands and master plan for the Genale-Dawa river basin are ongoing. In addition, the Ethiopian National Groundwater Database (ENGDA) was developed with IAEA support, into which all groundwater data are being collected. There are current efforts to upscale the implementation of EGRAP towards a more comprehensive integration of groundwater considerations into Ethiopian national water resources management.

Kenya

54. *Institutional arrangement:* The Water Resources Department in the Ministry of Water and Irrigation is the apex organization responsible for the collection and analysis of groundwater data in Kenya.

55. In 1999, the Government developed and adopted the National Water Policy through Sessional Paper No 1. Subsequently, the Water Act 2002 was enacted and two water strategies formulated for improved water resources management and service provision. The Water Act 2002 provides for the establishment of the Water Resources Management Authority. This Authority is in charge of water resources management issues such as water apportionment and allocation, source protection and conservation, water quality management and pollution control.

56. *Groundwater information*: The National Water Resources Database (NAWARD) was established in 1993 as part of the National Water Master Plan. Under NAWARD most of the existing data were integrated into one system to handle various types of data related to water resources management. A limited (incomplete) amount of groundwater data and information is available in this database. There is a generalized hydrogeological map of the country prepared at 1:1,000,000 scale and other hydrogeological maps at different scales for various areas.

57. *Use of groundwater*: Groundwater has been the fundamental resource allowing for the economical and rapid development of the rural population across extensive areas of Kenya. Groundwater is used for domestic, industrial, irrigation, livestock, wildlife and geothermal generation purposes.

58. Groundwater in Kenya is harnessed through boreholes or shallow hand dug wells. Records available at the Water Resources Department indicate that boreholes in Kenya have been drilled since the mid 1920s and that over 15,400 boreholes had been drilled by 2006. Of these boreholes, 53 per cent have been drilled for public water supplies, 24 per cent for agricultural, 5 per cent for livestock, 6 per cent for industrial or commercial purposes and 12 per cent for other purposes. Some boreholes are either not in use or abandoned due to poor quality water, low yields or high maintenance costs especially in areas where alternative sources of water are readily available.

59. *Surface water and groundwater contribution to the Nile River Basin:* Surface water in the Nile River basin has been studied to some extent. Eight rivers from Kenya flow into Lake Victoria. Of these, the Nzoia River accounts for over half of the flow.

60. Groundwater on the other hand has not been studied to the same extent. This notwithstanding, a few isotope studies supported by the IAEA have provided some insight into the role of groundwater in the water balance of Lake Victoria. The studies shows that along the largest part of the Lake Victoria shoreline there is no lake water flowing from or into adjacent aquifers. However the area around Modi indicates that there is groundwater-lake water interaction. (Note that the Pat Pier well in Nyalenda Kisumu is too far away from the lake to be influenced by lake water).

61. *Threats to the groundwater system:* Most of the problems affecting groundwater are associated with human development. The most common problem is degradation of the groundwater quality due to surface-level pollution or saline intrusion and

environmental degradation as a result of over abstraction in areas where demand far outstrips supply. Pollution of groundwater is caused by unregulated waste disposal in industrial areas and informal housing areas, abandoned waste disposal especially in peri-urban areas, agricultural chemical loading, domestic sewers and cemeteries. Salt water intrusion on the other hand is a threat in coastal areas of Kenya especially in areas where there is high population and intensive commercial activities that require large volumes of groundwater that can at times lead to over-abstraction. The consolidated and unconsolidated nature of the underlying sedimentary formations having high permeability aggravate the situation.

62. *On-going and planned projects to assess groundwater*: The Belgium Technical Cooperation, Japanese International Cooperation Agency and IAEA are currently supporting groundwater development, planning and management projects.

Sudan

63. *Institutional Arrangements*: The Directorate of Ground Water and Wadis in the Ministry of Irrigation and Water Resources is the apex organization responsible for collection, analysis and assessment of groundwater data and information.

64. *Groundwater information:* There is no comprehensive national groundwater assessment for the country. In general, groundwater is perceived as a strategic reserve (for example, the Nubian Aquifer) that should be assessed and protected for the future.

65. *Use of groundwater:* Groundwater is reported to be important for human and animal water supply, for irrigation and maintenance of wetlands.

66. *Surface water and groundwater contribution to the Nile River Basin*: It is evident that there is interaction between surface and ground waters in the Blue Nile area, although this interaction still has to be characterized. For the White Nile, an interaction between groundwater and surface water has not yet been studied.

67. *Threats to groundwater system:* Pollution from sanitation and to some extent from irrigation is thought to be the major threats to the groundwater system.

68. *On-going and planned projects to assess groundwater*: A number of IAEA assisted technical cooperation projects have been executed for some years, mainly to investigate the influence of the Nile River system and big seasonal wadis on the adjacent parts of the Nubian sandstone aquifer system. There is the on-going investigation under RAF/8/037 financed by IAEA for taking samples from the Blue Nile and adjacent wells to study the interconnection between groundwater and surface water in the system using isotope techniques. An IAEA/ UNDP/ GEF Medium Sized Project 'Action program for the integrated management of the shared Nubian Aquifer' started in June 2006; Sudan is one of the four participating countries.

Tanzania

69. *Institutional arrangement:* The Water Resources Division in the Ministry of Water is the apex organization responsible for collection and analysis of groundwater information. It has a staff of 15 hydrogeologists and 15 support staff directly involved with the project.

70. *Groundwater information:* There is no national groundwater assessment for the country. Groundwater assessment in Tanzania is in its primary stage in most of the basins with several international donors supporting the effort.

71. *Use of groundwater:* Groundwater is mainly used for drinking water supply in some urban settlements and in almost all rural settlements. Currently there are national plans for using the groundwater as a cost effective and sustainable option for irrigation and other economic development activities. The national water policy clearly states the need to provide clean and safe drinking water to all people with special attention on rural areas where over 80 per cent of the population resides. The goals for this policy are set in line with the National Strategy for Growth and Reduction of Poverty.

72. *Surface water and groundwater contribution to the Nile River Basin*: Tanzania is situated on the extreme southern part of the Lake Victoria basin. The major groundwater contribution to the basin is through river base flow entering the lake from the South. The major rivers are the Kagera on the western side and Mara River on the eastern part as well as several much smaller perennial and intermittent streams.

