



PROJECT IDENTIFICATION FORM (PIF).

PROJECT TYPE: FULL SIZED PROJECT

TYPE OF TRUST FUND: GEF TRUST FUND

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PART I: PROJECT INFORMATION

Project Title:	Enabling implementation of the Regional SAP for the rational and equitable management of the Nubian Sandstone Aquifer System (NSAS).		
Country(ies):	Chad, Egypt, Libya and Sudan	GEF Project ID: ¹	9165
GEF Agency(ies):	UNDP	GEF Agency Project ID:	4736
Other Executing Partner(s):	UNESCO/IHP, IAEA	Submission Date:	19 June 2015
		Resubmission Date:	13 August 2015
GEF Focal Area(s):	International Waters	Project Duration (Months)	48 months
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>		Corporate Program: SGP <input type="checkbox"/>
	<input type="checkbox"/>		
Name of parent program:	[if applicable]	Project Agency Fee \$: 379,050	

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES²:

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
IW-1	GEFTF	1,095,000	6,400,000
IW-2	GEFTF	2,895,000	15,900,000
Total Project Cost		3,990,000	22,300,000

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: Initiate regional SAP implementation through legal, policy and institutional reforms and addressing gaps identified in the SAP, supporting rational and equitable integrated management, socio-economic development and the protection of the ecosystem and resources of the NSAS in the Nubian Countries						
Project Component	Financing Type ³	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Co-financing
Component 1: Collaborative actions to further validate the functioning of the NSAS and its resources.	TA	Strengthened common understanding of the functioning of the NSAS, taking account of potential climate change and variability threats, based on the agreed methodology and data as basis of regional and national land and water resources management decision making.	Reducing uncertainties to achieve a common understanding of the NSAS functioning from joint studies; Joint Regional monitoring network implemented and operational by year 3; Updated & NSAS operational hydrological model at national and regional level ; Assessment of oases ecosystems and vulnerability	GEFTF	600,000	3,500,000

¹ Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

² When completing Table A, refer to the GEF Website, [Focal Area Results Framework](#), which is an Excerpt from [GEF-6 Programming Directions](#).

³ Financing type can be either investment or technical assistance.

			(including climate change impacts)			
Component 2: Strengthening capacity of national organisations and the Joint Authority, in-line with SAP, to manage the NSAS resources in a rational and equitable manner	TA	<p>Operationally strengthened National and Regional Authorities with sufficient technical and managerial capacities to jointly manage the NSAS towards its rational and equitable utilization that maximizes socioeconomic benefits while protecting critical ecosystems dependent upon NSAS.</p> <p>Trained stakeholders ensure environmentally and socially optimal development and protection of NSAS water and land resources and linked ecosystems</p>	<p>Completion of training on model use and maintenance;</p> <p>Training and assistance to undertake updates to national/regional policies and institutions;</p> <p>Establishment of a joint modeling centre within JA by year 2;</p> <p>Implementation of updated information management system within the JA/ countries by year 2;</p> <p>Adoption and implementation by countries and JA of Data & Information Protocols related to transboundary reporting of NSAS. IGRAC is participating in the OGC group that is developing an international protocol from groundwater data exchange. This specific knowledge will be used in the project as well.</p>	GEFTF	1,000,000	4,900,000
Component 3: Enabling SAP implementation through legal, policy and institutional reforms at both national and regional levels	TA	Improved regional and national legal, policy and institutional frameworks for the integrated management of joint NSAS resources	<p>Four NAPs developed, approved and under implementation by National Authorities by year 3;</p> <p>Updated National and regional legislation/policies and proposals for institutions reforms to reflect agreed SAP priorities and agreements by year 3;</p> <p>Joint Authority operational with strengthened role/capacity and with regular & sustainable</p>	GEFTF	800,000	4,500,000

			national financial contributions by year 4;				
Component 4: Implementing targeted pilot projects to validate environmentally and socioeconomically rational and equitable management approaches within the NSAS	TA	National governments and the Joint Authority obtain practical experiences and 'proof of concept' validation on appropriate ecosystem and water resource protection measures that support socio-economic development	Completion of four national/regional pilot demonstration that provide proof of concept for up-scaling/replication under the planned SAP activities; Strategies developed and incorporated in national plans for replication and financial/institutional sustainability of pilot demonstration activities at additional locations;	GEFTF	1,000,000	6,000,000	
Component 5: Pre-feasibility studies to identify NSAS investment opportunities	TA	Assessment of stress reduction and livelihood strengthening activities identified in the SAP leads to a broad investment programme to further catalyse SAP implementation	Reassessment of potential investments based on the SAP recommendations; Pre-feasibility reports on potential investments with outline budgets, scope of work and timescales; Convening a donor conference (year 4) to further stimulate SAP implementation through presentation of success stories etc.	GETF	400,000	2,400,000	
Subtotal						3,800,000	21,300,000
Project Management Cost (PMC) ⁴				GEFTF	190,000	1,000,000	
Total Project Cost						3,990,000	22,300,000

If Multi-Trust Fund project :PMC in this table should be the total and enter trust fund PMC breakdown here ()

⁴ For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Please include confirmed co-financing letters for the project with this form.

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
Recipient Government	Government of Chad	Unknown	2,000,000
Recipient Government	Government of Egypt	Unknown	2,000,000
Recipient Government	Government of Libya	Unknown	2,000,000
Recipient Government	Government of Sudan	Unknown	2,000,000
Donor Agency	International Atomic Energy Agency	Cash and In-kind	10,000,000
GEF Agency	UNDP	In-kind	300,000
UN Agency	UNESCO	In-kind	4,000,000
UN Centre	IGRAC	In-kind	tbc
Total Co-financing			22,300,000

D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS ^{a)}

GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) ^{b)}	Total (c)=a+b
UNDP	GEFTF	<input checked="" type="checkbox"/>	International Waters	(select as applicable)	3,990,000	379,050	4,369,050
(select)	(select)	<input type="checkbox"/>	(select)	(select as applicable)			0
(select)	(select)	<input type="checkbox"/>	(select)	(select as applicable)			0
(select)	(select)	<input type="checkbox"/>	(select)	(select as applicable)			0
(select)	(select)	<input type="checkbox"/>	(select)	(select as applicable)			0
Total GEF Resources					3,990,000	379,050	4,369,050

a) No need to fill this table if it is a single Agency, single Trust Fund, single focal area and single country project.

b) Refer to the [Fee Policy for GEF Partner Agencies](#).

E. PROJECT PREPARATION GRANT (PPG)⁵

Is Project Preparation Grant requested? Yes X No If no, skip item E.

PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee ⁶ (b)	Total c = a + b
UNDP	GEFTF	<input checked="" type="checkbox"/>	International Waters	(select as applicable)	150,000	14,250	164,250
(select)	(select)	<input type="checkbox"/>	(select)	(select as applicable)			0
(select)	(select)	<input type="checkbox"/>	(select)	(select as applicable)			0
Total PPG Amount					150,000	14,250	164,250

⁵ PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$50k for PF up to \$1 mil; \$100k for PF up to \$3 mil; \$150k for PF up to \$6 mil; \$200k for PF up to \$10 mil; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

⁶ PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS⁷

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	<i>(Enter number of hectares)</i>
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	<i>(Enter number of hectares)</i>
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	<i>1 basin</i>
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	<i>(Enter percent of fisheries, by volume)</i>
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO _{2e} mitigated (include both direct and indirect)	<i>(Enter number of tons)</i>
5. Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	<i>(Enter number of tons)</i>
	Reduction of 1000 tons of Mercury	<i>(Enter number of tons)</i>
	Phase-out of 303.44 tons of ODP (HCFC)	<i>(Enter number of tons)</i>
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	<i>4</i>
	Functional environmental information systems are established to support decision-making in at least 10 countries	<i>(Enter number of countries)</i>

PART II: PROJECT JUSTIFICATION

PROJECT OVERVIEW

1. *Project Description.* Briefly describes: 1) the global environmental problems, root causes and barriers that need to be addressed; 2) the baseline scenario or any associated baseline projects, 3) the proposed alternative scenario, with a brief description of expected outcomes and components of the project, 4) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing; 5) global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and 6) innovativeness, sustainability and potential for scaling up.

1) The Global Environmental Problem

The Nubian Sandstone Aquifer System (NSAS), covering approximately 2.6 million square kilometres (approximately 1,600 km East to West and North to South) of Northeast Africa in Chad, Egypt, Libya and Sudan, is one of the largest fossil freshwater aquifer systems in the world with reserves estimated at over 500,000 km³. The thickness of the aquifer varies from a few hundred metres at the southern peripheries to several kilometres in the centre and northern region. The four countries sharing the aquifer system face similar problems of arid climate, scarce surface water resources, persistent droughts and fragile ecosystems. The aquifer is a critically important source of water in this arid desert region and will be increasingly in demand in the future. As a fossil resource recharge is believed to have last occurred during the last ice age. All four countries have given priority to linking the NSAS groundwater exploitation to

⁷ Provide those indicator values in this table to the extent applicable to your proposed project. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period.

national development strategies and plans. Growing pressures on the NSAS poses threats to both the quantity and quality of the resource and could, if not appropriately managed, lead to transboundary tension.

The four countries, with the support of the GEF, have undertaken a Transboundary Diagnostic Analysis (referred to as a Shared Aquifer Diagnostic Analysis - SADA) and developed a Strategic Action Programme (SAP) that was adopted by ministers from each country in September, 2013. The SADA identified five transboundary and/or shared problems: (i) Declining water levels; (ii) Damage or loss of ecosystem and biodiversity; (iii) Water quality deterioration; (iv) Climate change; and, (v) Changes in groundwater flow regime (this last problem was not pursued further as it was recognised from the model's results that the problem did not occur outside the immediate area of well fields).

As noted in the SADA, climate change concerns are cross-cutting and may result in additional pressures through, for example, migration or conflicts between nomadic herders and pastoral farmers. Climate change in the form of higher temperatures and more arid conditions can affect water resources in the region in several ways. The aquifer itself will be almost unaffected, since there is practically zero recharge as it is. Higher evaporation and transpiration in oasis and sabkha areas will increase, but will not affect the water budget in any significant way.

The changes that can occur vary in the region. For example, if Mediterranean coastal rainfall decreases, Libya may rely more on the Great Man Made River as a freshwater source, resulting in increased demand on the aquifer there. The situation in Egypt is similar, but somewhat more complex. The Intergovernmental Panel on Climate Change predicted that flow in the Nile will remain steady or increase slightly over the next hundred years or so. However other factors, such as increased evaporation in Lake Nasser, reallocation of Nile resources among the riparian countries, and population increases all have the potential for increasing Egypt's reliance on the Nubian aquifer. Sudan is in the same situation as Egypt, except that their Nubian resources are more limited due to lower aquifer thickness in the southeast region of the aquifer. Increased aridity in Chad and parts of Sudan should not affect the aquifer resources themselves, but can significantly affect the grassland ecosystems that support pastoral practices. A better understanding of the impacts of climate change is necessary in order to separate the effects of the natural trajectory of the desert ecosystems from the human-related impacts.

These transboundary/shared problems were then addressed through a high-level SAP with agreed outline mitigation measures.

In undertaking the SADA and developing the SAP the region confirmed the following usage:

- Aquifer was only recharged during pluvial periods associated with glaciation cycles and the most recent recharge to the system occurred five to ten thousand years ago. Modeling studies indicate that the residence time of water in the deepest zones of the aquifer can exceed three million years. An isotopic study of water from oasis wells in the Western Desert of Egypt detected water in excess of one million years old.
- Development of (water extraction from) the Nubian aquifer began in the early 1960s in Libya and Egypt. Sudan began using the aquifer later, with significant withdrawals in the Khartoum region. Chad uses very little water from the aquifer.
- According to the FAO⁸ in the year 2000 demands on the Nubian aquifer comprised about one percent of total water demands for Egypt (0.825 km³ from the Nubian and 68.3 km³ total demands). While the Nubian now represents a relatively small portion of the country's water portfolio, it will likely become an important resource. Egypt relies almost entirely on the Nile River to supply its water needs. Increasing claims on the river from upstream countries, combined with steep population increases in Egypt and at least one upstream country, may result in water shortfalls within the next several decades.
- As with Egypt, Sudan relies almost entirely on the Nile River and riparian aquifers that it supports for its water needs. Nubian groundwater is recovered in Khartoum and several irrigation projects

⁸ http://www.fao.org/nr/water/aquastat/countries_regions/egypt/index.stm

are either planned or underway. Also similar to Egypt, Sudan is vulnerable to the effects of over-allocation of the Nile River.

- Libya is almost entirely dependent on fossil groundwater. The Great Man Made River project recovers water from the Nubian Aquifer in eastern Libya and another aquifer in its western desert. These investments in the country's water infrastructure will provide water security for Libya for the next several decades.
- The Nubian aquifer in Chad represents a small but potentially important part of their potential water resources. The aquifer supports a number of oasis ecosystems that are co-located with irrigation systems for date-growing agriculture and camel-herding routes. There is increasing interest in these oases as tourist destinations, which requires high levels of ecosystem quality to attract tourism, but also makes the oases more vulnerable to impairments as a result of the tourism.

