AFB/PPRC.2/5
September 10, 2010

Adaptation Fund Board
Project and Programme Review Committee
Second Meeting
Bonn, September 15, 2010

PROPOSAL FOR EGYPT

I. Background

1. The Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund, adopted by the Adaptation Fund Board, state in paragraph 41 that regular adaptation project and programme proposals, i.e. those that request funding exceeding US$ 1 million, would undergo either a one-step, or a two-step approval process. In case of the one-step process, the proponent would directly submit a fully-developed project proposal. In the two-step process, the proponent would first submit a brief project concept, which would be reviewed by the Project and Programme Review Committee (PPRC) and would have to receive the approval by the Board. In the second step, the fully-developed project/programme document would be reviewed by the PPRC, and would finally require Board's approval.

2. The Templates Approved by the Adaptation Fund Board (Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund, Annex 3) do not include a separate template for project and programme concepts but provide that these are to be submitted using the project and programme proposal template. The section on Adaptation Fund Project Review Criteria states:

> *For regular projects using the two-step approval process, only the first four criteria will be applied when reviewing the 1st step for regular project concept. In addition, the information provided in the 1st step approval process with respect to the review criteria for the regular project concept could be less detailed than the information in the request for approval template submitted at the 2nd step approval process. Furthermore, a final project document is required for regular projects for the 2nd step approval, in addition to the approval template.*

3. The first four criteria mentioned above are:
   1. Country Eligibility,
   2. Project Eligibility,
   3. Resource Availability, and
   4. Eligibility of NIE/MIE.

4. Based on the Adaptation Fund Board Decision B.9/2, the first call for project and programme proposals was issued and an invitation letter to eligible Parties to submit project and programme proposals to the Adaptation Fund was sent out on April 8, 2010.

5. According to the paragraph 41 of the operational policies and guidelines, a project or programme proposal needs to be received by the secretariat not less than seven weeks before a Board meeting, in order to be considered by the Board in that meeting.

6. The following fully developed project document titled "Promoting Mariculture as an Adaptation Strategy to Sea Level Rise in Nile Delta" was submitted by the United Nations Development Programme (UNDP), which is a Multilateral Implementing Entity of the Adaptation Fund. A concept for this project, diary number AFB/MIE/Coastal/2010/1 was submitted to the Adaptation Fund Board in its 10th meeting and was deferred. The current proposal was received by the secretariat in time to be considered in the 11th Adaptation Fund Board meeting. The secretariat carried out a technical review of the fully developed project document and filled in a review sheet.

7. In accordance with a request to the secretariat made by the Adaptation Fund Board in its 10th meeting, the secretariat shared this review sheet with UNDP, and offered it the opportunity of

providing responses before the review sheet was sent to the Project and Programme Committee of the Adaptation Fund.

8. The secretariat is submitting to the Project and Programme Review Committee the summary of the project, prepared by the secretariat, in Annex 1. The secretariat is also submitting to the Committee the technical review sheet and the responses provided by UNDP, and a revised proposal as confidential documents.

Project Summary

Egypt – Promoting Mariculture as an Adaptation Strategy to Sea Level Rise in Nile Delta. Implementing Entity: *UNDP.* Executing Entities: *Ministry of Water Resources and Irrigation, Coastal Research Institute, National Water Research Center)*

Project execution cost: USD 400,000
Total project cost (execution included): USD 5,200,000
UNDP management fee: USD 520,000 (10%)
Total amount of financing requested: USD 5,720,000

Project Background and Context: The Nile Delta coastal zone is highly vulnerable to the impacts of sea level rise through direct inundation and salt-water intrusion. The Rosetta region, which is located near the intersection of the Rosetta branch of the Nile River with the Mediterranean Sea, has encountered excessive erosion rates near its promontory. The proposed project will aim at introduction of mariculture as an adaptation technology that offers an alternative sea defense and livelihood diversification option to help minimize the adverse impacts of climate change.

Component 1: Technical design and socio-economic feasibility of mariculture development (USD 500,000)

The expected outcome of this component is to develop the technical capacity for scientifically sound and socio-economically feasible mariculture development in the Rosetta area of the Nile Delta. This component's outputs include the generation of models to determine potential climate change impacts on spawning migration and availability of juvenile for pond farming, a field-based study to identify the most appropriate native fish species for changed climate conditions, the completion of bathymetric surveys and the collection of data of available wind, wave, sea level and current. Other outputs include the technical engineering design and drawings for the fish pond embankments and cages as sea defense systems, scientific design of the mariculture system, and the development of a mariculture business plan with participation of local companies and community groups.

Component 2: Policy and regulatory framework for mariculture development (USD 350,000)

The expected outcome of this component is to establish a regulatory framework for mariculture development and operations. The component's outputs include a revised region-based ICZM to include mariculture as part of the framework, the formulation and adoption of legislative adjustments, sub-laws and code of conduct regulating climate resilient mariculture development in compliance with social and environmental standards, and the establishment of private sector licensing and incentive measures for mariculture business development with direct involvement of vulnerable coastal communities.

Component 3: On-the ground concrete adaptation actions for mariculture establishment (USD 3,350,000)

The expected outcome is to design and the sustainable mariculture in an area covering 50,000 m2. The component's outputs include the installation of on shore and off shore mariculture to protect the coasts and ficilate local livelihood development, the establishment of an artificial spawning laboratory, and the support of 5,000 communities to establish alternative livelihood ventures.

Component 4: Coastal monitoring capacity (USD 600,000)

The expected outcome of this component is to establish continuous monitoring capabilities to monitor coastal stabilization trends. The component's outcomes include establishing the continuous monitoring programme for a warning system against SLR and climatic change impacts on the sea parameters such as wave height and direction, tide, erosion, and storm surges. Also included is the definition of quality control and assurance procedures, the design and delivery of training for coastal monitoring and quality control system, the deployment of selected quupment in selected locations to measure sea level, and the establishment of participatory monitoring mechanisms.

ADAPTATION FUND

DATE OF RECEIPT:
ADAPTATION FUND PROJECT ID:
(For Adaptation Fund Board Secretariat Use Only)

PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

PROJECT/PROGRAMME CATEGORY:	**Regular Project**
COUNTRY/IES:	**Egypt**
TITLE OF PROJECT/PROGRAMME:	**PROMOTING Mariculture as an Adaptation Strategy to Sea Level Rise in the Nile Delta**. (PIMS 4449, ATLAS PROPOSAL ID: 00059784, PROJECT ID 00074934, EGY10)
TYPE OF IMPLEMENTING ENTITY:	**Multilateral Implementing Entity (MIE)**
IMPLEMENTING ENTITY:	**UNDP**
EXECUTING ENTITY/IES:	**Egyptian Coastal Research Institute, National Water Research center, Ministry of Water Resources and Irrigation.**
AMOUNT OF FINANCING REQUESTED:	**US$ 5,720,000**

PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

1. Given Egypt's growing population, its limited fertile land, the concentration of much of its economic activities in the coastal zones and the reliance on the Nile delta for prime agricultural land, the potential social and economic impact of climate change induced Sea Level Rise could be devastating for the country's future. The Delta and the narrow valley of the Nile comprise 5.5% of the area of Egypt but over 95% of its people, of which 25% live in the Low Elevation Coastal Zone (LECZ) areas of the Nile Delta. The proposed project is designed as a direct response to anticipated sea level rise in the Nile Delta and is aligned with the AF's objective *to reduce vulnerability to the adverse impacts of climate change at local and national levels*.
2. Egypt belongs to low middle income countries with total population of over 75 million. Despite considerable advancements in economic reforms, the country is faced with increasing population growth rates straining availability of natural resources for economic development. Moreover, while the shock to financial sector has been limited, as a result of recent global crisis, the real economy has been affected, especially through the decline of Suez Canal revenues, tourism receipts, FDIs, and construction sector. Egypt is fairly unique in the distribution of its population, land-use and agriculture, and economic activity which makes it extremely vulnerable to any potential impacts of climate change on its water resources and coastal zones. Despite being a large country with an area of about a million square kilometer, its lifeline is constrained along a narrow T-shaped strip of land (which constitutes less than 5% of its land area) along the Nile and the coast around the Nile delta. The Nile supplies about 95% of the country's total water requirements, including water intensive irrigated agriculture along its banks and in the delta. Agriculture is quite critical to the national economy as it employs 30% of the work force and contributes 17% to the gross national product (GNP). Major urban centers, commerce, and industrial activities are also confined to the narrow corridor along the Nile and the coast around its delta. This makes Egypt highly exposed to the impacts of sea level rise that is induced by climate change related thermal expansion of the Mediterranean waters and coastal subsidence characterized northern coasts of Africa.

3. The coastal zones of Egypt are perceived as vulnerable to the impacts of climate change, not only because of the direct impact of sea level rise, but also because of the potential impacts of climate changes on their water resources, agriculture, tourism and human settlements. In particular, the low lying Nile Delta region, which constitutes the main agricultural land of Egypt and hosts over one-third of the national population and nearly half of all crops (World Resources Institute, 2007), industrial activities and commercial centers, is highly vulnerable to various impacts of climate change. The Nile Delta shoreline extends from Alexandria to the west to Port-Said to the east with total length of about 240 km and is typically a smooth wide coast with different natural features including wetlands, elevated coastal sand dunes, empty narrow strips of land slightly higher than sea level and brackish lakes connected to the Mediterranean sea. These natural ecosystems together with some manmade structures are protecting large areas of lands of lower elevations than the current sea level encompassing cultivated lands, and other economic activities. The failure of any of the natural or manmade systems to withstand expected sea level rise will result in large areas of lands subject to flooding with sea water. The shoreline has two promontories, Rosetta and Damietta that are critical for shoreline protection.
4. The Nile Delta region is presently subject to changes, including natural shoreline changes, due to changes in erosion and accretion patterns, land subsidence rates and sea level rise. Agrawala et al., 2004 surveyed specific large economic centers of Alexandria, Rosetta and Port Said and obtained quantitative estimates of vulnerable areas and expected loss of employment in case of no action. It was concluded that the Nile Delta coastal zone is highly vulnerable to the impacts of sea level rise through direct inundation and sea water intrusion. The projected impacts of SLR on the Nile delta such as coastal inundation or seawater intrusion are consistent with the results of global vulnerability assessments of coastal areas. Land subsidence in the Delta is currently estimated at 1-5 mm/year (Emery et al., 1988; El Fishawi and Fanos, 1989).
5. Of particular concern are future impacts of increased climate change induced storm surges, inundation of coastal areas, and seawater intrusion into the groundwater table. OECD (2004) summarized and ranked the key climate change impacts and vulnerabilities in Egypt for sectors important to the national economy. The socio-economic impacts associated with seawater intrusion and inundations are far-reaching and include migration, unemployment and possibly political unrest. The risks to the coastal zone are ranked 'most serious'.

Ranked Key Climatic Changes and Vulnerability in Egypt

H= High M= Medium L=Low

Resource/ Risk	Certainty of impact	Timing of impact	Severity of impact	Importance of resource
Coastal Resources	H – M	M – L	H	H
Water Resources	M	M	H	H $^{+}$
Agriculture (mediated by SLR & water resources)	H – M	M – L	H - M	H - M
Energy	M - L	M – L	M - L	M - L

6. The recently launched Second National Communication Report of Egypt built on the results of IPCC fourth Assessment Report that indicated that a global sea level rise of 18-59 cm is expected by the end of this century. Based on this, and land subsidence rates two models have been initiated: (i) the business as usual scenario; and (ii) the actual situation in progress. For each model, three scenarios were considered namely the IPCC scenarios B1 and A1F1 as well as a new CoRI[1] scenario which assumes a linear increase rate of air temperature till 2100. Table 1 below summarizes the AIF1 scenario outputs and projected land loss from SLR in case the natural and manmade structures will

[1] Coastal Research Institute of the Ministry of Water and Irrigation of Egypt.

resist the sea level rise while Table 2 shows the impact on lands if these systems fail to stand against the increase in sea levels.

Table 1: Total affected area and its percentage of the Nile Delta area, A1F1 scenario

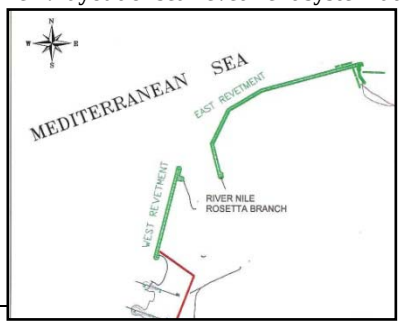
Year	2025	2050	2075	2100
Total Area Affected (km^2)	152.86	256.27	450.00	761.40
Total share from the Nile Delta Area (%)	0.61	1.03	1.8	3.01

Table 2: Total affected area and its percentage of the Nile Delta area, A1F1 scenario, without existing natural and manmade systems

Year	2025	2050	2075	2100
Total Area Affected (km^2)	701.00	1729.10	3010.60	3600.00
Total share from the Nile Delta Area (%)	2.80	6.92	12.04	14.40

7. Because of its geomorphologic characteristics, the northern coast of Egypt has been subjected to changes in the erosion accretion pattern since early 1970, this necessitated active protection through structural measures, since 1981. The government, through its Shore Protection Agency (SPA) has invested $10,000,000 / year in past 10 years. However, many of the structural measures, especially protective solid structure such as concrete sea revetments are subject to direct impact from the coastal erosion, questioning their long term functional stability and effectiveness in the face of change in wind and wave patterns, accelerated SLR and expected coastal inundation and submersion levels, as a result of climate change.
8. Rosetta region is a well-known Pharaonic and Islamic region located near the intersection of the Rosetta branch of the River Nile with the Mediterranean Sea east of Alexandria. Excessive erosion rates have been observed near the Rosetta promontory, due to the cessation of sediments following the construction of the High Dam on the River Nile about 1000 km to the south. The region surrounding the city is well known for its water-logging and water-bogging problems. The concern regarding this vulnerable coastal spot has been raised by the Coastal Research Institute (CORI) at the Ministry of Waters and Irrigation of Egypt. CORI has carried out a quantitative vulnerability assessment of the potential impacts of sea level rise for Rosetta. For a sea level rise of 0.5m, the study estimated the loss of about one third of the employment as well as the loss of $2.9 billion from land and property[2]. In addition, coastal erosion problems are expected to exacerbate with sea level rise.

Figure 1: layout of sea revetment system at the Rosetta Promontory



9. The Government has built a massive sea revetment near the tip of the promontory as a protective measure against already existing erosion problems (Figure 1). However, recent observations indicate that this massive hard structure is seriously challenged by coastal erosion and accelerated surges. Alternative means of long term coastal protection has to be sought that is more robust and based on win-win, "no-regret" adaptation strategies. As such, CORI, based on the results of

[2] As in the similar study conducted for Alexandria, the loss of historic and archeological sites has not been unaccounted for.

continuous research and observation, suggest softer measures of coastal protection. The approach is to help local population build-up their economic capital and be more resilient to future anticipated impacts of climate change.