73. *Threats to groundwater system:* These include pollution from human settlements and industrial waste, farming activities and groundwater depletion as a result of declining rainfalls.

74. *On-going and planned projects to assess groundwater:* The Japanese International Cooperation Agency (JICA) is currently conducting a groundwater potential study in the Mara and Mwanza regions in the basin. Tanzania is participating in the on-going IAEA regional groundwater project. Lastly, the Mara River Basin Management Project under the NBI is also in its initial stage.

Uganda

75. *Institutional arrangement*: The Water Resources Management Department, Directorate of Water Development of the Ministry of Water and Environment is the apex organization responsible for collection and analysis of groundwater information. The Department has 58 technical staff and 6 of these will be directly involved in this project.

76. *Groundwater information:* In mid 1990, the government realized the need to understand the nature and behavior of groundwater resources as a way of ensuring sustainability of water supply systems and protecting vital ecosystems. Studies aimed at assessment of the groundwater resources for sustainable town water supply and environmental conservation were initiated in 1996 through the use of both conventional and isotopic techniques and have continued up to now in a number of areas of the country. Such studies have been carried out in a few rural areas and towns based on groundwater and around Lake Victoria and in a few other areas to assess the

interactions between groundwater and surface water. Information obtained includes distribution and behavior of aquifers, groundwater recharge, aquifer vulnerability to pollution, impact of motorized abstraction on groundwater resources, conceptual models of groundwater dynamics and preliminary assessment of interactions between groundwater and surface water.

77. Although groundwater development has been ongoing for some time and plans to increase its development have been formulated, there remain many challenges. There is very limited knowledge of the groundwater systems making it difficult to predict whether future water demands will be met from groundwater and how the groundwater development should be carried out to avoid adverse effects to the environment. This information is essential for sustainability of water supply systems.

78. *Use of groundwater*: Groundwater plays a significant role in domestic water supply and its development has been ongoing since the 1930s mainly for rural and urban water supplies through deep boreholes and springs. The current rural and urban water supply coverage is estimated to be 61 and 68 per cent respectively implying that there is a need to expand the water supply system. There are approximately 20,000 deep boreholes, 3000 shallow wells and 12,000 protected springs in the country constructed mainly for domestic water supply although some are currently being used for livestock water supply.

79. Under the rural water supply investment plans it is intended to improve significantly the safe water supply coverage in the whole country to at least 95 per cent by 2015. The focus is on groundwater development using low-cost, simple water-supply technologies. In order to achieve this it is planned to construct an additional 40,000 hand pumped boreholes, 30,000 shallow wells and protect a few thousand remaining springs. Similarly, under the urban water supply investment plans, it is planned to supply piped water to over 250 small towns and over 50 per cent of these will be based on groundwater through deep boreholes. Some high yielding boreholes are also planned for livestock watering in areas where surface water resources are limited.

80. *Surface water and groundwater contribution to the Nile basin:* There is a need to improve the understanding of the quantity and quality of groundwater and runoff entering lakes and wetlands from adjacent land (i.e. interfluves) into Lake Victoria and the White Nile.

81. *Threats to the groundwater system:* Despite the important role groundwater plays in the socio-economic development of Uganda, it has been considered as a public good that is available in unlimited quantities and requiring no management and protection. Heavy groundwater development has for instance been observed in some towns in Uganda and this has resulted in the lowering of groundwater levels and sometimes competitive pumping between water sources. The lack of sewerage systems in many urban areas has also lead to construction of onsite sanitation systems in form of septic tanks and pit latrines, and this combined with poor solid disposal practices have caused contamination of groundwater resources in isolated areas**.**

82. The potential pollution of the lakes in the basin through groundwater and vice versa has not been investigated. It is expected that pollution through groundwater especially

in big towns and cities with many industries and on site sanitation facilities around Lake Victoria is significant but no information exists to confirm this.

83. *On-going and planned projects to assess groundwater*: A number of IAEA assisted technical cooperation projects have been implemented in Uganda for some years, mainly to assess groundwater resources for town water supplies in various parts of the country. The Government of Uganda with funding from DANIDA and IAEA is currently implementing groundwater assessment projects in various areas aimed at improved management of town water supplies and understanding of the interactions between groundwater and surface water.

Burundi, DRC and Rwanda:

84. The initial request to the IAEA was received from 6 of its member states. National institutions from Burundi, Rwanda and DRC had been indirectly involved in the development of the project proposal, specifically as they are not IAEA members and therefore cannot benefit from its financial support. However, being embedded in the NBI and given that the project looks into the mainstreaming of groundwater into the whole Nile Basin, these three countries are considered as participating countries. While DRC's limited involvement is warranted by its reduced geographic coverage of the Nile basin, Rwanda and Burundi were constrained by their limited groundwater assessment capacities. These two countries will benefit from the project primarily from a capacity development and policy debate perspectives.

Project Objective

The development objective is to provide the scientific basis and necessary institutional and policy support for incorporating a groundwater dimension into planning and management of the Nile river basin ecosystem as an essential component of sustainable development of the Nile basin.

85. The immediate project objectives are to:

1. improve the assessment of groundwater-surface water interactions towards strengthening protection of key ecosystem resources as well as the gains from and losses to groundwater on rivers and lakes in the Nile basin;
2. enhance the characterization of the role of groundwater in wetlands and of the Sudd swamps in the regional water cycle;
3. improve the use of water balance models in estimating basin-wide annual and monthly water balances in the Nile basin as an input to water planning and management;
4. facilitate the inclusion of groundwater considerations into integrated Nile basin water resources planning and management activities and to ensure a common understanding of groundwater issues and analysis among the riparian countries.

Project Components

86. Efforts to achieve the four objectives under this project will require implementation of activities under five components as follows:

1. Assess groundwater-surface water interactions in selected Nile basin lakes and rivers and their implications for Nile Basin management and ecosystem protection;
2. Investigate the role of groundwater in wetlands and of the Sudd Swamps in the regional water cycle and their implications for Nile Basin management and ecosystem protection;
3. Synthesize data and information with water balance models for sub-basins, basins and the larger Nile basin;
4. Support the incorporation of groundwater information into Nile basin planning and management including integration into Nile basin cooperation and institutional framework;
5. Project monitoring and evaluation.