In developing models the following forecasts were considered:

- The total reserves of the aquifer are immense. The CEDARE (Centre for Environment & Development for the Arab Region and Europe) modeling studies indicated that the recoverable volume of the aquifer is on the order of 500,000 km³, which roughly equals the flow of the Nile River at Aswan for 80 years.
- However access to these waters will be challenging. The recent modeling studies to support the SADA revealed that due to the low transmissivity of the system, groundwater pumping removes water only from the immediate vicinity of the wells themselves. This is the phenomenon that protects the system from significant transboundary movement of water, but also prevents efficient recovery of water over the long term.
- Because of the low transmissivity of the aquifer, pumping at any particular location results in high magnitudes of drawdown. These localized depressions in the elevation of the aquifer are long-lived and represent the most severe threats, both to oases and the ecosystems they support, as well as to the economic recovery of water from the aquifer.
- The Great Man Made River project in Libya anticipated these problems by installing spatially dispersed well fields at each pumping location. Even so, the engineers designing the well fields anticipated that the wells would have a service life of about 50 years, after which they would be abandoned and other well fields would have to be installed elsewhere.
- Modeling work conducted to support the SADA indicated that high magnitudes of drawdown can be supported in the Western Desert of Egypt and in Libya. However toward its southern and eastern edges, the aquifer is thin enough that pumping can deplete the aquifer locally. This can occur in the Khartoum area of Sudan where the aquifer is relatively thin.
- Responsible use of the aquifer will require developing strategies to recover water while minimizing the adverse effects of drawdown. These recovery strategies will need to be combined with conservation measures to minimize the demands, as well as to protect the aquifer from contaminated excess water recharged back to the aquifer.

2) Baseline Scenario and associated baseline projects

An important advancement in the management of the NSAS was the establishment of the Joint Authority for the Study and Development of the Nubian Sandstone Aquifer System. The Joint Authority was established in 1989 and officially launched in 1991, between Egypt and Libya with Sudan joining in 1996 and Chad in 1999.

Over the past 15 - 20 years there have been a number of initiatives to improve the understanding of the NSAS through the CEDARE with IFAD resources, assistance from the IAEA and most recently from the GEF through UNDP.

The CEDARE project resulted in a joint survey of the socio-economic development policies and plans in the aquifer areas and the establishment of a NSAS Regional Information System (NARIS) database. NARIS was envisioned to facilitate data storage, processing, display and analysis and would provide input files for geographic information system (GIS) and mathematical models. The groundwater modelling efforts have been well documented (CEDARE 2001) and provide indications of the impacts on water levels and water quality over a period of 60 years of development and abstractions.

The Joint Authority (JA) and the CEDARE programme made important advances in regional cooperation that resulted in an improved understanding of the aquifer system and established mechanisms for data sharing and groundwater monitoring and modelling⁹.

Since 2003, the GEF has been supporting a regional technical cooperation project to facilitate and promote the development of a framework for the optimal management and use of the NSAS among the Nubian system countries. This technical cooperation project, has helped improve the overall understanding of the NSAS and to set the basis and laid the groundwork for a partnership of the GEF, UNDP, UNESCO and IAEA to work with member countries to strengthen regional cooperation, address data gaps, improve the technical understanding of the NSAS, and develop policy strategies for managing the aquifer system. This partnership led to a broader Nubian project launched in 2006 as a UNDP-GEF MSP *'The Regional Formulation of an Action Programme for the Integrated Management of the Shared Nubian Aquifer'*, that, jointly with responsible national institutions, delivered a Shared Aquifer Diagnostic Analysis and developed a Strategic Action Programme which has been technically approved and endorsed by the Nubian Ministers with responsibility for water and the environment from the four countries and the Chair of the Joint Authority of the NSAS on 18th September 2013 in Vienna¹⁰. The SADA undertook a detailed analysis of the key transboundary problems, stakeholders and governance/management arrangements of the NSAS. The SADA included details of the use of both groundwaters and surface water usage in each country.

The SAP presents an agreed vision for the NSAS: *'to assure rational and equitable management of the NSAS for sustainable socio-economic development and the protection of biodiversity and land resources whilst ensuring no detrimental effects on the shared aquifer countries'*. To achieve this vision three overarching water resources/ecosystem quality objectives were defined: (i) to improve the management of the shared aquifer involving joint regional planning and taking into account climate change, population dynamics, etc.; (ii) to mainstream environmental issues into the overall integrated management of the NSAS to reduce biodiversity loss or damage; and, (iii) to utilise the Nubian aquifer resources on a sustainable socio-economic basis. Over one hundred key management activities, actions and targets were defined to strengthen the regional and national capacity to achieve the agreed vision, with the majority of these actions being under the co-ordination of the Joint Authority with co-operation with national institutes and ministries.

The work of the four countries in developing the agreed SAP has already resulted in a number of key benefits that will benefit the implementation process and reduce the risks associated with the project, namely: (i) Improved data sharing – as demonstrated by the willingness to make data available for the model; (ii) A shared regional groundwater model – as a result of the SADA activities; and, (iii) Improved understanding of transboundary threats.

UNDP is implementing programmes and projects across this region to assist countries and communities address land and water issues (including at the transboundary level), drought preparedness, and climate change, variability and adaptation. In addition, training resources from the UNDP CapNet (International network for Capacity Building in Integrated Water Resources Management) will be utilised to further assist the strengthening of IWRM capacity within national ministries and institutions within Component 2 of this project.

⁹ Constitution of the Joint Authority for the Study and Development of the Nubian Sandstone Aquifer; Agreement #1: Terms of Reference for the Monitoring and Exchange of Groundwater Information of the Nubian Sandstone Aquifer System, entered into in October 2000; and Agreement #2: Terms of Reference for Monitoring and Data Sharing, entered into in October 2000.

¹⁰ <http://www.thegef.org/gef/node/9925>

UNDP press release: <http://www.undp.org/content/undp/en/home/presscenter/pressreleases/2013/09/18/four-african-nations-agree-to-water-management-programme>

IAEA press release: <http://www.iaea.org/newscenter/pressreleases/2013/prn201314.html>

video link to ceremony: <http://www.youtube.com/watch?v=mbIDpxEtdwY>

UNESCO-IHP is continuously active in the region through the UNESCO Regional Office in Cairo, and the cooperation in various national and international projects and initiatives. Since 1995, the Observatory of the Sahara and the Sahel (OSS) and UNESCO established a fruitful cooperation for the development of dialogue platforms between countries sharing nonrenewable water resources and joined efforts to address the issues of the limited resources in the area.

Many of the aquifers are transboundary in nature, i.e. shared by two or more countries. A good understanding of the hydrogeological characteristics and dynamics of aquifer systems, as well as addressing the socio-economic, environmental, legal and institutional aspects is crucial to set governance and management frameworks. In response to such challenges and upon request of its Members States, UNESCO-IHP launched in 2002 a global multi-partner initiative dedicated to Internationally Shared Aquifer Resources Management (ISARM) aiming at providing support to Member States in conducting an inventory of transboundary aquifers globally by assessing their hydrogeological characteristics, as well as addressing the socio-economic, environmental, legal and institutional aspects; and providing guidance to Member States towards the sustainable management of shared groundwater resources. Since its start in 2002, ISARM has launched a number of global and regional initiatives. These are designed to inventory, map, delineate and analyze transboundary aquifer systems and to encourage riparian states to work cooperatively toward mutually beneficial and sustainable aquifer development. So far, more than 600 transboundary aquifers have been identified by UNESCO IHP in coordination with Member States and IHP National Committees.