10. The proposed project will therefore aim at introduction of mariculture, as an adaptation technology that offers an alternative sea defense and livelihood diversification option to help minimize the adverse impacts of climate change. Mariculture, is a specialized branch of aquaculture involving the cultivation of marine organisms for food and other products in the open sea / ocean, an enclosed section of ocean or ponds or raceways that are filled with sea waters. A good practice of mariculture will help the coastal communities to increasingly rely on sea rather than land-based agriculture. Under circumstances of high risks of climate change induced sea level rise and increasing financial burden associated with protective infrastructure incurred by the government, the project proposes an adaptation option that directly targets the vulnerable coastal population by promoting a more sustainable livelihood option for communities in the low lying coastal lands where submersion of agricultural lands will be increasingly unavoidable as a result of SLR. Mariculture (marine and coastal fish farms of native marine fish species) is increasingly becoming an important element of Integrated Coastal Zone management and widely recommended as an adaptation technology / measure in the low lying coastal areas subject to risks of seal level rise[3]. Hence, sea fish ponds will function as coastal buffer to halt sea water encroachment further in-land and at the same time provide an important economic development alternative that is much more resilient to anticipated SLR risks. Mariculture on the selected coastal strip lands of the Nile delta will protect large areas of low lying lands from inundation, harness available workforce, improve food security, reduce the impact of sea water intrusion, harness rainwater, and provide employment to the local population.
11. More specifically, the project will establish a demonstration for low cost sea defense system in selected empty coastal strips that is vulnerable to seasonal inundation during large tidal waves and storm surges. These narrow coastal strips of land are protecting southern inlands. In case of SLR and the complete inundation of the empty narrow coastal strips, large areas of lower lying lands under agriculture and other economic activities will become highly vulnerable to inundation. The sea defense system will be innovatively designed to serve as fish farms that will generate income and create jobs thus will present an incentive for the government to expand the same technique in other appropriate areas along the Nile Delta shores. Meanwhile, offshore mariculture systems will also be introduced next to Rosetta concrete sea defense revetment aiming to reduce the rate of coastal erosion and wave impact on the existing hard structures in nearby areas to the proposed onshore mariculture systems (figure 2).

Figure 2: Sea revetment structure where offshore mariculture system will be deigned to protect from erosion

12. In addition to protection from sea level rise, the project will also demonstrate livelihood diversification through introduction of mariculture, for minimizing adverse impacts of climate change in case agricultural lands south of the Coastal strip may no longer be suitable for cultivation of typical fresh water field crops due to possible sea water inundation.

PROJECT / PROGRAMME OBJECTIVES:

[3] IUCN (2009) "Guide for the Sustainable Development of Mediterranean Aquaculture – Responsible Practices and Certification"

The project objective is to introduce sustainable maricuture as a coastal defense against sea level rise and livelihood diversification measure. Through this project, it is expected that a population of over 5000 will benefit from an alternative livelihood opportunity in the form of sustainable mariculture. It is also expected that 50,000 m^2 of land will be made more resilient to withstand the effects of anticipated category 2-3 meter storm surges.

PROJECT / PROGRAMME COMPONENTS AND FINANCING:

PROJECT COMPONENTS	EXPECTED CONCRETE OUTPUTS	EXPECTED OUTCOMES	AMOUNT (US$)
1. Technical design and socio-economic feasibility of mariculture development.	1.1. Models generated to determine potential CC impacts on spawning migration and availability of juvenile for pond farming; 1.2. A field-based study to identify the most appropriate native fish species for changed climate conditions, including water temperature, salinity, water circulation patterns; 1.3. Bathymetric surveys completed and available wind, wave, sea level and current data collected; 1.4. Technical engineering design and drawings for the fish pond embankments and cages as sea defense systems and scientific design of the mariculture system completed; 1.5. Mariculture business plan developed with participation of local companies and community groups	1. Technical capacity for scientifically sound and socio-economically feasible mariculture development in the Rosetta area of the Nile Delta introduced.	500,000.

2. Policy and regulatory framework for mariculture development.	2.1. Region-based ICZM revised to include mariculture as part of the ICZM framework; 2.2. Legislative adjustments, sub-laws and code of conduct regulating climate resilient maricuture development in compliance with social and environmental standards formulated and adopted; 2.3. Private sector licensing and incentive measures for mariculture business development with direct involvement of vulnerable coastal communities established.	2. Regulatory framework for mariculture development and operations established;	350,000.
3. On-the ground concrete adaptation actions for mariculture establishment	3.1. On shore and off shore mariculture infrastructure installed to protect the coasts and facilitate local livelihood development (five rearing ponds installed (4000 m^2 each); five nursery ponds installed (1000 m^2 each) two isolation for breeders installed (1000 m^2 each); 3.2. Artificial spawning laboratory established; 3.3. 5, 000 communities supported to establish alternative livelihood ventures;	3. Sustainable miriculture designed and tested on 50,000 m^2 (12 feddans) benefitting over 5000 local population, mainly fishermen and their families;	3,350,000

4. Coastal monitoring capacity	4.1. Continuous Monitoring programme for warning system against SLR and Climatic Changes impacts on the sea parameters such as wave height and direction, tide, erosion, storm surges etc. established; 4.2. Quality control and assurance procedures defined; 4.3. Training designed and delivered for coastal monitoring and quality control system; 4.4. Selected equipment deployed in selected locations (see details under the component 4) to measure Sea Level, waves energy disseminated and coastal erosion; 4.5. Participatory monitoring mechanisms put in place to monitor the impacts of project activities on the coast and generate lessons learned. .	4. Continuous monitoring capabilities to monitor coastal stabilization trends established.	600,000.
6. Project/Programme Execution cost			400,000
7. Total Project/Programme Cost			5,200,000
8. Project Cycle Management Fee charged by the Implementing Entity			520,000
Amount of Financing Requested			5, 720,000

PROJECTED CALENDAR:

MILESTONES	EXPECTED DATES
Start of Project/Programme Implementation	September 2010
Mid-term Review (if planned)	September 2012
Project/Programme Closing	September 2015
Terminal Evaluation	January 2016

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

13. The project is fully in line with the AF's portfolio level objective 1 that is to "reduce vulnerability to the adverse impacts of climate change, including variability at local and national levels". By introducing an innovative defense and livelihood diversification solution the project will directly contribute to the AF's corresponding outcome "reduced exposure at national level to climate related hazards and threats" Mariculture offers the effective solution under the specific circumstances of the Northern coasts of Egypt for reduction of exposure to SLR as well as reduction of vulnerability of coastal communities through livelihood diversification that is necessary for spreading the risk and capital accumulation.