Component 1: Assess groundwater-surface water interactions in selected Nile basin lakes and rivers and their implications for Nile Basin management and ecosystem protection.

87. Under this component, the relative magnitude of storages and fluxes of water in significant lakes and rivers, identified by the Nile Basin Transboundary Environmental Analysis, will be estimated. This will be done using sub-basin and basin scale water balance models applied at monthly and annual time steps. Data requirements for these models include volumetric and isotopic measures of precipitation, direct runoff, groundwater recharge, groundwater discharge, lake levels, lake outflows, and stream flow. The data collection strategy is to make periodic measurements for the determination of water volumes and isotope values at selected points in time and space. The number of points and the frequency of sampling are functions of the spatial and temporal variability of the specific water balance elements. (Generic sampling and data analysis activities for modeling water balances will be identified under component 3.)

Outcome**:** Enhanced capacity in national and regional institutions to understand extent and impact of groundwater on selected rivers systems comprising the Nile basin;

Success indicators:

1. Continued investigation by national and regional institutions of groundwater using a combination of conventional and isotope hydrological methods to assess and monitor groundwater-surface water interaction.
2. Incorporation of the findings from these investigations into water planning and water management activities.

Output 1.1 Report on groundwater discharge to Lake Victoria (Kenya, Tanzania and Uganda)

Activities

1. Prepare sampling and data analysis plan
2. Install multi-level piezometers from the shore inland at selected sites
3. Sample piezometers for physical and chemical parameters and isotopes and age-dating tracers
4. Monitor groundwater level in the piezometers
5. Use appropriately scaled water balance model to estimate groundwater discharge

Output 1.2 Report on the water balance of Equatorial Lakes (Uganda)

Activities:

1. Prepare sampling and data analysis plan
2. Sample groundwater, surface water in tributaries and lake water in and around the Ugandan lakes
3. Establish rainfall sampling stations and collect data on a routine basis
4. Use appropriately scaled water balance model to estimate surface water-groundwater interaction

Output 1.3 Report on the water balance of Lake Tana (Ethiopia)

Activities:

1. Prepare sampling and data analysis plan
2. Sample on a routine basis groundwater, tributaries, and lake water in and around the lake
3. Measure rainfall on a routine basis at established stations
4. Use appropriately scaled water balance model to estimate surface water-groundwater interaction

Output 1.4 Report on the fraction and age of groundwater contributing to the river flow of major rivers entering Lake Victoria (Kenya, Tanzania and Uganda)

Activities
1. Prepare sampling and data analysis plan
2. Sample on a routine basis rivers waters at selected stations for isotopic analysis (e.g., Kagera and Mara in Tanzania etc.)
3. Sample on a routine basis rainwater in catchment area
4. Use appropriately scaled water balance model to estimate fraction of groundwater contribution to river flow

Output 1.5 Report on the fraction and age of groundwater contributing to river flow of major rivers of the White Nile (downstream from Lake Victoria) (Ethiopia, Sudan and Uganda)

Activities
1. Prepare sampling and data analysis plan
2. Sample on a routine basis river waters at selected stations for isotopic analysis (Baro-Akobo, and others to-be-decided)
3. Sample on a routine basis rainwater in the catchment
4. Use appropriately scaled water balance model to estimate fraction of groundwater contribution to river flow

Output 1.6 Report on the fraction and age of groundwater contributing to Blue Nile (upstream from confluence with White Nile) (Ethiopia and Sudan)

Activities
1. Prepare sampling and data analysis plan
2. Sample on a routine basis rivers waters at selected stations for isotopic analysis
3. Sample on a routine basis rainwater in the catchment area
4. Use appropriately scaled water balance model to estimate fraction of groundwater contribution to river flow

Output 1.7 Report on the loss of river flow from the Blue Nile to groundwater (Sudan)

Activities
1. Prepare sampling and data analysis plan
2. Sample river waters on a routine basis at selected stations for isotopic analysis
3. Install and sample shallow piezometer transects near the river to estimate rate of river recharge to groundwater
4. Use appropriately scaled water balance model to estimate loss of river flow

Output 1.8 Report on surface water-groundwater interaction upstream of the High Dam (Egypt)

Activities
1. Prepare sampling and data analysis plan
2. Sample on a regular basis lake and groundwater at selected stations for isotopic analysis
3. Install and sample shallow piezometer transects near the lake to estimate rate of exchange between lake water and groundwater
4. Use appropriately scaled water balance model to estimate surface water-groundwater interaction

Output 1.9 Report on the fraction of groundwater and approximate residence time of groundwater in rivers and lakes composing the Nile basin.

Activities
1. Write summary report on findings from outputs 1.1 to 1.8
2. Described implications from findings for water management and ecosystem protection

Output 1.10 Summary reports indicating where groundwater is important for ecosystem protection of lakes and rivers as determined by appropriately scaled water balance models.

Activities
1. Write report on the groundwater balances in the ecosystems investigated
2. Describe implications and recommendations of findings for ecosystem protection
3. Make map indicating areas where groundwater has a notable impact on lake and wetland systems.

Component 2: Investigate the role of groundwater in wetlands and of the Sudd Swamps in the regional water cycle and their implications for Nile Basin management and ecosystem protection;

88. Under this component, the role of groundwater in sustaining the wetlands in the Nile Basin and the role of wetlands in the regional atmospheric water cycle will be quantified. This will be done using isotope analyses of precipitation, surface water, and groundwater, as well as by using atmospheric measurements and models of moisture transport.

89. Physical sampling at the Sudd Swamps and other sites will be undertaken based on a sampling plan to be technically determined and identified. The number of points and the frequency of sampling are functions of the spatial and temporal variability of the specific water balance elements. (Generic sampling and data analysis activities for modeling water balances will be identified under component 3.)

Outcome**:** Enhanced capacity in national and regional institutions to assess the contribution of groundwater in sustaining wetlands in selected areas of the Nile basin, particularly where groundwater is important for ecosystem protection.

Success indicators:

1. Continued investigation by national and regional institutions of groundwater using a combination of conventional and isotope hydrological methods to assess and monitor groundwater-surface water interaction.
2. Incorporation of the findings from these investigations development and planning activities affecting the Nile wetlands.