In 2008, the 63rd session of the UN General Assembly (UNGA) adopted Resolution A/RES/63/124 on the Law of Transboundary Aquifers, which includes in its annex the draft articles of that law, prepared with the scientific support of UNESCO-IHP. The Resolution "...encourages the States concerned to make appropriate bilateral or regional arrangements for the proper management of their transboundary aquifers taking into account the provisions of the draft articles...". In 2011, another Resolution A/RES/66/104, adopted by the UNGA reiterates its call to States to "make appropriate bilateral or regional arrangements for the proper management of their transboundary aquifers", and calls upon UNESCO-IHP to offer further scientific and technical assistance to the States concerned. Taking into account the UNGA Resolutions on the Law of Transboundary Aquifers the Intergovernmental Council of the UNESCO International Hydrological Programme at its 20th Session, in June 2012, adopted in its turn the UNESCO IHP Resolution IC/XX-3 (Annex 1). The Resolution requests the UNESCO IHP programme to continue the Study and Assessment of Transboundary Aquifers and Groundwater Resources and encourages Member States to cooperate on the study of their transboundary aquifers, with the support of the IHP. As a follow-up of Resolutions, UNESCO-IHP has developed (jointly with IGRAC) indicator-based assessment methodologies to conduct transboundary aquifers assessment at global and local/regional level within the framework of "Transboundary Waters Assessment Programme" (TWAP). As part of this global study, important preparatory work included the identification of major challenges and an analysis of the Nubian sandstone system.

In addition, UNESCO-IHP and United Nation Economic Commission for Europe (UNECE) are currently undertaking joint activities in order to promote the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention), which aims to protect and ensure the quantity, quality and sustainable use of transboundary water resources by facilitating cooperation. In November 2012, the Parties of the Convention adopted a Resolution recognizing UNESCO expertise in the subject of transboundary aquifers and strengthening their cooperation for the promotion of the Water Convention and its Model Provisions on Transboundary Groundwaters. These provisions are based on the principles of the Draft Articles and the Water Convention is a global instrument open to all countries since February 2013, providing an improved framework for UNESCO activities on transboundary aquifers.

The IAEA has also undertaken a range of technical co-operation activities within specific countries and the region, including: supporting water resource planning (*Building capacity in support of regional and sub-regional water resources planning, development and management in Africa*); and pollution monitoring (*Contribution of isotopic and hydro-chemical techniques to assess sources of pollution in shallow groundwater basins - Sudan*).

The approaches used by UNDP/GEF in characterizing the aquifer and developing management action plans (SADA/SAP) and utilizing modelling techniques for the NSAS are applicable to other aquifer systems. The IAEA is in the process of developing An implementation plans is under development to replicate the approaches used in the NSAS and applying them (replication) to five aquifers in the Sahel region (Illumedden Aquifer System, Liptak-Gourma-Upper Volta System, Senegalo-Mauritanian Basin, Chad Basin and Taoudeni Basin) involving 15 countries. This should also The IAEA has agreed the overall programme (approximate budget of 7.5 M euro) that will both replicate the experiences from the Nubian project and provide input to this proposed SAP implementation project by sharing lessons and approaches to assist with both management strengthening through potential exchange activities and sharing of community activity results aimed at conserving and protecting the aquifers.

The IW: LEARN Groundwater COP will be an appropriate platform to share lessons from the implementation of this project and learn from the other GEF and non-GEF groundwater projects.

Without further support the goal of the endorsed SAP will not be achieved within the NSAS. While there have been significant advances in the understanding of the hydrogeology of the NSAS there is still a need to develop and enhance capacity to assess and protect the ecosystems dependent on the water resources of the aquifer, in particular to mitigate the potential impacts of climate change and variability within the region. In addition the Joint Authority needs further strengthening to develop and implement effective management actions (including a routine monitoring programme). Further work through pilot demonstration activities will assist the four governments in collaborative actions that will both strengthen their capacity on environmental management and improve the livelihoods of the local population dependent on the resources of the NSAS.

3) Proposed Alternative scenarios

This proposed project is to initiate the implementation of the endorsed NSAS SAP that, through legal, policy and institutional reforms, and supported by further capacity strengthening, technical support to address gaps identified in the SAP, and results from pilot demonstrations, will lead to rational and equitable management of the NSAS to the benefit of the ecosystems, economies and the population of the region. The project will further strengthen the function and role of the Joint Authority in its regional management of the shared aquifer in support of the four Nubian countries and to facilitate the equitable management of the groundwaters and surface waters.

This project addresses both GEF6 IW Objective 1: *‘Catalyse sustainable management of transboundary water systems by supporting multi-state co-operation through foundational capacity building, target research and portfolio learning’* and IW Objective 2: *‘Catalyse investments to balance competing water-uses in the management of transboundary surface and groundwater and enhancing multi-state co-operation’*. In undertaking this planned project to initiate the implementation of the agreed SAP, contributions will be made to four outcomes associated with these Objectives, including: Outcome 1.2 (*On the ground demonstration actions implemented, such as in water quality, quantity, conjunctive management of groundwater and surface water, fisheries, coastal habitats*); Outcome 3.1 (*Improved governance of shared water bodies, including conjunctive management of surface and groundwater through regional institutions and frameworks for co-operation lead to increased environmental and social benefits*); Outcome 3.2 (*Increased management capacity of regional and national institutions to incorporate climate variability and change, including improved capacity for management of floods and droughts*); and, Outcome 4.1 (*Increased water/food/energy/ecosystem security and sharing of benefits on basin/sub-basin scale underpinned by adequate regional legal/institutional frameworks for co-operation*).

The project will initiate a number of activities to validate the SAP proposed approaches through pilot demonstration activities and work with national and regional authorities to implement changes in governance, policies and practices that will result in improved capacities (technical and management) that will deliver the expected objective of this project. The project will also address some of the gaps that were identified in the development of the SAP, including: (i) NSAS hydrological status (the lack of data for most of the aquifer) and further analysis using isotopic age dating using krypton 81 (and other advanced hydrogeological techniques) that will further improve the model's performance; (ii) Improving both the

capability and capacity to undertake ecosystem assessment and vulnerability of the region's oases to provide improved management guidance to mitigate the impacts of abstraction and development; and, (iii) to develop agreed common approaches to assessing and managing the impacts of climate change on grasslands and aquatic ecosystems of oases.

To-date there have been no observed transboundary impacts from abstraction from the aquifer. Although this may be the result of model or data (monitoring) limitations, the implementation of the SAP presents a unique opportunity to create shared management strategies oriented around prevention of possible conflicts. The risk of direct transboundary effects is low, but is sufficiently large to merit vigilance through improved and co-ordinated monitoring and data-sharing. The region is also in a position to take advantage of the existing framework of the Joint Authority to cooperate in shared management of the aquifer to minimize the risk of adverse impacts from national activities.

The project will address key targets identified in the agreed SAP on reforming /updating legal, policy and institutional arrangements, strengthening capacity and implementing collective measures within the four countries and at the regional level to protect the resources of the NSAS and associated ecosystems. Through strengthening national institutions and the regional Joint Authority this project will result in assisting with sustaining the effective operations of the Joint Authority to co-ordinate the management of the NSAS.