Component 1: Technical design and socio-economic feasibility of mariculture development

14. AF resources will be utilized to support local expertise to design a technically and economically feasible coastal defense structure and alternative livelihood option for local communities in this highly vulnerable region. As some parts of the Nile Delta, nearest to the Mediterranean Sea, already experience prolonged inundations, including parts of the ancient city of Rosetta, the pressure is mounting on the Egyptian authorities to do more to protect the Nile Delta, from rising sea levels. The AF project takes a people-centred approach by designing and applying mariculture as a viable sea defense system for coastal protection and adaptation solution that helps harness local workforce, create climate resilient livelihood options and establish integrated water and land use practice that may provide more viable and longer term solutions to SLR risks. Under this component, the project will undertake the detailed engineering design and drawings for the embankments of the ponds including exact location, side slopes, materials, etc for the onshore mariculture as sea defense systems as well as the design of the cages/enclosures to reduce impact and erosion of the hard structures through offshore mariculture. The design will require continuous wind, wave and current data collection in the pilot project area in addition to an initial Bathymetric survey to select the exact locations.
15. The technical design will also cover identifying appropriate species, including native species, for changed climate conditions, including water temperature, salinity, water circulation patterns; generating models to determine more accurately the potential impacts on spawning and nursing grounds, migrations and changes in availability of larvae and juveniles for pond farming; studying likely invasive species and diseases with different climate conditions; evaluating potential increases in

the virulence of dormant pathogens due to climate change impacts. The pond and cage design specifications will be completed and detailed business plan developed to set up the mariculture and associated infrastructure. Local communities, governments and companies will take active role in business design and determine their financial role during the project design phase.

Component 2: Policy and regulatory framework for mariculture development

16. Under this component the project will create the conditions for establishing sustainable mariculture business practice in the Rosetta area of Nile Delta, which can be implemented in other locations in Egypt. It is therefore paramount to set appropriate environmental and business regulatory standards through associated laws and by-laws and clarify local enforcement mechanisms. Provision of local employment and involvement of local companies will be incentivized through the business licensing, established mariculture credit conditions, or monetary allowances for local community engagement. High environmental standards will be designed based on the international best practice that addresses likelihood of the spread of disease and high costs of water, electricity and fuel, contributes to coastal wetland restoration, maintenance and coastal stabilization. In this regard, the project will be guided by The FAO *Code of Conduct for Responsible Fisheries* (FAO, 1995) that sets out 'principles and international standards of behavior for responsible practices with a view to ensuring the effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity'. Its Article 9 deals with aquaculture. Secondly, by the FEAP (Federation of European Aquaculture Producers) *Code of Conduct for European Aquaculture* (FEAP, 2006) that has as its primary goal 'the responsible development and management of a viable and sustainable European aquaculture sector to assure the highest standard of quality food production while respecting environmental considerations and consumers' demands'.

Component 3: On-the ground pilot action for mariculture establishment

Figure 3: The coastal strip empty lands subject to seasonal inundation that can host the onshore mariculture system

17. The project offers a combination of offshore and onshore mariculture practices and the installment of the associated infrastructure that will be fully tailored around the coastal exposure and current land use patterns. Onshore mariculture is proposed to be established on low lying lands by the Sea that are currently empty from any economic activity because of its vulnerability to tidal waves and storm surges. Hence the main aim of establishing the fish ponds is to act as a buffering zone or defense system against SLR in order to protect large areas of coastal inlands and economic activities from SLR. The income that will be generated from the fish farms as a byproduct from establishing this alternative coastal protection technology will trigger the expansion of these systems to fill all the gaps along the coast. As for the offshore mariculture, the project will test and introduce marine cage/enclosure fish culture practices that can reduce the impact of wave energy and hence erosion on the existing concrete structures after the water currents and waves has been disseminated or absorbed or even changed directions.
18. Project will build the physical infrastructure for demonstrating mariculture. Based on initial studies and calculations by the Coastal Research Institute at the Ministry of Water and Irrigation of Egypt, five rearing ponds installed (4000 m^2 each); five nursery ponds installed (1000 m^2 each); two isolation ponds for breeders installed (1000 m^2 each); and artificial spawning laboratory established. The implementation and operation will be carried out in full cooperation with General Authority for Fish Resources Development (GAFRD) as well as the Agriculture Research Center holds necessary

expertise for managing such systems. Local communities will be mobilized to build this infrastructure through direct employment guarantee scheme that will be co-financed by the government of Egypt. Under this component a pilot business case will be financed by the project that will initiate a good mariculture practice. The good mariculture business case will be built based on the best international practice (e.g. USAID "adapting to coastal climate change: a guidebook for development planners" UNESCO and CBD guidance and standards for sustainable mariculture)

Component 4: Coastal monitoring capacity to monitor coastal stabilization trends established

19. Given the innovative nature of the proposed adaptation solution to climatic changes and SLR that combines the mariculture - as important livelihood and business opportunity, with mariculture - as coastal protection and stabilization solution, playing the role of a dynamic buffer against sea intrusion and coastal inundation, it is necessary to have a system of regular monitoring of key parameters, such as wave height and direction, tide, erosion, storm surges etc. The project will help CoRI, SPA and other Research Centers to enhance their coastal monitoring capacity in the target area near Rosetta and ensure systematic and continuous monitoring to help establish coastal stabilization trends. The project will determine the key indicators against which the monitoring programme will be designed and employed. Two sets of targeted training for at least 40 staff members will be organized: (i) oriented to quality control and quality assurance of monitoring data; the results of such monitoring will judge the long term adequacy of marine aquaculture as an adaptation method to SLR in the Nile Delta[4]; (ii) oriented to marine aquaculture (fish-farms or floating cages/enclosures)[5]. The project will also incur the cost of procuring special monitoring equipment and associated software (e.g. Continuous Recording Doppler Current Meter, Recording Tides and Wave Gauge: wave height, frequency and direction, including software for operation and results visualization, etc). This equipment will serve as a monitoring and warning system against Sea Level Rise as well as erosion of the coastal zones, change in wave, current and wind patterns and directions, etc. The project will also set up observation groups with participation of local communities so that the impacts of the project activities are monitored on the ground. As a result of monitoring necessary adjustments into the mariculture infrastructure and management practice can subsequently be made and further replicated in other relevant parts of Nile Delta coast. Under this component the project will utilize the established monitoring processes to derive critical lessons on effectiveness of mariculture for coastal protection and buffering against sea surges and SLR. The project will capture critical mass of knowledge in utilizing maricluture as an adaptation measure. Based on the lessons learnt throughout the life cycle of the project a knowledge product "climate resilient mariculture in Egypt" will be produced and disseminated among relevant stakeholders helping to publicize the experience of the project aiming at replicating it in other areas in Egypt subject to be affected by sea level rise. Series of round tables with local communities and other key project stakeholders will be organized to capture the lessons.

B. Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities.

20. Project will yield significant economic, social and environmental benefits by demonstrating cost-effective techniques for sea defense that will protect thousands of acres of land, including agricultural and other economic activities from flooding due to SLR. 50,000 m^2 of coastal land will be better protected from the SLR related floods and submersions. Coastal communities will directly benefit from the mariculture both as a coastal protection infrastructure and a source of additional income.

[4] Project will partner with IOC/UNESCO and other key organizations in this area of expertise
[5] Project will partner with FAO and other specialized organisations

Diversification is the project strategy that does not imply the diversion from current economic practices (e.g. farming) but rather the introduction of additional source of revenue and capital accumulation as core of adaptation approach. Within the scope of the pilot initiative, the project will employ over 5,000 people, mainly fishermen, but also farmers. The expected total production is 2000 ton/year of high quality fish with a market price approaching $ 3,000,000 / per year that will contribute to the maintenance of the sea defense system and encourage expansion to neighboring areas of similar conditions. The project is expected to be self-sustained after the fourth year with an average depreciation period of 15 years.

21. The project will promote a good practice of mariculture, based on the international experience and the good practice guidelines. It will introduce an innovative approach to coastal protection and adaptation to SLR in the context of Egypt and promote the solution that creates socio-economic wealth and allows the communities to become much more resilient through accumulated capital from mariculture and adoption of a livelihood that will help withstand the SLR related risks.

C. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.

22. Preliminary cost-effectiveness was assessed based on professional inputs that come from the Coastal Research Institute (CORI) of Egypt under the Ministry of Waters and Irrigation. Most of the studies and contributions to global knowledge on SLR impacts on northern coasts of Egypt come from the CORI experts. They were also the main contributors to the SNC under the coastal section. Structural and maintenance cost of the mariculture ponds is approximately 10% of an alternative approach of risk reduction such as concrete sea revetment and associated maintenance costs. In addition, the proposed approach will result in additional benefits of employment and income generation.
23. There are three main alternatives in the context of Egypt, based on coastal specificities and pace of submersion that is accelerated as a result of climate change driven thermal expansion of the Mediterranean waters and tectonic subsidence of the coast: (i) to continue with traditional sea walling and coastal protection approaches (ii) coastal dikes combined with vegetative rehabilitation and more soft buffers (iii) alternative livelihood that is more resilient to coastal inundation risks and is inherently sea-based than land-based.
24. The first solutions is already proving both ineffective and inefficient therefore is excluded; the second is being tested in Egypt by enhancing natural defenses in the coastal regions, but it misses alternative livelihood approach that is necessary to strengthen not only coastal but also community resilience to climate change risks. In this respect, the proposed project will demonstrate a combination of the last two alternatives by taking more people-centred approach cost-effectiveness increases considerably as it entails income generation in addition to coastal robustness.

D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

25. Coastal vulnerability of Nile Delta is not only national priority for Egypt but also - a climate change issue of global significance. The recently launched Government of Egypt's Second National Communication, the primary reporting tool on key national vulnerabilities to climate change has prioritized Nile Delta coastal subsidence and accelerated SLR as a major risk to the country, its

economy and livelihood of coastal communities. SNC has a dedicated section on SLR and risks of coastal submersion and inundation that highlights the priority assigned to Nile Delta and urgent necessities for alternative innovative solutions to the traditional structural measures.

26. The national ICZM strategy of Egypt prioritizes habitat and fisheries protection as coastal management strategy that enhances robustness of the coast as well as protects local livelihoods. It also highlights the importance of innovative solutions for coastal adaptation. The project is fully in-line with the national development and adaptation priorities of Egypt. It is underscored in the strategies of the Ministry of Water and Irrigation, in investment strategies of the Shoreline Protection Agency and the Centre of the Coastal Research under the Ministry that identifies and plans for priority coastal adaptation solutions. Mariculture is particularly highlighted as an adaptation technology to protect Low Elevation Coastal Zone (LECZ) areas. Coastal adaptation in the Nile Delta is one of the top development priorities in Egypt raising growing concern of the government and drawing increasing attention of development partners. It is classified by SNC as an immediate and urgent adaptation needs to be addressed with no further delays.

E. Describe how the project / programme meets relevant national technical standards, where applicable.

27. The project will operate fully in line with the following national standards relevant to the thematic scope of the project. The Law of environment 4/94 and its Executive Regulation and their amendments will be observed that guides coastal protection projects in the target shoreline. Meanwhile, the establishment of the fish ponds and sea cages will be constructed according to the Egyptian codes of construction.
28. The proposed project will be in line with all relevant laws, regulations and existing technical standards. Especially those related to the General Organization of Veterinary Services – Ministry of Agriculture and Land Reclamation – concerned with the hygiene and health conditions of cultured fish for export to Europe (Ministerial Decree, August 2001).
29. As the General Authority of Fish Resources Development is among the potential parties of the project implementation, The Presidential Decree 465/1983, the Law 124/1983 and the Decision No. 70/1986 will be well observed along the different phases of the project.
30. All UNDP supported donor funded projects are required to follow the mandatory requirements outlined in the UNDP Programme and Operational Policies and Procedures (UNDP POPP). This includes the requirement that all UNDP development solutions must always reflect local circumstances and aspirations and draw upon national actors and capabilities. In addition, all UNDP supported donor funded projects are appraised before approval. During appraisal, appropriate UNDP representatives and stakeholders ensure that the project has been designed with a clear focus on agreed results. The appraisal is conducted through the formal meeting of the Project Appraisal Committee (PAC) established by the UNDP Resident Representative. The PAC representatives are independent in that they should not have participated in the formulation of the project and should have no vested interest in the approval of the project. Appraisal is based on a detailed quality programming checklist which ensures, amongst other issues, that necessary safeguards have been addressed and incorporated into the project design

F. Describe if there is duplication of project / programme with other funding sources, if any.

31. International guidance on coastal adaptation provides a recommended suit of measures that constitute viable alternatives to traditional coastal protection solutions (e.g. sea walls). Among them are "living shoreline approach" and mariculture, both a novelty in Egypt. A $4 million grant from GEF/SCCF is fully dedicated to the former, whereas the requested AF grant will be fully allocated for the latter. The former is a methodology of coastal stabilization. "Living shorelines" are accomplished through the strategic placement of plants, stone, sand fill and other materials. They are designed to stabilize the shore while maintaining natural processes. This includes processes such as tidal exchange; sediment movement, etc. In the context of Egypt, the rehabilitation of dune structure and wetland areas will be tested through SCCF project. Approximately 2,504km^2 is covered by the project activities focusing on three main coastal lagoons Idku, Burullus and Manzala. This is indeed a progressive step forward in improving coastal resilience to climate change induced risks. However, is not applicable in all coastal areas along the Egyptian Mediterranean Shoreline and other alternatives have to be tested.
32. Therefore, the proposed project for AF funding takes an alternative coastal defense and livelihood diversification approach to adaptation and will cover 50,000 m^2 Rosetta branch of reventment area at Rashid. Mariculture (type of sea-based aquaculture) is increasingly recognized as an effective concrete coastal adaptation technology / measure. In addition to direct defense through its off-shore and on shore infrastructure it also carries direct economic benefits to local communities as an additional source of income. Hence there is no duplication with other funding sources. The two projects offer not only distinct approaches to coastal adaptation but also focus on different geographic localities of the Nile Delta thus covering distinct geomorphological, and socio-economic characteristics that determine varied approaches to adaptation.
33. It is of urgent importance for the country to test various innovative coastal resilience solutions and gradually depart from extremely costly and less effective sea wall –based coastal protection measures. Given the priority assigned to coastal adaptation in Egypt (especially to its northern coasts), the government prefers to avoid resource fragmentation and consolidate AF and SCCF resources for discrete alternative solutions to one pressing climate change issue for the country – the coastal adaptation in the Nile Delta. Therefore, the two initiatives are highly complementary offering unique opportunities for synergies and amplifying the impacts. They have clearly defined thematic scope within broader geographic boundaries of one of the world's most vulnerable low laying coastal areas, the Nile Delta. The two initiatives in no ways represent co-financing sources for each other but rather build on related but distinct set of baseline conditions.

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

34. The project will have a fully dedicated output to knowledge identification, codification and dissemination. Project annual reporting will require coverage of lessons learned. The project will systematically document key lessons good practices and challenges experienced in establishing mariculture as adaptation measure for coastal stabilization and coastal community resilience. As described under the component 4, the project will organize regular stakeholder round tables, as part of the monitoring exercise, to document lessons for further adjustments and replication. Adaptation Learning Mechanism http://www.adaptationlearning.net and other relevant platforms will be used for knowledge dissemination.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation.

35. The project idea has emerged at the Coastal Research Institute (CoRI) the main technical entity of

the Ministry of Waters and Irrigation in consultation with the Shoreline Protection Agency that is charged with responsibilities for the coastal management. The project idea has been consulted with the UNFCCC focal point and AF National Designated Authority. The following are some of the key stakeholders of the project.

Stakeholder name	Stakeholder mandate	Potential role in the project
The Ministry of Water Resources and Irrigation: Shore Protection Authority (SPA)	Responsible for managing the shoreline in coastal areas that have socioeconomic value or natural resource value that are threatened by erosion. It develops coastal zone management plans, designs projects for shore protection and all studies for shore protection, and issues license for projects located in the coastal zone area.	A basic stakeholder that have a lead role in planning, implementing and monitoring shorelines and adaptation measures in Egypt.
The Ministry of Water Resources and Irrigation: Coastal Research Institute (CoRI)	Responsible for investigating the coastal process along the Nile Delta as well as all the entire Egyptian coasts; monitor the evolution of the Egyptian coast, to study the dynamics of its shores and to find out efficient and cost-effective control methods to protect valuable coastal infrastructure from erosion.	A lead research institute in adaptation measures and an important Agency in formulating adaptation strategy in Egypt.
The Egyptian Environmental Affairs Agency	According to Law No 4 for the year 1994, EEAA was given specifically the authority to .participate with the concerned agencies and ministries in the preparation of a National Integrated Coastal Zone Management Plan for the Mediterranean Sea and the Red Sea coasts and the responsibility of initiating and co-coordinating national ICZM activities. A National Committee for Integrated Coastal Zone Management (NCICZM) was set up, and the Secretariat of this Committee was established under the Environment Management Sector of the EEAA. One of the major tasks of the National Committee for ICZM is to develop a	The lead authority for Climatic Changes Mitigation and Adaptation measures in Egypt.

	programme for the development of a national ICZM Plan. The role of EEAA in the Committee is to review the Environmental Impact Assessment reports and provide the environmental license for all projects located within the coastal zone area, develop coastal zone management guidelines as well as chairing the National Integrated Coastal Zone Management Committee (NICZMC).	
Ministry of Housing: Urban Planning Authority, General Organization for Physical Planning (GOPP)	Responsible for developing guidelines for urban planning inside the coastal zone (and outside coastal zone); for any modification or extension or new project in the country; and provides assistance to any developer to prepare the Environmental Impact Assessment within and outside coastal zone areas.	Responsible for land use planning and National land exclusion and allocation for specific tasks.
General Authority for Fish Resources Development (GAFRD) - Ministry of Agriculture and Land Reclamation	No specific mandate for coastal zone management or shore protection but provides licenses for fish farms and fishing activities in the coastal lagoons and other coastal areas, and works closely with the Coastal Guard.	Accepting the responsibility of supervising the fish farm complex after the project is terminated will insure the sustainability of the fish farm and the promotion of the concept.
Agriculture Research Center - Ministry of Agriculture and Land Reclamation	No specific mandate for coastal zone management or shore protection but Research oriented toward agriculture practices, under which the Abassa Aquaculture Research Center falls.	Act as a Center of Excellency and advisor in fish farming practices.
Ministry of Defense: Coast Guard Department	No specific mandate for coastal zone management; important for coastal zone protection in that it is responsible for checking licenses in coastal areas before any project can start and works closely with the Fish Authority to check fishing licenses.	Controlling the Territorial water and 50 m from the high water level.
Ministry of Transportation: Marine Transportation Department in	Responsible not only for marine transportation projects but also for	Marine Cage Culture had to report to the U/S of

Alexandria	providing assistance to developers and the Government in all aspects of marine transportation. It works closely with the Marine and Harbor Authority in the area of environmental protection and environmental impact assessment.	Maritime Transportation and take licenses to operate in the coastal zone.

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

36. The project is designed to address adverse impacts of climate change on low lying Nile Delta coast of Egypt, its residing population and local economies. As noted above, the government of Egypt, through its Shore Protection Agency, has been investing in coastal protection since many decades ago. With increasing levels of coastal inundation, incidents of coastal flooding and anticipated SLR, the government is under the mounting pressure to identify and implement more effective, including cost-effective measures for coastal adaptation. Despite the fact that the government of Egypt already received the grant investment from the GEF managed Special Climate Change Fund to address coastal vulnerabilities of the Nile Delta, the government assigns the issue a high significance and considers a top adaptation priority. Therefore, it has decided to maximize the investment into this adaptation priority by complementing the two grant streams. This will help the government to test various advanced and innovative approaches to coastal protection, by departing from largely practiced structural measures that are increasingly questioned in terms of long term viability and effectiveness.
37. Component 1: Even though there is a tradition of aquaculture in Egypt, mariculture and its sea and coast based infrastructure has never been considered and used as effective sea defense, especially in the extremely low elevation parts and revetment areas that would require wave strength dissipation and tidal speed and direction management in order to keep the existing revetments long lasting and effective. Without the AF support this coastal defense innovation won't be brought into Egypt that is in dire need for improvement of coastal adaptation solutions. The project incurs the cost of mariculture technical design, with close consideration of anticipated climate change risks both on the physical coast as well as fisheries.
38. Component 2: Egypt has developed ICZM framework and embarked on its implementation. Potential of mariculture for coastal defense has not been accounted for. Without the AF support the ICZM will largely rely on traditional, costly and ineffective options of coastal protection against sea surges and floods. The project covers the additional cost of policy change and adjustments required to stimulate climate resilient mariculture as an integral part of the Egypt's ICZM framework. This also includes development of subsidiary legislation and code of conduct regulating maricuture development in compliance with social and environmental standards;
39. Component 3: Egypt has invested over $200 million during the past ten years in coastal protection. Mainly sea wall structures that have blocked the sediment flows and coastal nourishment, exacerbated erosion processes and undermined stability of these very protective structures themselves. The government of Egypt is seeking for various alternative options of more cost-effective defense systems that are robust to SLR. The project covers the cost of mariculture infrastructure that is to play the coastal protection function and brings additional source of income to the vulnerable coastal communities.
40. Component 4: Without the AF the key research institutes such as CORI, at the Ministry of Water and Irrigation will remain with limited coastal monitoring and early detection capacities. The project will cover the cost of professional training and introduction of methods of observation on key parameters, such as wave height and direction, tide, erosion, storm surges etc. The project also covers the cost of

coastal monitoring scheme both at scientific level and community level by applying participatory monitoring to detect environmental and socio-economic impacts of project activities.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

41. As a direct request by the Government of Egypt, the project will be implemented through The United Nations Development Program (UNDP), in its capacity of accredited MIE to the AF. The project will be implemented in close coordination and collaboration with all relevant government institutions, local communities and NGOs, as well as other related projects in the region. UNDP-CO will support project implementation by, contracting project personnel, experts and subcontractors, undertaking procurement, and providing other assistance upon request of the National Executing Agency. The UNDP-CO will also monitor the project's implementation and achievement of the outcomes and outputs and ensure the proper use of Adaptation Fund resources. Financial transactions, reporting and annual auditing will be carried out in compliance with UNDP regulations for national project execution modality.
42. Executing Arrangements:
43. The Executing Agency/Implementing Partner will be the Ministry of Water Resources and Irrigation through the National Water Research Institute - Coastal Research Institute (CoRI). The Executing Agency/Implementing Partner will appoint a National Project Director and will appoint jointly with UNDP CO and a Project Manager and an administrative/financial assistant. A summary of the roles and responsibilities of the National Project Director, the Project Manager, and the Administrative and Financial Assistant are provided below.
44. The National Project Director will be a high-level government official primarily responsible for overall implementation of the Project. This responsibility includes representing and supporting project objectives at high decision making levels within the Government of Egypt. The National Project Director also takes the primary responsibility for ensuring that the required government support to reach the milestones of the Project is available.
45. The Project Manager will assume overall responsibility for the successful implementation of project activities and the achievement of planned project outputs. S/he will work closely with the national and international experts hired under the project, as well as the Project Assistant, and will report to the National Project Director and to the UNDP Country Office. The Administrative and Financial Assistant will provide assistance to the Project Manager in the implementation of day-to-day project activities. S/he is responsible for all administrative (contractual, organizational and logistical) and accounting (disbursements, record-keeping, cash management) matters related to the project.
46. The project will be nationally executed by the Ministry of Water and Irrigation that is the main sectorial institution responsible for water as well as coastal management. National Execution enables the project to exercise greater national ownership whereby, UNDP will only provide technical backstopping, quality assurance and compliance with fiduciary standards in its capacity of MIE.
47. Project Management Unit (PMU): The day-to-day implementation and management of the project will be undertaken by the project management unit, under the overall guidance of a Project Board (see below), which will be responsible for steering the activities of the PMU. Heading the project board will be the Ministry of Water Resources and Irrigation, and members will include the National Water Research Center, Shore Protection Agency, Coastal Research Institute, and UNDP CO representative. Additional members will be decided during the project inception phase. For the PMU, a full time project manager, technical, administrative and financial staff, will be selected jointly by the executing agency and UNDP. The role of the PMU will be to: a) ensure overall project management and

monitoring according to UNDP rules on managing UNDP/GEF projects, b) facilitate communication and networking among key stakeholders, and c) organize the meetings of the Project Board.

48. Project Board: The Project Board will be responsible for steering the activities of the PMU. Heading the project board will be the Ministry of Water Resources and Irrigation, and members will include the National Water Research Center, Shore Protection Agency, Coastal Research Institute, and UNDP CO representative.
49. Project quality assurance will be undertaken by UNDP CO, Regional Centre and HQ. The UNDP will monitor the project's implementation, provide guidance and advice, and facilitate communication, cooperation, and coordination among stakeholders and other project partners. At the initial stage of project implementation, the PMU may, if deemed advantageous, wish to meet more frequently to build common understanding and to ensure that the project is initiated properly. The project will hire short-term national and international experts for specific project assignments. Project activities will be contracted out on a competitive basis through tenders.

B. Describe the measures for financial and project / programme risk management.

50. Project risk assessment and mitigation measures will be further identified and detailed during the project design phase.

Risk	Risk rate	Risk mitigation measure
National legislatures are not sufficiently proactive in supporting in law and sub-law amendments and adoption to set the conditions for mariculture development	Medium	The project will seek to mobilize high level support from the national authorities. The project will produce high quality technical studies and maritime design specifications. It will bring and advocate for international best practice for mariculture that contributes to local economy as well as coastal protection.
Local population is skeptical about the open sea and pond sustem mariculture as a viable business for their communities and is not willing to commit their workforce in the proposed adaptation measure.	Low	Continuous stakeholder consultation and engagement will be employed by the project. Meetings with local stakeholders to explain project activities and enlist support. Community mobilization and participation in design, implementation and impact monitoring of on-the-ground adaptation measures will be a project methodology.
Local businesses are not attracted to the new business opportunity and are rigid about the innovation.	Medium	Private sector engagement from the outset of project design stage and through the project implementation. Setting up a platform, through regular meetings and consultations, with the government, local fishermen and business community to indentify and address their distinct roles and interests in the mariculture development.

C. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

Type of M&E activity	**Responsible Parties**	**Budget US$***	**Time frame**
Inception workshop	▪ Project Coordinator ▪ UNDP-CO	$3,000	Within first two months of project start up
Inception Report	▪ Project team ▪ UNDP-CO	None	Immediately following IW
Measurement of Means of Verification for Project Purpose Indicators	▪ Project Coordinator ▪	None	Start, mid and end of project
Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis)	▪ Project Coordinator ▪	None	Annually prior yearly reports and to the definition of annual work plans
Monthy reports	▪ Project team	None	At the end of each month
Annual reports	▪ Project team ▪ CoRI ▪ UNDP-CO	$2,500	At the end of each year
Meetings of the Project Coordination Committee	▪ Project Coordinator ▪ UNDP-CO	None	After the inception workshop and thereafter at least once a year
Technical reports	▪ Project team ▪ External consultants	None	To be determined by Project team and UNDP CO
Mid-term external evaluation	▪ Project team ▪ UNDP-CO ▪ External consultants	$ 30,000	At the mid-point of project implementation.
Final external evaluation	▪ Project team ▪ UNDP-CO ▪ External consultants	$ 30,000	At the end of project implementation
Final Report	▪ Project team ▪ UNDP-CO	None	At least one month before the end of the project
Publication of lessons learned	▪ Project team	$ 17,500 (average $ 3,500 per year)	Yearly
Audit	▪ UNDP-CO ▪ Project team	$ 15,000 (average $ 3,000 per year)	Yearly
Visits to field sites)	▪ UNDP-CO ▪ CoRI ▪ Project team	$2,000	Yearly

TOTAL INDICATIVE COST	**$ 100,000**	

NB: the above costs relate to expenditures that need to be incurred by the project for monitoring and reporting on project deliverables. UNDP related costs are not included in the above. Such costs are covered by the fee to UNDP as a MIE for this project.

D. Include a results framework for the project proposal, including milestones, targets and indicators.

Objective	Outcomes and indicators	Baseline:	Targets and Milestones	Source of Verification	Outputs and indicators
To introduce sustainable maricuture as a coastal defense against sea level rise and livelihood diversification measure	**Outcome 1:** Technical capacity for engineering and scientifically sound and socio-economically feasible mariculture development for coastal protection in the Rosetta area of the Nile Delta introduced **Indicator 1.1:** Coastal management institutions have ability to develop mariculture of international standard, as coastal adaptation measure; **Indicator 1.2:** climate impact information on coastal areas and fisheries generated and available to main decision making institutions (e.g. Ministry of Waters and Irrigation, Ministry of Agriculture)	Sea revetment is the only option currently considered for coastal protection in Egypt. Over the last three decades sea revetment systems have proven to be very costly and in the absence of an ICZM plan, it has been shifting erosion to other areas of the shore. This has made it necessary to construct additional sea revetments to move the erosion along the coast away from important areas that could be affected by the new erosion zones. Sea bed under the established sea revetment has been subject to erosion that can affect the stability of these systems. The cost of the rehabilitation of the systems has proven to be very expensive. Furthermore the change in tidal waves directions associated with climate change has reduced the effectiveness of some of the existing sea revetments and has further increased erosion of the revetment itself which need to be addressed.	Climate change models and all technical material necessary for mariculture development prepared by the local institutions by end of 2011 A mariculture business model following international standards and code of conduct designed by end of 2013 at least 1000 local community groups, at least 50% women, participated in business plan design for adaptive mariculture development by end of 2013	Project annual reports; model outputs; technical reports, Project mid term evaluation; Project final evaluation	**Output 1.1.** Models generated to determine potential CC impacts on spawning migration and availability of juvenile for pond farming; **Indicator 1.1.1:** Number of models generated to determine CC impacts on native fish communities; **Output 1.2:** A field-based study to identify the most appropriate native fish species for changed climate conditions, including water temperature, salinity, water circulation patterns; **Indicator 1.2.1:** Groundtruthing report with identified native fish varieties robust to CC impacts and suited for mariculture delivered; **Output 1.3:** Bathymetric surveys completed and available wind, wave, sea level and current data collected **Indicator 1.3.1:** Number of Bathymetric

		There is limited experience available in Egypt on the engineering design of alternative sea defense and coastal protection systems Scientific design of the mariculture system is available at the private sector and few research institutions, but has never been applied on a pilot scale.			surveys covering all key parameters delivered **Output 1.4:** Technical engineering design and drawings for the fish pond embankments and cages as sea defense systems and scientific design of the mariculture system completed **Indicator 1.4.1** Number and type of engineering drawings and designs for mariculture systems completed **Output 1.5:** Mariculture business plan developed with participation of local companies and community groups **Indicator 1.5.1:** Number of business plans developed by local experts; **Indicator 1.5.2:** Number of local community groups, and % of women, participating in business plan design for adaptive mariculture development
	Outcome 2: Regulatory framework for mariculture development and operations established	The Law for the Environment (Law No 4 for the year 1994) regulated protection of the marine	At least 3 pieces of legislation adopted on code of conduct that	Project annual reports; model outputs; technical	**Output 2.1:** ICZM revised to include mariculture as part of the ICZM framework;

	Indicator 2.1: Local communities and businesses have legislative incentives and regulatory guidance to engage in socially and environmentally sound mariculture **Indicator 2.2:** Adoption of mariculture as adaptation technology has increased among businesses and local coastal population	environment; mandated environmental impact assessment (EIA) for any new project, authorized construction of coastal structures to protect some vulnerable coastal areas from erosion; established environmental monitoring networks; facilitated management and supervision of natural protectorates; called for integrated coastal zone management (ICZM); and established a Coastal Zone Management Committee (CZMC) for the proper management and coordination among concerned authorities The ICZM strategy is incomplete and ICZM planning and implementation is not enforced A National ICZM Committee is existing but is not empowered enough to take substantial decisions. There is a large fishermen community operating in the open sea and Lake Burulus nearby the proposed project area. The fish production from the open areas in the Lake is negatively affected	regulate the mariculture construction and development by end of 2013 At least 2 licenses issued to establish mariculture businesses by end of 2014 at least 80% participation of target local coastal communities in mariculture business development by end of the project	reports, Project mid term evaluation; Project final evaluation; National legislation journal.	**Indicator 2.1.1:** Revised ICZM includes mariculture; **Output 2.2:** Legislative adjustments, sub-laws and code of conduct regulating climate resilient maricuture development in compliance with social and environmental standards formulated and adopted; **Indicator 2.2.1:** Number and type of laws formulated and modified to regulate climate resilient mariculture in compliance with environmental and social standards; **Output 2.3:** Private sector licencing and incentive measures for mariculture business development with direct involvement of vulnerable coastal communities established; **Indicator 2.3.1:** Number of mariculture business initiatives registered through direct support of the project; **Indicator 2.3.2:** % of targeted local population

		by the illegal fishing of the juvenile fish entering the lake from sea.			participating in coastal defense mariculture
	Outcome 3: Sustainable miriculture designed and tested on 50,000 m^2 (12 feddans) benefitting over 5000 local population, mainly fishermen and their families **Indicator 3.1:** 80% of targeted population has more secure livelihood access through practiced mariculture	Large areas of low lying lands of the Nile Delta vulnerable to inundation in case of Sea Level Rise as well as the ongoing Nile Delta land subsidence. These lands are densely populated areas mainly cultivated areas but also include other economic activities. Some of the existing sea revetment structures are subject to erosion due to climate change and need an intervention to protect it In the selected project area, there is a narrow empty coastal strip of land subject to seasonal inundation during storm surges and tidal waves where these lands are proposed to be utilized for the establishment of onshore mariculture systems	Five rearing ponds installed (4000 m^2 each); Five nursery ponds installed (1000 m^2 each) Two isolation for breeders installed (1000 m^2 each) and one artificial spawning laboratory is available in the target region to serve mariculture practice by end of the project At least 80% of target community is engaged in mariculture infrastructure development works and / or mariculture business by end of the project	Project annual reports; model outputs; technical reports, Project mid term evaluation; Project final evaluation.	**Output 3.1:** On shore and off shore mariculture infrastructure installed to protect the coasts and facilitate local livelihood development; **Indicator 3.1.1:** Number and type of infrastructure installed; **Output 3.2:** Artificial spawning laboratory is operational; **Indicator 3.2.1:** Artificial spawning laboratory is established; **Output 3.3:** Local mariculture business has been set up with direct involvement of local coastal population **Indicator 3.3.1:** % of target communities engaged in mariculture development;
	Outcome 4: Continuous monitoring capabilities to monitor coastal stabilization trends established **Indicator 4.1:** CoRI has capacity to undertake systematic coastal	There are scattered tidal gauge stations along the Mediterranean Sea in Egypt belonging to several institutions but there is no national network for regular monitoring of Sea Level Rise and other physical	By end of the project there is a quality control and assurance procedures designed and approved for SLR monitoring at the	Project annual reports; model outputs; technical reports, Project mid term evaluation; Project final	**Output 4.1:** Continuous monitoring programme for warning system against SLR and Climatic Changes impacts on the sea parameters such as wave height and direction, tide, erosion,

	obeservation	oceanographic variables	Coastal Research Institute of the Ministry of Water and Irrigation At least 3 training sessions on quality control and assurance designed and delivered by end of 2012 At least 40 staff of CoRI and other national and local institutions trained in coastal monitoring quality system by end of 2012 At least 1000 local population participates in monitoring process and contributes to lessons learned by end of the project.	evaluation.	storm surges etc. established and relevant software purchased and installed **Indicator 4.1.1:** Climate and sea-level monitoring programme infrastructure established and upgraded with additional software **Output 4.2:** Quality control and assurance procedures defined **Indicator 4.2.1:** Guidelines for quality control and assurance procedures defined **Output 4.3:** Training designed and delivered for coastal monitoring and quality control system; **Indicator 4.3.1:** Number of training sessions on coastal monitoring and quality control system designed and delivered **Indicator: 4.3.2:** Number of staff of CoRI and other national and local institutions trained in coastal monitoring quality system; **Output 4.4:** Participatory monitoring

					mechanisms put in place to monitor the impacts of project activities on the coast and generate lessons learned **Indicator 4.4.1:** % of local population participating in monitoring process and contributing to lessons learned.

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT[6] *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Dr. Mawaheb Abu El-Azm C.E.O. of Egyptian Environmental Affairs Agency / (EEAA) Ministry of State for Environmental Affairs (MSEA)	Date*:* August 8, 2010

B. IMPLEMENTING ENTITY CERTIFICATION *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.
Y. Glemarec Yannick Glemarec Director Environmental Finance Implementing Entity Coordinator

6. Each Party shall designate and communicate to the Secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

Date: July 23, 2010	Tel. and email: +1-212-906-6843 yannick.glemarec@undp.org
Project Contact Person: Keti Chachibaia	
Tel. And Email: +421-2-58337-422; keti.chachibaia@undp.org	