Output 2.1 Report on the source of water to wetlands adjacent to selected rivers and larger lakes in the Nile Basin

Activities

1. Prepare sampling and data analysis plan
2. Sample surface waters through the wetlands
2. Install piezometer (wells) transects through selected wetlands
3. Sample and analyze groundwater in piezometers
4. Use appropriately scaled water balance model to estimate surface water – groundwater interaction

Output 2.2 Report on the source of water to the Sudd wetlands (Sudan)

Activities

1. Prepare sampling and data analysis plan
2. Reconnaissance sampling through the Sudd wetlands where possible
3. Use appropriately scaled water balance model to estimate surface water-groundwater interaction

Output 2.3 Report on the contribution of moisture from the Sudd Swamps to the regional water cycle, including precipitation in the Ethiopian Highlands

Activities

1. Evaluate regional atmospheric data to map regional moisture sources and transport including the Sudd Swamps and Ethiopian Highlands;
2. Integrate isotope data to quantify moisture sources in the Ethiopian Highland Precipitation
3. Evaluate potential changes in the Sudd Swamps on regional precipitation

Component 3: Synthesize data and information with water balance models for sub-basins, basins and the larger Nile basin

90. Once water balance models have been developed and tested on the sub-basin and basin scale, the integration step or second level of modeling can begin. This is the

integration of the individual study results into a more complete picture of the Nile basin. Here river flows and their isotopic composition need to be routed from the headwaters to the Dam and changes in their magnitude and composition as they interact with different groundwater and lake systems need to be included. It is from this integrated water balance model that contributions to management of the Nile basin and to the Nile DSS being developed by the basin-wide Water Resources Planning and Management project, will be made. (Annex G is a brief summary of water balance modeling and list of references on the topic.) The estimations of water balance resulting from this project will differ from existing estimates which mostly ignore groundwater as a significant source of discharge into lakes, rivers and wetlands.

Outcome: Enhanced capacity in national and regional institutions to use water balance models that incorporate physical, chemical and isotope data to estimate annual and monthly water balance information that is essential for sustained management of wetlands and lakes in the Nile basin.

Success indicators:
1. Continued application by national and regional institutions of the models using the latest water and isotope data to estimate annual and monthly water balances and interpret the results
2. Incorporation of the findings from these investigations into water planning and management decision
3. Integration of assessment results in the DSS and water models of the NBI

Output 3.1 Report on sub-basin and basin models to be used in analyses undertaken under components 1 and 2

Activities
1. Identify water balance models to be used in sub-basin and basin analyses
2. Specify additional physical, chemical and isotopic data needed for model application
3. Prepare generic guidance document for sampling and data analysis

Output 3.2 Report on the availability, integration and application of water and isotopic data for estimation of the magnitude and timing of water fluxes to and from the Nile basin

Activities:
1. Review model applications at the sub-basin and basin levels from components 1 and 2
2. Develop methodology to retrieve, assemble and integrate available data from the related basin-scale studies for use in regional model applications
3. Assess the available data in terms of regional applications and identify data gaps
4. Identify other sources of data that might be used to fill gaps and obtain data where possible

Output 3.3 Report on the development and application of a regional water-balance model for the larger Nile basin

Activities:

1. Develop, test, apply and evaluate a regional water balance model, using available water and isotopic data, to estimate the spatial and temporal variations of the contribution of groundwater and other water balance components to the larger Nile basin
2. Interpret the implications of regional model results for water management and ecosystem protection
3. Identify specific linkages with the WRPM project's DDS and its regional river basin planning model

Output 3.4 Report on training activities in support of modeling

Activities

1. Hold regional training workshop on use of water balance models
2. Fund six participants in short-term training courses on water balance modeling

Component 4: Support the incorporation of groundwater information into Nile basin planning and management including integration into Nile basin cooperation and institutional framework;

91. The Nile basin countries are making significant efforts to jointly manage the Nile basin for mutual benefit. In the frame of the NBI, there is a series of coordinated actions to improve cooperation and management via respective programs and projects. To date most of the activities are not including considerations of groundwater.

92. In a region where water is often scarce, and water allocation and sharing is a principle management issue, groundwater plays both an important role in the Nile hydrological system and represents a potential alternative to utilizing Nile basin surface water resources that are already significantly stressed. Groundwater and surface water are often assessed and managed by different groups of professionals, and institutions are frequently divided between groundwater and surface water units, which may or may not cooperate and share information. Further, there is little precedent in both quantifying the importance of groundwater to a river system as well as in making decision-makers aware of the importance and potential options of related groundwater resources. Targeted efforts must be made to make the baseline of existing groundwater information available to surface water experts as well as the existing Nile programs and projects and perhaps more importantly, making them aware of the relevance and potential impact of the information. In this component, efforts will be made to assist all 9 Nile basin countries, including those not involved in the groundwater assessment activities in Components 1, 2, and 3 (Burundi, DRC, Rwanda), in building capacities to consider groundwater in their Nile River Basin management activities.

93. This component 4 will ensure that the greater knowledge of the relationship between groundwater and the Nile Basin System, that is achieved via activities in Components 1, 2 and 3, will be disseminated via existing Nile Basin Initiative structures as well as facilitate that groundwater is included in the Nile policy framework where appropriate. Where needed, new networks and or institutional arrangements will be defined to ensure that groundwater considerations continue to be appropriately included in the

future. This component will ensure that the new scientific information gained within this project, is mainstreamed into the overall NBI framework and in particular to the relevant programmes and projects.

94. This MSP – and the information generated by it – is directly connected with the WRPM project of the NBI. However, its development and policy impacts spread throughout the investment, development and policy-related activities of the NBI be it at national, sub-regional or basin levels. This will be ensured because (i) the DSS is used by basin and sub-basin institutions to inform decision-making; (ii) the demand for groundwater integration emerged from the participating countries who are eager to utilize this information and (iii) component 4 will disseminate targeted information communicated in a suitable manner depending on its expected utilization and recipient group.