The project will be undertaken through four inter-linked components and supported by a regional project management co-ordination unit (PCU) planned to be co-located within the offices of the Joint Authority¹¹.

- Component 1 will further improve the technical understanding of the NSAS and associated ecosystems to provide a common basis for the future joint management of the resource within the region;
- Component 2 will address the SAP priorities to strengthen national and regional capacities on water resource and ecosystem management and assist in increasing awareness within the wider stakeholder groups (including the indigenous population) on ecosystem management and protection.
- Component 3 will further enhance the implementation of the SAP at the national level through strengthening policy and institutional reforms through National Action Plans;
- Component 4 will implement a range of pilot demonstration activities (based on preliminary recommendations in the SAP) that will act to catalyse national and regional interest in up-scaling and replication.
- Component 5 will undertake pre-feasibility studies to aid future investment strategies and to identify appropriate donors to build on this catalytic project initiating the implementation of the SAP.

Component 1: Collaborative actions to further validate the functioning of the NSAS and its resources

Although the Nubian countries have made great advances in understanding the condition of the aquifer and the linkages between potential changes in the aquifer and responses of environmental and human systems, much work remains. To improve the joint management of the resource the following gaps identified in the SAP will be addressed that will strengthen the common understanding of the functioning of the NSAS:

- ***Aquifer characteristics and groundwater regime:*** The single greatest limitation in analyzing data for this project was the uncertainty introduced by the lack of geologic and hydrologic data¹². Vast expanses of the aquifer are essentially unknown. Modelling activities were able to provide forecasts of future effects of abstraction, however, improved knowledge is necessary to confirm these findings and improve statistical confidence in the predictions. Improved knowledge can be based only on additional hydrogeological assessment.

¹¹ Location to be confirmed.

¹² The development and operation of an updated 3-dimensional hydrogeological model during the MSP indicated that, based on limited observational data, there was little transboundary concern from the impacts of pumping within countries, but that the impact had significant local impacts that were manifested in all countries.

- **Isotopic Age Dating:** A promising technique employed in this project has been the analysis of groundwater in Egypt for krypton-81 isotope ratios (^{81}Kr). These data revealed ages of groundwater on the order of hundreds of thousands of years and were important in confirming theories regarding water movement in the aquifer. Existing wells in Libya and Egypt can be sampled for this analysis and as a result important information can be provided at a relatively low cost.
- **Ecosystem Assessment and Vulnerability:** Only limited data appear to be available on the condition of terrestrial and oases ecosystems and there is a need to identify endemic species at risk and to develop a prioritized biodiversity inventory. The calibrated regional groundwater model has not yet been applied extensively. An important early application of the model is to refine the grid in the region of pumping and oasis areas and determine the vulnerability of oases ecosystems to abstraction. This also implies to characterize the evolution of demands in relation to agricultures and population dynamics among other economic developments as this might imply additional pressure on the ecosystem. This is very much related with data available and will ask for additional assessment.
- **Climate Change Threat:** Adverse environmental changes are likely to occur in both grasslands and aquatic oasis ecosystems. A better understanding of the impacts of climate change is necessary in order to separate the effects of the natural trajectory of the desert ecosystems from the human-related impacts.

In addition to addressing these gaps within the four countries and sharing the results within the framework of the Joint Authority, further work to refine the hydrogeological model using the updated data provided by the countries and to develop and implement a transboundary monitoring network is expected, building on existing national groundwater and climate monitoring networks. Monitoring activities will be expanded to include the NSAS dependent ecosystems; to develop and implement protocols for monitoring socio-economic development consistently across the NSAS; and to agree the parameters for monitoring the direct and indirect impacts of climate change on the NSAS and related ecosystems. In the framework of GGMN (Global Groundwater Monitoring Network) UNESCO Programme, a web-based portal has been developed to serve for storage, processing and dissemination of groundwater (-related) information. This portal will be made available to the aquifer countries during the project execution and after its termination in order to sustain monitoring activities.

The expected **outputs** from Component 1 include:

- Reducing uncertainties to achieve a common understanding of the NSAS functioning from joint studies
- Joint Regional monitoring network implemented and operational by year 3
- Updated and operational hydrological model at national and regional level
- Assessment of oases ecosystems and vulnerability (including climate change impacts)

Improvements to the NSAS model will further enhance the understanding of the impacts of groundwater abstraction, especially in sensitive cross border locations and to better interpret potential impacts of groundwater level change on oases and the dependent ecosystems. The development of a regional monitoring network will both complement the model and provide important management information for national authorities and the JA.

Component 2: Strengthening capacity of national organisations and the Joint Authority, in-line with SAP, to manage the NSAS resources in sustainable manner

The SAP acknowledged *'that the Nubian countries vary considerably in their capacities for field, laboratory monitoring, and groundwater modeling activities. The co-operative mechanisms developed through the Joint Authority need to be exploited to equalize capacity among the countries'*. This component will focus on addressing these issues that will also assist with long-term sustainability by strengthening the capacities of the Joint Authority to undertake the day-to-day technical management of the NSAS.

Specific functions to be strengthened by this project to enhance the regional water management include:

- Improve the capacity and capability of the four countries and the JA to utilise the model and to implement updates to the functionality of the model, that would lead to a Joint Modelling Centre within the JA;
- Assist the countries with isotope studies and their interpretation to provide enhanced data for the agreed model;
- Update the existing data and information system to provide both national and regional authorities with appropriate management information. The IGRAC experience gained with development of GGMN, Global Groundwater Information System, can be very instrumental here. Moreover, one of the options is to customise a transboundary aquifer module of the GGMN to serve the Nubian aquifer sharing countries.
- Strengthen the national and regional capacity to review and revise legal and institutional arrangements that will enhance the shared management of the NSAS and assist with planned updating of the JA agreement including governance and remit (linked with Component 3);
- Undertake training and support to undertake regional joint studies to address the NSAS knowledge gaps identified in the SAP (linked with Component 1);
- Design and implementation of data and information systems within the JA and four countries;
- Assisting the Joint Authority with the identification of sustainable financing mechanisms for managing and operating a central modelling facility;
- Develop training courses (linked with national academic institutes) to support capacity in undertaking environmental assessments of oases and to agree regional procedures for vulnerability assessments of oases;
- Initiate and maintain technical and management exchanges with key international groundwater centres of excellence and water management commissions/authorities;
- Develop national and regional skills to communicate NSAS activities and issues to stakeholders.

The expected **outputs** from Component 2 include:

- Completion of training on model use and maintenance
- Training and assistance to undertake updates to national/regional policies and institutions
- Establishment of a joint modeling centre within JA by year 2
- Implementation of updated information management system within the JA/ countries by year 2.
- Adoption and implementation by countries and JA of Data & Information Protocols related to transboundary reporting of NSAS. IGRAC is participating in the OGC group that is developing an international protocol from groundwater data exchange. This specific knowledge will be used in the project as well.

