PROJECT IDENTIFICATION FORM (PIF)
MEDIUM-SIZED PROJECT
UNDER THE GEF TRUST FUND

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GEFSEC PROJECT ID:
IA/EXA PROJECT ID: 3765
COUNTRY: Burundi, Congo(DR), Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda
COUNTRY ELIGIBILITY: All participating countries are eligible under para 9-b of the GEF instrument.
PROJECT TITLE: Mainstreaming Groundwater Considerations into the Integrated Management of the Nile River Basin
GEF IA/EXA: UNDP
OTHER PROJECT EXECUTING AGENCY(IES): IAEA
PROJECT DURATION: 42 Month
GEF FOCAL AREA: Medium-sized ProjectInternational Waters
GEF-4 STRATEGIC OBJECTIVES: IW - 2
GEF OPERATIONAL PROGRAM: OP9 Integrated Land and Water
EXPECTED DATE OF WP INCLUSION:
EXPECTED DATE FOR CEO ENDORSEMENT: July 2007

EXPECTED STARTING DATE (PROJECT TYPE): MSP
EXPECTED STARTING DATE (PPG, if planned):
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DATE OF SUBMISSION: March 2[3r]d, 2007

FINANCING PLAN ($)		
	PPG	Project
GEF Total		1,000,000
Co-financing		
GEF IA/ExA		
Government	18,000	1,540,800
IAEA	30,000	1,350,000
Others (NBI)	6,000	
Co-financing Total	54,000	2,890,800
Total	54.000	3,890,800

PART I - PROJECT IDENTIFICATION

A - PROJECT SUMMARY

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. Groundwater supports perennial water supply to many wetlands and stream base flow, which is critical for providing refuge for fauna and maintaining biodiversity. 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. In addition, large wetland areas, such as the Sudd swamp in Sudan, are an important component in the local/regional atmospheric water cycle.

2. The Sudd swamps presently are 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 therefore 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.

3. The overall 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, 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.

4. 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:

    - 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;
    - enhance the characterization of the role of groundwater in wetlands and of the Sudd Swamps in the regional water cycle;
    - improve the use of water balance models in estimating basin-wide annual and monthly water balances in the Nile basin (headwaters to Aswan Dam) as an input to water planning and management;
    - 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.

5. This project will build on 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. In addition, IAEA will provide co-funding that matches the contribution by UNDP/GEF to complement the co-funding confirmed by the national governments and the NBI.

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

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

- 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;

  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 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 of 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.

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

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

  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.

  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.
  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.

  Outcome: Enhanced integration on the part of national and regional institutions, of groundwater considerations into Nile basin planning and management activities

  Component 5: Project monitoring and evaluation

  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

B – PROJECT OBJECTIVE

7. 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.

C – PRIORITY THREATS/ROOT CAUSES AND BARRIERS TO BE ADDRESSED

8. 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.

9. 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). 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. 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.

10. 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.

11. 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. There are also important policy inter-linkages. Water allocation from the Nile system is severely over-burdened. Thus providing water supply and services from groundwater can directly or indirectly relieve the stress on Nile water resources.

12. 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. The importance of groundwater as a source of water supply in the six countries participating in this project is described, to the extent that data were available, in the following country profiles.

13. Thus, the lack of sufficient baseline knowledge of groundwater in the Nile system hinders the fundamental information needed to support comprehensive management decision-making. Likewise policy options are incomplete without considerations of how groundwater fits into the overall water resource management framework for Nile basin countries. Further, information on groundwater might be necessary for appropriate assessment of water related investments.

14. There are also institutional barriers to adequately incorporating groundwater into river basin management. Groundwater specialists and surface water experts are often located in different departments or government institutions leading to uncoordinated approaches to addressing groundwater- surface water interactions. River basin management institutional frameworks have typically not included groundwater expertise.

D – GLOBAL ENVIRONMENTAL BENEFITS EXPECTED, OR ADAPTATION BENEFITS (if LDCF or SCCF project)

15. Global environmental benefits include improved knowledge of the nile basin system and its water resources, as well as better understanding of the water balance i.e. Information needed for sound management and shared use. Second, improved understanding of linkages between groundwater and wetlands will lead to better measures for protecting them based on an enhanced understanding of the ecosystem functions and services supported via groundwater (e.g. Sudd swamps designated as a Ramsar site in 2006.) Third, the enhanced understanding of the Nile hydrological cycle provides a better basis for understanding regional climate changes and for supporting models for prediction and considering adaptation responses.

E – FIT WITH FOCAL AREA STRATEGY

16. The project contributes to the third priority of IW in GEF 4: "conflicting uses of water". By integrating groundwater into surface water modeling and improving the understanding of GW/surface/wetland interactions it improves the attribution of water resources and provides a better basis for allocation decisions while also provisioning for maintaining the minimum environmental flows required to sustain the Sudd and other wetlands and ecosystem services.

The project is related to GEF 4 Strategic Objective 2 "expanding foundational capacity building to a limited number of new transboundary systems through integrated approaches and foster replication through targeted learning for the IW portfolio." 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 groundwater/surface water policy and management linkages in the existing Nile cooperative process (the Nile Basin Initiative.) This has a potentially 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.

F – POTENTIAL RISK AND MITIGATION

17. There is a risk that the planned groundwater assessments can not be undertaken in some areas of the basin due to a lack of on the ground support from participating countries and/or due to difficulties in gaining access to remote areas due to political instability e.g. the Sudd Swamp areas. This will be mitigated by integrating national expert teams into the planning of sampling activities as well as sharing responsibility for conducting them a and in assessing the results. Concerning areas of political 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 bemade with UN organizations as well as other international organizations so as to utlize the logistical network and support that they are already setting up in the region. These measures in conjunction with strong government support should overcome these potential risks. Finally, there is the risk that the project will not be effectively integrated into the Nile Basin Initiative framework given the scale and scope of the activities being carried out in the frame of the NBI. Efforts to communicate with and to involve the NBI Secretariat and relevant parts of the NBI activities began already in the IAEA's current technical cooperation project for the Nile (2003-2006.) Futhermore the NBI was represented in the project formulation meeting and in the review process for this MSP. Finally, MSP meetings will be organized with input from the NBI and where feasible linked to existing NBI related meetings to achieve maximum integration.

G – ADDITIONAL COMMENTS

18. Project development was supported by IAEA funding without the use of PPG. Participating governments and the NBI also provided in kind support to the preparatory phase.

PART II - FINANCING PLAN

1) ESTIMATED PDF MANAGEMENT BUDGET (IF PLANNED)

Component	Estimated Staff weeks	GEF($)	Other Sources ($)	Project Total ($)
Locally Recruited Personnel				
Internationally recruited consultants				
Training				
Office equipment				
Travel				
Miscellaneous				

2)- TIMETABLE FOR THE PROJECT

	PDF		Project	
	Start Date	**Completion Date**	**Start Date**	**Completion Date**
Implementation			October 2007	December 2010