Outcome: Enhanced capacity on the part of national and regional institutions to integrate groundwater considerations into Nile basin planning and management activities

Success indicators:

1. Groundwater information generated under components 1, 2, and 3 are included in basin-wide projects carried out under the auspices of NBI, primarily NTEAP and WRPM, and in the Lake Victoria Environmental Management project;
2. Existing Nile water management networks discuss and review groundwater issues on a regular basis and new structures (e.g. Nile Groundwater Working Group) established as deemed appropriate and functioning within the NBI as needed to ensure the inclusion of groundwater issues appropriately;
3. National groundwater focal points and/ or other mechanisms for groundwater information exchange established within the NBI continue to function beyond the duration of the project

Output 4.1 National Groundwater Reports and 1 Regional groundwater status report

Activities

1. Establish format for reports
2. Produce national reports on groundwater status, on both groundwater as a whole in the country, as well as specifically within the Nile basin in that country, and national technical capacity to assess groundwater issues
3. Prepare a regional report, on both groundwater as a whole in the country, as well as specifically within the Nile basin in that country, and national technical capacity to assess groundwater issues
4. Hold regional Nile Basin Groundwater meetings, with appropriate stakeholders, to review the reports and to consider next steps for integrating groundwater considerations into NBI cooperation

Output 4.2 Report on the planned and potential use for groundwater information in both Nile basin as well as related national aquifer planning and management projects

Activities

1. Review of groundwater considerations in on-going and planned regional planning projects within the Nile Basin Initiative framework
2. Review, together with managers of basin-wide and regional projects, the need for groundwater data in their planning efforts, as well as potential policy implications in consideration of integrated water resources management
3. Make recommendations for follow-up activities and training

Output 4.3 Enhanced awareness of groundwater management issues among national and regional decision makers

Activities

1. Prepare a standard package on groundwater assessment and management to be used in seminars and media campaigns
2. Present information on groundwater data and modeling and their management implications at appropriate national/regional water or economic development meetings.
3. Present information on groundwater data and modeling and their planning and management implications at annual meetings of NBI (different national experts) and Lake Victoria Basin Commission (different national experts)
4. Hold additional regional Nile Basin Groundwater meetings to review the results of Components 1, 2 and 3 and to determine specific measures and mechanisms for appropriately incorporating groundwater considerations into NBI programmes and activities as well as related national activities on a sustainable basis.
5. Hold two sub-regional training/ awareness raising workshops to better enable Nile Basin managers and policy-makers to include groundwater considerations into Nile Basin management and policy framework.

Output 4.4 Regional Nile Groundwater network (9 country) established to exchange information on groundwater planning and management issues as well as to assist in integration of groundwater considerations into Nile River Basin planning and management

Activities

1. Review options for information sharing based on cooperation via existing or potential networks e.g. Integrated Water Resources Management (IWRM) Nile working group, a Nile Groundwater Forum, regional groups of the International Association of Hydro-geologists and others
2. Assess how a specific Nile Groundwater mechanism or network can assist the NBI, existing programmes and projects in appropriately considering best approaches for integrating groundwater considerations.
3. Hold appropriate regional meetings of information network members to discuss groundwater data collection, analysis and management issues as well as approaches for integrating groundwater into IWRM approaches in the Nile River Basin
4. Equip regional and national resource centers with appropriate literature and internet links on GW management issues (to be designated in each country)

Component 5: Project monitoring and evaluation

95. This project is unique because (i) the executing agency – IAEA – will provide the necessary managerial input and coordination to ensure project activities are implemented smoothly and project development objectives are delivered and (ii) building on the scientific outcomes of components 1, 2 and 3, it will integrate their findings into the policy and decision making processes of an on-going program – the NBI.

96. The project monitoring and evaluation component has been designed based on concepts of adaptive management; it actually serves as both project management and project monitoring and evaluation to secure the linkages between the two processes and ensure that the findings of internal monitoring activities are taken up in the implementation approach of the project.

97. The IA and EA will work closely with the project counterparts nationally and with the NBI structures regionally to take stock of project progress and identify how well the project responds to the needs of the NBI and its riparians. This will be undertaken through annual PSC meetings held concurrently with NBI meetings or other technical meetings of this project.

98. In this process, there will be two key meetings both at the beginning and the end of the project – the Inception workshop and Final project meeting. These two meetings are intrinsically different from all other meetings of the project as (i) they will bring together all the project proponents from the nine countries, including the broader NBI regional structures such as the TAC, WRPMP, NTEAP, SVP-C and SAPs and (ii) they will not tackle technical issues but rather agree on and review the project's effectiveness in delivering its results.

99. Inception Workshop: UNDP/GEF's experience in implementing GEF projects shows that an Inception Workshops can yield the following benefits:

- "Re-builds commitment and momentum, especially if a substantial time has elapsed since the project design phase – the project design workshop took place in May 06.
- Establishes the project team and support structures (e.g. Steering Committee) with authority – individual members of the PSC and its TORs will be agreed.
- Ensures that the project team and other stakeholders have a clear understanding of what the project seeks to achieve (and, conversely, what it does not seek to achieve!) and their own roles in achieving objectives
- Establishes procedures for oversight, and for changes in project activities, outputs, outcomes or objective – often project proponents feel constrained in adjusting the project implementation strategy. The inception workshop will clarify the boundaries and procedure for doing so as well as the communication lines and roles and responsibilities.

100. Final project meeting: the final project meeting will take stock of the overall project results building on the results of the final project evaluation, come up with recommendations to sustain its results (if need be) and identify possible follow-up initiatives to be supported by the IA, EA, riparians or Nile structures.

Outcome: Project components implemented effectively and efficiently accordingly; appropriate implementation of agreed monitoring and evaluation plan and subsequently completed evaluation of project based on project objectives and performance indicators

Success Indicators

1. Reports from national advisory and project steering committees submitted in a timely manner
2. Corrective actions and adjustments recommended where needed
3. Written reviews of the final summary reports prepared at the end of components 1 to 3
4. Plans and reports prepared as required

Output 5.1 Reports on the annual meetings of the project steering committee

Activities

1. Hold project inception meeting and prepare inception report
2. Review project activities under all components on an annual basis and more often if necessary and prepare reports on the reviews to be submitted to IAEA and UNDP.
3. Establish project website and link to NBI portal

Output 5.2 Reports on the annual meetings of national project advisory committees

Activities

1. Hold annual (or more often if needed) meetings of the national project advisory committee in nine countries
2. Submit reports to the project steering committee

Output 5.3 Evaluation reports

Activities

1. Regular (quarterly) progress reporting to UNDP/GEF,
2. Establishment and regular updating of project work plans and budgets,
3. Annual reporting to GEF and UNDP (PIR)
4. Arrangement of one independent final project evaluation exercise.

See Paragraph 99 for further information on the Monitoring and Evaluation Plan.

INCREMENTAL REASONING

101. The MSP will provide global benefits by filling critical information gaps needed for integrated water resource Management throughout the Nile Basin. Improved groundwater information will enhance knowledge about the Nile water balance with important policy implications for all Nile countries. Better understanding of groundwater-surface water linkages, groundwater links to wetlands etc. provide benefits for ecosystem management throughout the basin. Finally, the

lessons learned by mainstreaming groundwater considerations into Nile basin management will be replicable in other basins throughout the world.

SUSTAINABILITY (INCLUDING FINANCIAL SUSTAINABILITY)

102. The efforts undertaken by this project will lead to groundwater considerations being more comprehensively incorporated into ongoing national and regional Nile basin activities. As activities under this project will be closely linked with the respective projects under the NBI, a mechanism for sustainability will be assured through the institutional and policy mechanisms explored in Component 4. All of the participating countries have been or are currently participating in IAEA supported technical cooperation projects in which their capacities to conduct field investigations, collect samples, facilitate analysis and interpret results are being strengthened. These scientific capacities in the participating countries will be further strengthened through the respective field investigations (learning by doing). Moreover, the context of the investigations and linkages to important national and regional policy and institutional issues will be highlighted. The project will strive to bring scientific communities together with the appropriate water managers and policy makers at both the national and regional levels. This will ensure that good, needed science is both demanded and utilized by those making important water management decisions in the Nile basin (and in respective countries.) By making this science- policy-management linkage via the involvement and cooperation of the appropriate national and regional institutions, programmes and projects, the sustainability of the project will be assured.

REPLICABILITY

103. This new project represents a unique initiative as thus far, the groundwater dimension has not been directly integrated into transboundary river basin management programmes. Therefore, an important objective of this MSP will be to define, demonstrate and institute a methodology for sustaining incorporation of the groundwater dimension in the integrated management of the Nile basin that can be subsequently used in other transboundary water management projects. This would fulfill GEF targeted learning objectives for transfer to other GEF funded International Waters activities in the future. This also could have relevance in efforts to build better linkages between different GEF priority areas including: biodiversity, climate change adaptation and land degradation.

104. At its inception the project will design an IW: LEARN type webpage to be hosted by the IAEA and integrated to the NBI portal as an effort to ensure full mainstreaming of the project and its results into the NBI processes. This will also offer an opportunity for stakeholders interested in GW issues to have an easy reference point.

105. In addition, through its component 4 the project will participate in bi-annual IW Conferences and other significant African/International events to showcase, publish and exchange knowledge generated. The IA and EA are involved in key GEF supported groundwater projects and will ensure exchange of information and lessons with these projects. A minimum of two IW LEARN Experience Notes will be produced by the project; the topics will be identified in due time in a way to produce maximum benefit to the IW community and support the replication of project processes and results.

STAKEHOLDER INVOLVEMENT

106. The main stakeholders are the country representatives cooperating within the framework of the NBI. At the Nile basin level, these stakeholders are represented by the NBI and its institutional mechanisms (e.g. Technical Advisory Committee and constituent NBI projects and programmes) as well as the Lake Victoria Basin Commission. In addition, they include international organizations who are currently partners in the NBI, such as financial institutions and key development partners (e.g. the World Bank and African Development Bank, SIDA, CIDA, Netherlands, etc.); regional institutions and initiatives such as AMCOW, NEPAD and AMCEN; regional networks, such as CAPNET, Nile IWRM and Nile Discourse; and regional networks of universities and research centers.

107. At the national level, stakeholders include the responsible ministries e.g. water as well as related ministries (environment, finance, planning, foreign affairs, international cooperation etc.), national atomic energy commissions and agencies, national geological surveys, national meteorological institutions, relevant research institutions and universities, water users and user associations, river basin authorities and regional development commissions and water offices. Some of these institutions listed might in fact be the important partner organizations that will need to be strengthened in order to sustain the groundwater dimension in the respective governments and regional programmes. The appropriate institutions/organizations that should be strengthened to facilitate groundwater integration will be determined in the initial stages of the project.

108. A project formulation meeting was held at IAEA headquarters May 29- June 2, 2006 that was attended by key stakeholders including representatives of countries that will be involved in the core of the project activities. In addition, there were representatives of two projects within the framework of the NBI (NTEAP and the WRMP) that will have the closest linkages to this project. These project representatives also participated on behalf of the NBI. A representative of the LVBC also participated and contributed to developing this project to mesh the outputs into LVEMP II. These representatives along with IAEA staff and experts from the US Geological Survey identified and agreed on the scope of the project and then outlined project objectives, desired results/outcomes, expected outputs, activities and began the process of defining the inputs needed to achieve these desired results. (See Annex E for meeting report.)

MONITORING AND EVALUATION

109. The monitoring of the project will be based on the project monitoring and evaluation plan as to be implemented in Component 5 "*Project Monitoring and Evaluation*." This will be complemented by monitoring feedback from stakeholders, who will be consulted and supported to communicate with the Project Steering Committee on observed issues and specific objectives and interests. The budget allocated for this activity is foreseen to be US$118,800. The project based monitoring

will be organized by the IAEA with the guidance of the Steering Committee and in accordance with GEF/UNDP monitoring and evaluation policy. Specific considerations in relation to the monitoring of results and adaptive management approaches will form the basis of Monitoring and Evaluation processes. The Executing Agency, in cooperation with the Implementing Agency, will initiate and coordinate the external review processes.

The monitoring and evaluation plan will include the following activities:

- Inception meeting to kick-start the project and fine-tune project implementation plan, including budget, activities and indicators.
- Regular progress reporting to UNDP/GEF, IAEA as well as the Project Steering Committee,
- At least 2 meetings of the Project steering committee,
- Annual GEF PIR
- One independent project evaluation exercise (end of project.)
- Final project review meeting.

The project will specifically aim at tracking progress towards the following two process indicators:

1- Identification and adoption of a mechanism (specialist panel, GW specialist network) to sustain the inclusion of GW considerations in NBI processes;
2- Enhanced mainstreaming of GW consideration in national level water resource management.

TABLE 1: INDICATIVE MONITORING AND EVALUATION WORK PLAN AND CORRESPONDING BUDGET

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team Staff time*	Time frame
Inception Workshop	▪ IAEA ▪ UNDP CO ▪ UNDP GEF	43,200 USD (included in project component 5)	Within first two months of project start up
Inception Report	▪ IAEA Project Team with feedback from countries ▪ UNDP/GEF	None	Immediately following IW
PIR	▪ IAEA Project Team ▪ UNDP-GEF ▪ Others as identified	None	Annually
Project Steering Committee (PSC) Meetings / TPR meetings	▪ IAEA Project Team ▪ PSC members as designated ▪ UNDP/GEF	To be linked to other project events/meetings therefore costs covered in other budget lines	Following Project IW and subsequently at least once a year
Final External Evaluation	▪ Project team ▪ UNDP/GEF ▪ External Consultants (i.e. evaluation team)	32,400 USD	At the end of project implementation
Final Project Meeting	▪ IAEA ▪ UNDP CO ▪ UNDP GEF	43,200 USD (included in project component 5)	3 months before the end of the project

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team Staff time*	Time frame
Final project reports (technical & financial)	▪ IAEA ▪ UNDP CO ▪ UNDP GEF ▪ Others as identified	None	6 months following the end of the project
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US$ 118,800	

4. FINANCING (for all tables, expand or narrow table lines as necessary)

FINANCING PLAN, COST EFFECTIVENESS, CO-FINANCING, CO-FINANCIERS

a) PROJECT COSTS

Project Components/Outcomes	IAEA Co-financing ($)	*GEF ($)*	Total ($)
1. Enhanced capacity in national and regional institutions to understand extent and impact of groundwater on selected rivers systems comprising the Nile basin	544 330	101 304	645 634
2. Enhanced capacity in national and regional institutions to assess the contribution of groundwater in sustaining wetlands in selected areas of the Nile basin, particularly where groundwater is important for ecosystem protection	455 670	147 960	603 630
3. Enhanced capacity in national and regional institutions to use water balance models that incorporate physical, chemical and isotope data to estimate annual and monthly water balance information that is essential for sustained management of wetlands and lakes in the Nile basin		294 058	294 058
4. Enhanced capacity on the part of national and regional institutions to integrate groundwater considerations into Nile basin planning and management activities		337 878	337 878
5.Project components implemented effectively and efficiently accordingly; appropriate implementation of agreed monitoring and evaluation plan and subsequently completed evaluation of project based on project objectives and performance indicators		118 800	118 800
Project Management (refer to Table b)	350 000		350 000
Total project costs	1 350 000	1 000 000	2 350 000

b) PROJECT MANAGEMENT BUDGET/COST[3]

Component	Estimated staff weeks	GEF($)	Other sources ($)	Project total ($)
Personnel				

[3] For all consultants hired to manage project or provide technical assistance, please attach a description in terms of their staff weeks, roles and functions in the project, and their position titles in the organization, such as project officer, supervisor, assistants or secretaries.

Local consultants				
International consultants				
Office facilities, equipment, vehicles, com				
Travel				
Miscellaneous				
Total	***0***	***0***	***350000***	*350000***

**THERE WILL BE A 350,000 USD in-kind contribution of the IAEA for project management; this estimate will be confirmed during project implementation.

C) CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	**Estimated staff weeks**	**GEF($)**	**Other sources ($)**	**Project total ($)**
Personnel		0		**0**
Local consultants (national & from the region)	346	234 360		**234 360**
International consultants	76	189 540		**189 540**
Total	**422**	**423 900**	**0**	**423 900**

d) CO-FINANCING SOURCES[4] (expand the table line items as necessary)

Co-financing Sources					
Name of co-financier (source)	Classification	Type	Amount ($)	Status	
				Confirmed	unconfirmed
UNDP	IA		TBD		
IAEA	EA	in-kind	350,000	✓	
IAEA	EA	cash	1,000,000	✓	
Burundi	Nat'l Gov't		-		
Congo	Nat'l Gov't		-		
Egypt	Nat'l Gov't	In kind	522,000	✓	
Ethiopia	Nat'l Gov't	In-kind	86,000	✓	
Kenya	Nat'l Gov't	In-kind	68,500	✓	
Rwanda	Nat'l Gov't		-		
Sudan	Nat'l Gov't	In-kind	550,000	✓	
Tanzania	Nat'l Gov't	In-kind	183,500	✓	
Uganda	Nat'l Gov't	In-kind	130,800	✓	
Sub-total co-financing			2,890,800		

COST EFFECTIVENESS

110. The project is cost-effective as it builds on the significant body of knowledge that has been developed and/or consolidated in the frame of the NBI in general and in the frame of previous IAEA TC projects in relation to groundwater assessment. The proposed project builds on an active IAEA TC project (750,000 USD) that has been implemented from 2003-2006 which has established "proof of concept" confirming the approach that is now proposed in this proposal.

111. By working directly with the NBI and closely with those programme components most directly relevant to groundwater, the new project would efficiently

[4] Refer to the paper on Co financing, GEF/C.206/Rev. 1

build on on-going activities and assure that results achieved are effectively utilized in future cooperation. The project's cost effectiveness also lies in the facts that instead of creating a DSS from scratch, it will integrate GW data and information into an existing system. The NBI has initiated a high level policy dialogue and created the fora and platforms on which this MSP can build to trigger debates and exchanges.

112. Furthermore, rather than hiring full-time project staff, the project will outsource specific activities to specialized consultants, national, regional and international. These consultants will intervene with specific capacities as highlighted in Annex h; they will complement and support the work being undertaken by counterparts of the national focal institutions. With regards to international consultants, these have been hired only when internal expertise within IAEA and NBI was not available and when national expertise would not be sufficient for the task. As an example, there are very few water modelers in the world capable of designing models that integrate both GW and surface water, their interactions and simulate impacts. This is a case where the project will depend heavily on the contribution of such an international consultant.

113. All consultants will be recruited, identified and coordinated by the IAEA in conjunction with the relevant national and/or regional entities involved in the project. One of the advantages of such an approach is that it brings in highly technical capacities to the project while at the same time broadening the set of individuals and stakeholders benefiting from on-the-job capacity building through their involvement in the project.

5. INSTITUTIONAL COORDINATION AND SUPPORT

A. CORE COMMITMENTS AND LINKAGES

This project proposal has been developed in close cooperation with Nile Basin countries and representatives of the NBI and its constituent programmes. The NBI represents a strong commitment amongst Nile Basin countries to cooperatively manage and share Nile Basin resources. The need to more effectively assess and manage groundwater resources has already been recognized by Nile governments and there is therefore an increasing demand for activities to fill this gap. The IAEA/UNDP/ GEF Nubian Aquifer Project began in June 2006. While it does not specifically entail surface/groundwater linkages, the project will build capacities for GW assessment, will trigger discussions on policy changes and will identify key resource people, especially in Sudan and Egypt. Being both executed by the IAEA with UNDP as an implementing agency will reinforce the complementarity between the two projects and the transfer of lessons, knowledge and experiences. There are also national as well as bi-lateral initiatives related to groundwater in general in specific Nile countries. For example, the IAEA and UNDP have been approached to develop a GEF MSP for "National Groundwater Assessment in Ethiopia." This reflects the desire expressed by several Nile Basin countries to more accurately assess groundwater resources at the national level for better consideration and inclusion in both national as well as regional integrated water resources management.

B. CONSULTATION, COORDINATION AND COLLABORATION BETWEEN IAS, AND IAS AND EXAS, IF APPROPRIATE.

The IAEA (the Executing Agency) is already working closely with UNDP (the Implementing Agency) in the region e.g. the IAEA/UNDP/ GEF Nubian Aquifer

project and the (under preparation) proposed IAEA/UNDP/ GEF Ethiopian National Groundwater Assessment. The IAEA is also a co-funder of both the UNEP/GEF NW Sahara Aquifer Project and the UNEP/GEF Iullumeden project in the region. Consultations have been held with World Bank staff, as manager of the Nile Basin Trust Fund, in the development of this concept.

C. PROJECT IMPLEMENTATION ARRANGEMENT

The project will be managed by the relevant IAEA staff (representing an "in' kind" contribution to the project,) supported by regionally based experts, as needed, in close cooperation with the participating countries and relevant projects of the NBI and Lake Victoria Basin Commission. The project will be guided by a project steering committee made up of the national project focal points designated by the countries, NTEAP, Nile WRPM, UNDP/GEF, IAEA and the NBI, which will meet at least once a year to review and provide strategic advice and guidance to the project, with meetings to be held, where possible, in the frame of other project activities/meetings. Each participating country will organize a national advisory committee made up of relevant national stakeholders (inter-ministerial etc.) to ensure relevance and coordination with related national activities.

The overall arrangements for project implementation will be as follows:

UNDP/ GEF	Implementing Agency
International Atomic Energy Agency	Executing Agency
NBI Secretariat	Co-operating institution*

*The NBI Secretariat will be involved in the project steering committee and supported by representatives of the most relevant projects and programmes (NTEAP, WRPMP, LVEMP Phase 2.) The NBI has been involved in the development of this project. In particular, the project manager of the Nile Basin Water Resources Planning and Management Project was delegated the responsibility of representing the NBI Secretariat in the Project Formulation Meeting held in Vienna, Austria May/June 2006 and was charged with briefing the NBI on respective results, process and way forward. The IAEA supported project preparation (30,000 USD) without the use of GEF preparatory funds (PDFA.)

6. REQUIRED ATTACHMENTS

b) Country Endorsement Letter

c) Confirmed letters of commitments from co-financiers

PART II –SUPPLEMENTAL ANNEXES

- **a)** LFA with Impact Indicators
- **b)** TBWP
- **c)** Implementation Plan / Project Time-Chart 2007-2009
- **d)** MAP-Nile River Basin (Project Area)
- **e)** Report on the IAEA/UNDP/GEF Project Formulation Meeting on "Adding the Groundwater Dimension to Nile River Basin Management"
- **f)** Wetland Information Extracted from Nile River Basin 'Transboundary Environmental Analysis'.
- **g)** Basics of Water Balance Models
- **h)** Tentative list of national and international consultants
- **i)** Overview of Major Project Meetings

PART III - RESPONSE TO PROJECT REVIEWS

a) Convention Secretariat comments and IA/ExA response
b) STAP expert review and IA/ExA response (if requested)
c) GEF Secretariat and other Agencies' comments and IA/ExA response

GEF comments	Response
April 5th, 2007	
The proposal should be strengthened by identifying key results indicators (in the case of this project they would fall in the category of "process indicators") for annual reporting on progress.	Process indicators identified in the logframe have been revised and integrated into the M&E section of the project (3.f)
The proposal should make reference to specific dissemination mechanisms, including IW LEARN. The project should establish a website according to IW LEARN standards, and allow for participation to IW LEARN activities, such as biannual conferences.	Dissemination mechanisms have been identified under component 4 of the project (reflected in the document), integrated into the replicability section of the project (3d) and funding will be earmarked in the budget allocation under component 4 in terms of regional meetings/travel for participation in relevant events. (Annex b – TBWP).
May 7th, 2007	
Consolidated TBWP aggregating GEF and other funding sources + fine-tuning of certain amounts	C.f . attached aggregate budget Annex b
Integration of country co-finance in budget tables	Rough allocations of country co-financing provided in co-financing tables with the letters of co-finance. Estimated annual attribution of country co-finance provided in Annex b – Summary of funds table
Details on national and regional meetings	C.f. Annex i – new
Justification for Inception and Final project meetings	C.f. para 95 to 100
Details of each activity	C.f. para 89. Additional details for components 3 and 4

	cannot be provided at this stage: they will be defined as a consequence of the results of the field surveys and reports from components 1 and 2.
Rationale for national/international consultants	C.f. Annex h – new C.f. para 112 & 113
No resources of component 5 are used for writing up the final documents	c.f. Table 1 under M&E section – explicit addition committing the EA and IA not to use any GEF funds for the preparation of final reports.
Justification for travel budget (71.902)	There are 9 countries participating in the project requiring significant coordination. The travel to be funded by GEF refers primarily to travel for experts. It is planned that the international modeling expert in Component 3, will spend a significant amount of time working directly with the Nile Water Resources Management Project to assure appropriate coordination and integration of the MSP's modeling work into the overall Nile Decision Support System (DSS.) Travel resources will also be allocated for internal travel within the countries to the sampling collection sites – e.g. Sudd swamps.