The project will work closely with GEF IW:LEARN and related regional initiatives (e.g. through MENARID programme) to further disseminate experiences and results. 1% of the GEF budget will be devoted to supporting IW:LEARN activities (including GEF IW Conferences, Experience Notes, Exchanges, participation in Communities of Practice, etc.).

Component 3: Enabling SAP implementation through legal, policy and institutional reforms at both national and regional levels

The effective implementation of the agreed SAP requires the countries of the NSAS to develop corresponding National Action Plans (NAPs) - specific to each country – aligned with national development plans/policies and where necessary to transform policies and institutions to deliver the expectations of the SAP. In addition the SAP stresses the importance of strengthening the legal and institutional framework at the regional level through the Joint Authority. This component will address both the needs of national governments to develop and to initiate the implementation of NAPs and to formally review, and if needed, enhance the legal status and remit of the JA.

National teams will engage stakeholders to develop NAPs that address each countries specific needs and common elements to all countries. A series of national and regional workshops will be required to review national policies and institutions and develop appropriate changes where needed. The reviews will cover: national monitoring and sharing of data; legal and institutional mechanisms to protect groundwater from over exploitation and consideration of ecosystem dependency on groundwater (taking into consideration potential impacts from climate change, economic development, population increases and migration, etc.); development of common (between the four countries) policies and procedures for managing the NSAS, including approaches for ensuring common adopted management actions are ‘climate proofed’ . This work will result in NAPs that are in-line with the agreed SAP for government approval and support.

The NAPs will present a road-map for the implementation of key legal and institutional reforms, at the national level, identified within the SAP, and ensure the regional compatibility of the approaches between each country. The NAPs will also include the means and mechanisms for outreach/awareness raising targeted at various stakeholder groups to reinforce the importance of the protection and equitable use of the aquifer and the need for effective management of groundwaters and surface waters. Following the development of the NAPs, implementation of the SAP recommended reforms will be undertaken in each country addressing the key targets, specifically:

- **Target 1a.1:** Establish enhanced transnational mechanisms to strengthen the existing cooperation through the Joint Authority and explore new areas of cooperation.
- **Target 1a.2:** Establish a cooperation framework on data exchange
- **Target 1a.3:** Ensure the effective establishment and performance of National Offices of the Joint Authority
- **Target 1b.1:** Enhance legal and institutional mechanisms to exercise regional protection and control on water use activities and priorities
- **Target 1c.1:** Establish legal and institutional mechanisms to enable adaptation to climate change
- **Target 2a.1:** Establish a regional legal and institutional mechanism to protect the NSAS dependent ecosystems and biodiversity, and extend the competence of the Joint Authority in this field
- **Target 3a.1:** Establish legal and institutional procedures to develop transboundary cooperation and integration of the NSAS dependent socio-economic activities and schemes of land use; considering efficient utilization of the waters
- **Target 3b.1:** Develop a strategy to establish cooperation on prevention, control and management of human migrations in the Nubian region

The expected **outputs** from Component 3 include:

- Four NAPs developed, approved and under implementation by National Authorities by year 3
- Updated National and regional legislation/policies and proposals for institutions reforms to reflect agreed SAP priorities and agreements by year 3 as indicated above in the examples of specific SAP targets;
- Joint Authority operational with strengthened role/capacity and with regular & sustainable national financial contributions by year 4

Achievement of these planned targets through the management actions agreed in the SAP will result in improvements of the operation of the JA to regionally co-ordinate the ecosystem and water resources protection strategies across the NSAS.

Component 4: Implementing targeted pilot projects to validate rational and equitable management approaches within the NSAS

Up to four pilot projects are integral to validating the approaches for resources and ecosystem management within the NSAS. Three overarching themes were agreed in the SAP that should be further explored as 'proof of concepts' to assist with the development of the NAPs and to encourage additional national resources to be provided that will aid sustainability of the SAP actions and facilitate replication /up-scaling of the pilots both nationally and regionally.

The focus of these pilot demonstrations will be addressing elements that are either of common problem (i.e. shared) or can be used in specific transboundary locations that will further encourage international co-operation. The final selection of the pilots to be implemented (issue, location, etc.) will be concluded during the Project Preparation Grant stage with regionally agreed criteria for selection. Candidate criteria are likely to include availability of co-finance; maturity of pilot concepts; stakeholder involvement and support; sustainability post pilot intervention; opportunity/potential for replication/up-scaling; etc. . The themes are:

- **Water Conservation:** The SAP identified a range of actions that would be beneficial to protecting the NSAS resources through reducing demand and pollution to encourage reuse of wastewaters. These will address water conservation in different sectors (agriculture – including irrigation methods, the use of alternative crops, reducing impacts from agro-chemicals, industry – including oil polluted waters, wastewater, etc.) and highlight the benefits of integrated land-water management. Where appropriate, links and experience exchange will be made with relevant MENARID projects within the North African / mid-East regions. (for example this Project will link with MENARID theme of groundwater's role in land management and agricultural production including aquifer recharge management – water harvesting, and the enhancement of traditional knowledge, in MENA countries in order to promote integrated land and groundwater management practices and solutions aimed at increasing the effectiveness of soil conservation efforts and more generally of land degradation mitigation initiatives and link with progress made with IW:LEARN collaboration on these issues within the MENA countries).
- **Ecosystem Conservation:** To-date there has been little assessment of ecosystems that are dependent on the NSAS water, specifically at oases. The SAP identified the need to implement a range of demonstration activities at national locations (with common features to aid replication) and at transboundary sites (for example the establishment of a cross-border protected area between Chad and Sudan). These pilot activities will be important for both national and regional authorities to gain experiences from and for local communities who are dependent on the ecosystem services provided by oases to better appreciate the value and the vulnerability of these important groundwater dependent resources.

The countries of the NSAS identified the following as potential candidate pilot demonstrations within the SAP:

Chad

- Protection of the water quality in Guelta Archei and Bachikite through actions to reduce the detrimental impact of nomadic animal breeders at oasis (by reducing animal waste in the vicinity of the oasis) through the provision of new wells and protection measures).
- Estimation of the recharge of the NSAS at the southern boundary and the mechanism of water flowing at the contact zone between the bedrock and the paleozoic formation

Egypt

- Assessment of Transboundary environmental impacts of large-scale groundwater development projects: "The East Ewinut ".

- Environmental impacts of climate change on the coastal aquifer in northwest Egypt "Siwa and East Katara Depression", post-Nubian aquifer and wadi aquifer.
- Application of water use association for pumping well in el Kharga Oasis.

Libya

- Possibilities of Recent NSAS Recharge
- Environmental Impacts of Petroleum Exploration and Oil fields Development on Groundwater in NSAS
- Environmental impacts of NSAS Development On Existing Lakes
- Groundwater Discharge to Natural Outlets

Sudan

- Groundwater flow modelling at Wadi el Mugadam Area
- Development of Wadi Hawar Area
- Development of Salima Oasis

The final identification and selection of pilot demonstration activities, consistent with the three thematic areas, will be concluded during the PPG phase and will involve wide stakeholder consultation to ensure national/local acceptance of the concepts and to generate additional local co-financing to support both the pilot activities and to sustain these where possible post-project.

The expected **outputs** of Component 4 include:

- Completion of four national/regional pilot demonstration ~~that provide proof of concept~~ for up-scaling/replication under the planned SAP activities.
- Strategies developed and incorporated in national plans for replication and financial/institutional sustainability of pilot demonstration activities at additional locations

All the demonstration pilot activities will be closely linked with Component 2 – Capacity Development – to use practical experience to further strengthen the national and regional skills necessary for the future sustainable management of the NSAS. Integral to each demonstration project will be the development of a national and regional plan to support sustainability and to assist with identifying additional sites (and financial resources) for replication. In addition, the lessons from the four demonstration actions will be widely disseminated to stakeholders across the region (in particular to decision makers, farmers, nomadic herdsman) to further encourage uptake of the concepts tested.

Component 5 Pre-feasibility studies to identify investment opportunities

Recognising the significant investments that are required to fully implement the SAP, this project will undertake a pre-feasibility assessment to review these needs and to recommend specific investments and approaches to protect the NSAS, improve livelihoods and better understand the approaches required to further support the SAP implementation.

The project will review the list of potential investments addressing recommendations in the SAP for stress reduction and livelihood strengthening activities. Potential investments will be further developed with pre-feasibility assessments, budgets and outline descriptions for further action during the FSP implementation along with the identification of potential donors that will be fully involved in the pre-feasibility studies. To further facilitate the implementation of the SAP, a donor conference will be organized towards the end of this project.

Key outputs of this component will include:

- Reassessment of potential investments based on the SAP recommendations.
- Pre-feasibility reports on potential investments with outline budgets, scope of work and timescales;
- Report from a donor conference (year 4) in partnership with the Joint Authority summarizing the key actions that require further investment, the benefits and lessons from the pilot demonstrations, sustainability plans and a road-map for further SAP implementation.

The PPG phase will also be utilized to explore synergies with the GEF Small Grants Programme (SGP) and develop collaborative initiatives that are consistent with the SAP and the mandate of the SGP.

Implementation Arrangements

The project will be implemented by UNDP overseeing the compliance with GEF and UNDP policies and providing linkages with other GEF initiatives on groundwater management. The project will be executed through UNESCO/IHP (providing project management and technical support on data management, interpretation and reporting). Already for more than a decade, UNESCO-IHP has been involved in execution of GEF IW projects and in particular those dealing with internationally shared groundwaters. Together with UNESCO-IGRAC (International Groundwater Resources Assessment Centre), UNESCO-IHP has developed a specific methodology for assessment of transboundary aquifers, including data collection, processing and storage. An interactive web-based Information Management System set up specifically for transboundary aquifers will be customized for the purpose of this project and made available to participating countries. The IAEA, through an Inter-Agency Agreement, will have responsibility for technical capacity development (isotope methods, hydrogeological model enhancement and training, etc.). The PCU will be co-located within the offices of the Joint Authority to assist with both project implementation and to assist with capacity strengthening of the JA.

4) Incremental Cost Reasoning

Through the implementation of the endorsed SAP, GEF will support the strengthening of the capacities of countries and JA to develop and implement new policies and procedures (including monitoring / modeling of aquifer and ecosystem assessments – resulting in new skills), testing of shared and common approaches to management and the piloting of novel approaches within the region to reduce pressures on the aquifer. Through the GEF resources (and expected national and partner co-financing) the countries (and the JA) will collaboratively implement pilot demonstration activities that will further enhance the knowledge and capacity of all involved stakeholders to utilize the NSAS resources for multiple purposes including protecting the water dependent ecosystems. The GEF resources and IAEA technical input (on the model and the use of isotope studies) will further improve the understanding (and thereby, management) of the NSAS.

The project's objectives of enhancing regional co-operative governance through the JA, through national legal, policy and institutional reforms, capacity development, through improving the technical understanding of the complex aquifer and its interactions with surface ecosystems, and through the shared undertaking of pilot demonstration projects, will result in improved sustainability of the resources, ecosystem and livelihoods of the NSAS population.

5) Global Environmental Benefits

Initiating the implementation of the regional SAP will assist in protecting this valuable fossil water resource from further impacts of pollution and more significantly, protecting the water dependent ecosystems of the oases from further excessive dropping water level, through the introduction of policies and practices to effectively manage water use. The importance of the oases ecosystems has yet to be established and developing capacity within the region to assess impacts from any decrease in water level will be an important step towards mainstreaming these issues within national policies.

6) Innovativeness and sustainability

The preparation of the SADA and the SAP was linked to the innovative work undertaken with IAEA through the use of isotope studies and the development / updating of the innovative three-dimensional NSAS hydrological model. The use of both isotopes and the model will continue during the SAP implementation to ensure that these are continually refined and that the skill-base is established within the region to ensure the sustainability of the knowledge/skills gained. This SAP implementation project will also begin the innovative process within this region of linking the NSAS with water dependent ecosystems through an improved understanding of the goods and services provided by oases.

All project activities, in particular the pilot demonstration activities, will incorporate the development of sustainability and national/regional replication plans from the outset.

2. *Stakeholders.* Will project design include the participation of relevant stakeholders from civil society and indigenous people? (yes X /no) If yes, identify key stakeholders and briefly describe how they will be engaged in project design/preparation.

During the SADA a detailed stakeholder analysis was undertaken and during the PPG stage this will be reassessed to reflect any changes resulting from the government transitions that have occurred over the last two - three years. However based on the experiences of the SADA and the SAP developed through the GEF MSP key stakeholder groups will include governments (ministries and institutes), users (agriculture, industry and civil society) and the Joint Authority. Additional analysis and engagement will be undertaken to involve nomadic people that will also benefit from the improved governance and management of the NSAS.

The PPG phase will see the development of a draft communication / outreach strategy and plan to actively engage all relevant stakeholder groups (including CSOs, NGOs, farmers associations, nomadic representatives, institutes, government representatives, etc.)

6. *Gender Considerations.* Are gender considerations taken into account? (yes /no). If yes, briefly describe how gender considerations will be mainstreamed into project preparation, taken into account the differences, needs, roles and priorities of men and women.

Lack of information represents a barrier to the assessment and monitoring of gender equity issues at all levels, including transboundary. In the water resources area there is a vacuum of gender information. Since recent years, countries are becoming sensitive to the need of collecting gender information when carrying out national surveys and agricultural censuses but still the information is scarce and can rarely be compared due to the lack of uniform criteria in the collection of information. To overcome this barrier, the proposed project will consider gender sensitive indicators developed by United Nations World Water Assessment Programme (WWAP) – tailored to the environmental and socio- economic conditions of the study area that could be used in the domain of groundwater resources to assess the process of women empowerment in the use of the water resources. Essentially, they will provide the snapshot of the situation, or baseline, at the national and aquifer level. The indicators that will be considered will focus on the use of water in agriculture and for domestic use and sanitation, considering that these uses represent for most of the countries more than 90 percent of the total uses.

The project will further mainstream gender considerations within the planning and actions of all activities within this project. In particular the role of women in water use and water management will be recognised in both Component 2 (strengthening capacity) and Component 4 (implementing targeted pilot projects) where the specific needs of women will be considered to encourage greater participation in all aspects of water use and management. Within the direct control of the project and in line with UNDP and other UN gender parity policies and practices, encouragement will be given for women to apply for positions within the PCU and for consultancy positions.

4. *Risk.* Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable):

Risk	Rating	Mitigation Strategy
Political stability	M -H	International support for this regional project will provide some additional assistance to maintaining political stability within the region but it is clearly recognized that ongoing political uncertainty and poor security may limit project implementation progress, particularly in Libya.
National support for the Joint Authority	L-M	It is clear that although the JA has been in existence for a number of years there

		has been limited financial support from the countries to facilitate routine operation. The project will assist with strengthening the legal basis for the JA and by providing capacity development for both the JA and corresponding national authorities
Willingness to share information between countries	L -M	Although there has been limited data exchange through the NSAS Regional Information System (NARIS) the development of the SADA and the SAP has shown willingness of the countries to co-operate and share data. The project will continue to support the collaborative approach adopted in the previous GEF MSP to encourage data sharing.
National approval of demonstration activities in transboundary locations	L	By ensuring active involvement of the countries in the PPG stage only pilot demonstration projects that are actively supported with required co-financing will be confirmed for the proposed project.

5. *Coordination.* Outline the coordination with other relevant GEF-financed and other initiatives.

The project will collaborate with other on-going GEF initiatives involving groundwater in the region (including the MENARID programme) and support to water commissions/authorities. In particular the project will actively participate within the GEF IW:LEARN groundwater experience sharing activities and will proactively collaborate and participate in twinning events with other GEF IW projects. At least 1 percent of the GEF project budget will be dedicated to portfolio learning through IW:LEARN.

The on-going GEF initiatives in the region (including Nile Groundwater MSP, Lake Chad etc.) will contribute to the increase in IW awareness within the region and the sharing of experiences within the NSAS and adjacent projects.

Close co-operation is expected with the broader IAEA programme to replicate the SADA/SAP and modeling approaches from the previous GEF NSAS project to five Sahel Aquifers¹³ through sharing experiences and organizing exchanges between the Joint Authority of the NSAS management bodies in these other systems.

UNESCO-IHP is a leading the ISARM (Internationally Shared Aquifer Resources Management) programme, a multi-agency effort aimed at improving the understanding of scientific, socio-economic, legal, institutional and environmental issues related to the management of transboundary aquifers. The ISARM activities in the region started already in 2002 by the International Workshop on "Managing Shared Aquifer Resources in Africa" hosted by the General Water Authority of the Libyan Arab Jamahiriyan More than 200 experts of different disciplines from 30 countries and from regional and international organisations and associations attended the workshop in Tripoli. In 2008, the 3rd International Conference on Shared Aquifer Resources in Africa was held in Tripoli (<http://www.isarm.org/publications/298>). Since then, UNESCO-IHP and UNESCO groundwater centre IGRAC have been constantly active in the region, in the last two years also through implementation of GEF TWAP project.

¹³ Illumedden Aquifer System, Liptak-Gourma-Upper Volta System, Senegalo-Mauritanian Basin, Chad Basin and Taouden Basin

6. *Consistency with National Priorities.* Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes X /no). If yes, which ones and how: NAPAs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.

1) National strategies

The overarching regional strategy that has been adopted by the four countries is the NSAS SAP which is aimed at protecting the water resources and the dependent ecosystems that will also enhance the livelihoods of the regional population. In the preparation of the regional SAP all four countries initiated the development of national action plans (that will be further developed and implementation started under this project) to ensure that the objectives of the SAP are closely aligned to national expectations. The four countries have demonstrated their commitment to co-operation and implementing the SAP through the formal endorsement of the SAP by the Ministers from all countries. Specifically the countries have identified the following issues of importance:

Chad: The strategies adopted in the SAP are consistent with the needs and requirements of Chad and specifically the regional benefits of developing shared information and understanding of the NSAS resources.

Egypt: The NSAS is used extensively for agriculture and closely linked to socio-economic development in the old traditional oases of the New Valley. As a consequence the role of groundwater resources has been given more emphasis in recent national water policies, specifically for the NSAS, to protect resources, control demand, develop additional resources and to increase water use efficiency.

Libya: The NSAS is used extensively for agriculture and closely linked to socio-economic development in the old traditional oases of the Kufra, Jalo/Ojla, Tazerbo and for domestic uses in northern coastal areas. As a consequence, the role of groundwater resources has been given more emphasis in recent national water policies, specifically for the NSAS: to protect resources, control demand, develop additional resources and to increase water use efficiency. The industrial and municipal impacts on the ecosystem from wastewater and pollution are resulting in updated national policies (e.g. from lakes and ground water pollutions from the oil fields or from sanitation networks). The proposed pilot projects support these national initiatives.

Sudan: The SAP implementation is consistent with key national policies (e.g. Rural water supply and sanitation policy, Urban water supply and sanitation policy, Water resources and IWRM policy) and, the goals of the Ministry of Agriculture and the Ministry of Water Resources (in July 2012 the responsibility of the Ministry of Irrigation and Water Resources was divided between the Ministry of Agriculture and the formation of the Ministry of Water Resources).


PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY (IES)

- A. Record of Endorsement¹⁴ of GEF Operational Focal Point (S) on Behalf of the Government(s):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [SGP OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Hakim Djibril	National GEF OFP - CHAD	MINISTERE DE L'ENVIRONNEMENT ET DES RESSOURCES HALIEUTIQUES	
Eng. Ahmed ABOU ELSEOUD AHMED	National GEF OFP – EGYPT	EGYPTIAN ENVIRONMENTAL AFFAIRS AGENCY	
Dr. Mustafa Soliman	National GEF OFP – Libya	Environment General Authority (EGA)	
Dr. Babiker Abdalla Ibrahim	National GEF OFP – Sudan	MINISTRY OF ENVIRONMENT, FORESTRY AND PHYSICAL DEVELOPMENT	

B. GEF Agency(ies) Certification

This request has been prepared in accordance with GEF policies¹⁵ and procedures and meets the GEF criteria for project identification and preparation under GEF-6.

Agency Coordinator, Agency name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email
Adriana Dinu UNDP/GEF Executive Coordinator		13 August 2015	Vladimir Mamaev, Regional Technical Advisor		vladimir.mamaev@undp.org

C. Additional GEF Project Agency Certification (*Applicable Only to newly accredited GEF Project Agencies*)

For newly accredited GEF Project Agencies, please download and fill up the required **GEF Project Agency Certification of Ceiling Information Template** to be attached as an annex to the PIF.

¹⁴ For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required

even though there may not be a STAR allocation associated with the project.

¹⁵ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF