

OFFICE MEMORANDUM

DATE: March 11, 2002

TO: Mr. Ken King, Assistant CEO, GEF Secretariat
Att: GEF PROGRAM COORDINATION

FROM: Lars Vidaeus, GEF Executive Coordinator 

EXTENSION: 3-4188

SUBJECT: **Egypt: Second Matrouh Resource Management Project (P074075)**
Submission for Work Program Inclusion

1. Please find enclosed the electronic attachment of the above mentioned project brief for work program inclusion. We would appreciate receiving any comments by **March 20, 2002**.

2. The proposal is consistent with the Criteria for Review of GEF Projects as presented in the following sections of the project brief:

- **Country Drivenness:** Country commitment and ownership is discussed in section D4.
- **Endorsement:** The endorsement letter by the Egyptian GEF National Focal Point is attached.
- **Program Designation & Conformity:** Section B.1.2 describes how the project design meets Operational Program 12.
- **Project Design:** Section B.2 describes the sector issues, Government of Egypt strategy and strategic choices made in selecting the project design and components. Section C.1 describes the different project components, while Section C.2 provides the details of GEF proposed activities therein. Annex 1 provides the project's Logical Framework.
- **Sustainability:** Section F discusses aspects of the project design related to sustainability.
- **Replicability:** Section C.4.3 describes the replication potential within the country as well as in the region.
- **Stakeholder Involvement:** Section E.6.1 describes the key social issues of the project, while section E.6.2 summarizes public consultations and participation of stakeholders both during project development and implementation. A separate Annex (Annex 9) is also devoted to detailing the furthering of the participatory planning process.
- **Monitoring & Evaluation:** Section A.1 gives a list of the key performance indicators for both the national and global project objectives and the proposed means of measuring them. Section E.6.4 includes a discussion of the current M&E systems under MRMP I, and the proposed enhancement and focus on impact monitoring. A summary of the performance indicators by outputs and activities is provided in the project LogFrame.

PROJECT BRIEF

1. IDENTIFIERS:

PROJECT NUMBER: P074075
PROJECT NAME: **Egypt: Second Matrouh Resource Management Project**
DURATION: 5 Years
IMPLEMENTING AGENCY: World Bank
EXECUTING AGENCY: Ministry of Agriculture and Land
Reclamation/Egyptian Environmental Affairs
Agency
REQUESTING COUNTRY OR COUNTRIES: Arab Republic of Egypt
ELIGIBILITY: Egypt ratified CBD on June 1994 and FCCC on December 1994
GEF FOCAL AREA: Biodiversity/Climate Change
GEF PROGRAMMING FRAMEWORK: OP 12

2. SUMMARY:

The overarching objective of the Matruh Resource Management Project II (MRMP II) is to improve further the welfare of the stakeholders, especially the more disadvantaged rural people and contribute to poverty alleviation. This will be done through community development and strengthening the local communities' capacity to conserve, rehabilitate and use their natural resources in a sustainable manner. It will be achieved by: (a) assisting communities, including women and the poor, to organize themselves and participate in community-based planning and implementation of development activities; (b) assisting communities to conserve, rehabilitate and sustainably manage the natural resource base through developing appropriate community-based institutional processes and mechanisms; (c) improving small holder sustainable agriculture, horticulture and livestock production; (d) promoting demand-driven non-farm income generating activities, mainly targeting women; and (e) providing improved access to technical, financial and commercial services and market linkages. Within this framework of integrated resource management, GEF support is sought to address global environmental concerns in the day-to-day management of resources, as well as mainstream environmental dimensions into overall planning and implementation of development activities in the area. The GEF alternative will build on the baseline scenario to: (i) achieve biodiversity conservation and improved integrated natural resource management of further areas of the NWCZ through the establishment of protected areas, community-based species conservation initiatives and various type of soil and water management practices in both the agriculture and livestock sectors; (ii) reduce the net emissions of greenhouse gases through greater energy efficiency and improved carbon sequestration in biomass and the soil and develop methods to quantify carbon sequestration potential in dryland areas under different land use types; and (iii) establish local and national capacity to ensure adequate management of the resources in a sustainable manner. The support of GEF will also ensure that lessons learned in this project can be replicated in other areas with similar characteristics within Egypt and in the region.

3. COSTS AND FINANCING (MILLION US\$):

GEF:	- Project	4.82	
	- PDF	0.3	
	Subtotal GEF		5.12
Co-FINANCING:	- IA	14.99	
	- Other Int'l (IFAD)	14.99	

- Government of Egypt	8.47
- Private (Beneficiaries)	12.10
Subtotal Co-Financing	50.55
TOTAL PROJECT COST (WITH PDF):	55.67
TOTAL PROJECT COST (WITHOUT PREPARATION):	55.67

4. OPERATIONAL FOCAL POINT ENDORSEMENT

Name: Dr Ibrahim Abdel Gelil
Title: Chief Executive Officer
Organization: Egyptian Environmental Affairs Agency
Date: June 2000

5. IA CONTACTS

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Table of Contents

A. Project Development Objective	5
1. Project Development Objective	5
2. Key Performance Indicators	5
B. Strategic Context	5
1.1 Sector Related CAS goal	5
1.2 Global Operational Strategy/ Programme addressed by Project	6
2. Main Sector Issues and GOE Strategy	7
2.1 Sector Issues	7
2.2 Government Strategy	8
3. Sector Issues to be addressed by project and strategic choices	9
3.1 Sector Issues	9
3.2 Government Strategy under MRMPI and project achievements	12
3.3 Strategic choices	13
C. Project Description Summary	13
1. Project Components	13
2. GEF initiatives within the project	18
3. Key policy and institutional reforms to be sought	22
4. Benefits and target population	23
4.1 National benefits	23
4.2 Global Environmental Benefits	24
4.3 Replicability	25
5. Institutional and Implementation Arrangements	26
D. Project Rationale	28
1. Project alternatives considered and reasons for rejection	28
2. Major related projects financed by the Bank and/ or other donors	28
3. Lessons learned and reflected in project design	29
4. Indications of Borrower commitment and ownership	29
5. Value added of Bank and Global Support	30
E. Summary Project Analysis	30
1. Economic	30
2. Financial	31
3. Technical	31
4. Institutional	31
4.1 Executing Agency	31
4.2 Project Management	31
4.3 Procurement Issues	31
4.4 Financial Management Issues	31
5. Environmental	32
6. Social	34
7. Safeguard Policies	37
8. Business Policies	38
F. Sustainability and Risks	38
1. Sustainability	38
2. Critical Risks	39
G. Project Preparation and Processing	40

- Annex 1:** Project Design Summary
- Annex 2:** Incremental Cost Analysis
- Annex 3:** STAP Review and Response
- Annex 4:** Biodiversity Conservation, Carbon Sequestration & Environmental Protection – Technical Background

OPTIONAL ANNEXES (Available on request)

- Annex 5:** MRMP: Land-use in the Project Area in three Time Periods
- Annex 6:** Investment and Running Costs
- Annex 7:** Economic and Financial Analysis
- Annex 8:** Socio-Economic Profile of Target Group
- Annex 9:** Community Participation and Capacity Building
- Annex 10:** List of Documents in Project File

A. Project Development Objective

1. Project development objective (See Annex 1)

The overarching objective of this Matruh Resource Management Project II (MRMP II) is to improve further the welfare of the stakeholders, especially the more disadvantaged rural people and contribute to poverty alleviation. This will be done through community development and strengthening the local communities' capacity to conserve, rehabilitate and use their natural resources in a sustainable manner.

It will be achieved by:

- (a) assisting communities, including women and the poor, to organize themselves and participate in community-based planning and implementation of development activities;
- (b) assisting communities to conserve, rehabilitate and sustainably manage the natural resource base through developing appropriate community-based institutional processes and mechanisms;
- (c) improving small holder sustainable agriculture, horticulture and livestock production;
- (d) promoting demand-driven non-farm income generating activities, mainly targeting women; and
- (e) providing improved access to technical, financial and commercial services and market linkages.

Within this framework of integrated resource management, GEF support is sought to address global environmental concerns in the day-to-day management of resources, as well as mainstream environmental dimensions into overall planning and implementation of development activities in the area.

2. Key performance indicators (See Annex 1)

Project impact, output and performance indicators have been developed to provide a baseline and targets for project monitoring and evaluation. The overall project impact will be measured in terms of both the project's development objective and its global objective.

Indicators for the project's development objective of poverty reduction

- a) Change in household welfare attributable to the project, as measured by improved access to education, health, water supply, energy, markets, and by proxies; such as type of housing, improved nutrition and kitchen practices, more efficient use of energy, increased off-farm revenue-earning activities for women, and increased revenue from marketed products.

Indicators for the project's global objective of integrated ecosystem management

- a) Formulation and adoption of appropriate policies and regulations to support the integrated ecosystem management: as assessed by the % of appropriate management plans for the area implemented with full community and stakeholder involvement;
- b) Reduction in adverse impacts of resource use on the biodiversity: as measured by improvement in demographic status of key species and the richness and diversity of habitats;
- c) Reduction in wind and water erosion; and
- d) Reduction of net emissions or improved storage of greenhouse gases: as measured by increase organic carbon stored under different land-use systems and more efficient use of biomass and non-biomass energy.

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1) **Document number: 22163 Date of latest CAS discussion: June 2001**

1.1. Project linkage to CAS objectives

The Egyptian Country Assistance Strategy (CAS) is consistent with the country's development agenda, which emphasizes poverty reduction. The overarching objective of the Bank Group's assistance to Egypt is poverty alleviation. The alleviation of rural poverty in particular is cited in the CAS as the most relevant target for the coming years.

“As 63% of the poor and 74% of the ultra poor in Egypt live in rural areas, increasing productivity of agriculture remains an important prerequisite for increasing the incomes of the rural poor in a sustainable manner. More effort needs to be made to develop new crop varieties and agricultural techniques to enhance smallholder access to basic services, information, technology and extension. In addition, increased emphasis on non-agricultural sources of rural employment and income from rural handicrafts and industries will be needed for rural poverty alleviation.”

To address rural poverty, a key focus of the Bank's assistance strategy in agriculture is to assist the GOE in its efforts to promote an export-oriented agricultural sector and provide gainful employment to an increasingly large labour force, through developing rural infrastructure, promoting natural resource management and enhancing local capacities. The present project addresses the issue of rural poverty alleviation through community-based rural development and natural resource management. The project also seeks to mainstream environment into rural/community development investment projects, through a fully-blended GEF component, in accordance with the stated CAS objective of mainstreaming environment into sectorial development projects.

This assistance is also in line with the GOE's Strategy to fully integrate women in development. Gender is an important component in the current GOE Five-Year Plan. The Government has requested Bank support in mainstreaming gender concerns, which has been reflected in the CAS.

As requested by the GOE, the CAS lists in part D, the follow-on "Matruh Resource Management Project" as part of the "Targeted interventions for poverty reduction" slated for FY 2003.

1.2. Global operational strategy/program addressed by the project

The proposed project complies with the GEF Operational Strategy in the areas of biodiversity conservation and reduction of greenhouse gas emissions. It addresses the Operational Program (OP12) "Integrated Ecosystem Management," which provides a comprehensive and cross-sector approach to address many of the goals of global environmental conventions, including the United Nations Convention on Biological Diversity (UNCBD), the Framework Convention on Climate Change (UNFCCC) and the Convention to Combat Desertification (UNCCD). Such an integrated approach allows for the adoption of comprehensive management interventions that integrate ecological, economic and social goals to achieve both local and global benefits. It addresses three of the identified program objectives of OP12, as follows:

- a. Conservation and sustainable use of biological diversity, as well as equitable sharing of benefits arising from biodiversity use;
- b. Reduction of net emissions and increased storage of greenhouse gases in terrestrial ecosystems; and
- c. Conservation and sustainable use of water bodies, including watersheds and coastal zones.

Egypt has ratified all the major international environmental conventions and agreements dealing with the protection of natural habitats and related species, as well as addressing global climate change. The project is designed to support through its relevant outputs, many of the articles of the Convention on Biological Diversity (CBD) such as:

Article 6 – General measures for conservation and sustainable use

Article 8 – In-situ conservation

Article 13 – Public education and awareness

The project will also seek to establish systems for increasing and measuring carbon sequestration in dryland areas as pilot for these rainfed systems. It will promote sustainable forms of agriculture in light of climate change considerations, as well as contribute to the research and development of carbon dioxide sequestration technologies.

In achieving these objectives, the project will seek to establish institutional mechanisms to facilitate integrated and cross-sector management practices between the local communities and relevant local and national level Government authorities responsible for development planning in the region. The project will also liaise closely with the approved regional GEF/UNDP project “Conservation of Wetlands and Coastal Ecosystems in the Mediterranean Region” (MedWet) of which Egypt is one of 6 participating countries. One conservation area in this MedWet project close to the current project area is situated along the coast at the El Omayed Protectorate (70 km west of Alexandria). Lessons learnt from this and other MedWet areas will be used by the project. The project will also seek to collaborate with the recently approved GEF/UNDP project on the “Conservation and Sustainable Use of Medicinal Plants in Arid and Semi Arid Areas of Egypt.” This will ensure that national level activities implemented by the latter are utilized to support local level efforts with the Bedouin communities in the North West Coastal Zone (NWCZ) area, where the utilization of medicinal and herbal plants is common for a variety of purposes. Also, plans to adopt multi-sector environmentally centered planning for the Siwa Oasis have been initiated recently through support from the Italian Government, and will be assessed during the initial stages of this project for extension in the project zone.

2. Main sector issues and Government strategy

2.1 Sector Issues

Agriculture contributed about 17% to GDP and 12% of the value of total exports in the 1990s, but captured only 7 % of total investments. Almost 60% of the industrial sector’s income comes from agricultural-based operations such as cotton spinning and weaving and food processing industries. Agriculture provides the food for about 65 million people living in the Delta and the Nile Valley.

Over the last two decades, Egypt’s agricultural sector pioneered the economic reform process, with substantial success achieved in price liberalization of inputs and outputs and the elimination of land-use controls for most crops. During the 1990s’, the focus was on increasing agricultural productivity of land and water through more efficient use of these limited resources. Thus, the performance of the agricultural sector improved, from an average annual growth rate of 2.8% in the 1980s to 3% in the 1990s. And the food gap narrowed significantly. Notwithstanding this progress, much more needs to be done to harness the full potential of this sector in increasing further agricultural production, rural incomes and alleviating poverty. In addition to rural poverty, already cited above, the following issues appear as the most relevant for the coming years:

- Water scarcity, a prime challenge for the future of Egypt. The Nile is the country’s life-sustaining water resource. It provides about 95% of Egypt's water requirements and 90% of water supplies for its irrigated agriculture. Rainfed agriculture occupies a very small percentage of agricultural land, - only 4 percent. Per capita water availability has already dropped below the scarcity level of 1,000 m³ per-capita/year and below the regional average (950 to 1,200 m³/c/year). It is expected to fall to 670 m³/c/year by 2017. Agriculture uses more than 80% of the available water. However, the project area depends entirely on rainfed agriculture and the water availability is well below the average. Thus, managing the scarce water supply is critical.
- Land and water degradation. Annual loss of land due to urban encroachment is estimated to be between 15,000 and 30,000 feddan per year (1 feddan= 0.42 ha). As to land degradation, its major causes are poor irrigation drainage, soil salinization, inadequate crop rotation and soil erosion. In addition, water quality is deteriorating because of salinity and increased concentrations of municipal and industrial pollution loads entering the water bodies, particularly in the downstream reaches of irrigation and drainage canals. In the project, the coastal zone area is relatively little developed, but vacation villages are being built and more are planned. It will be a challenge to ensure that unregulated development does not occur, especially on sites of ecological importance. Where development occurs, a proper environmental assessment should be undertaken before plans are approved and once approved environmental directives must be enforced.
- Below-potential development of agricultural exports. Revenues from agricultural exports, excluding cotton, have remained low and volatile during the 1990s, owing to the incomplete liberalization of prices and marketing mechanisms for some products. Other reasons, especially for the horticulture sub-sector, identified as the most promising sub-sector for exports, are import barriers in major potential markets, poor

quality control and the lack of reliable supporting infrastructure and other services to allow private sector competitive involvement. The project area grows figs and olives and has some potential to develop medicinal/herbal products.

Thus, rural development is dominated by the critical need to manage scarce arable land and water resources more efficiently and sustainably, in order to meet the needs of a rapidly growing population while maintaining the natural biodiversity. Further scope for agricultural growth and exports is contingent upon deepening the policy and institutional reforms successfully undertaken in the 1990s, being mindful of the government's environmental policy and strategy.

2.2 Government's strategy

The relevant elements of the GOE agricultural strategy, as expressed in the Ministry of Agriculture and Land Reclamation (MALR) *Strategy for Agriculture Development until year 2017* are as follows:

- The maintenance and development of the natural resource base through a more efficient allocation and use of soil and water resources, including strict checking of encroachment of urban activities on agricultural land and rationalizing water use in the major water-consuming crops: wheat, rice, maize, cotton and sugarcane. Soil reclamation and soil amelioration will be given priority to overcome the problems of soil salinity and water logging;
- As part of the strategy to safeguard agricultural land against desertification, green belts, hedges and shelterbelts will be encouraged;
- Agricultural exports will be promoted, based on quality assurance and product safety, removing obstacles to private sector development and improving rural infrastructure;
- The role of rural women in development will be promoted through literacy programs and the enhancement of women-led small and micro-enterprises to increase women's access to economic opportunities in the livestock, indigenous resources (e.g. medicinal/herbal plants), marketing and processing sub-sectors.

Egypt has had a long history of pioneer legislation regarding biodiversity. In 1936, Egypt became party to the "Convention Relative to the Preservation of Fauna and Flora in their Natural State". Egyptian law also provides a conservation framework for plants and animals. Law 53 of 1966 prohibited the hunting of birds and other wild animals useful to agriculture as well as prohibiting the destruction of their nests. Law 72 of 1968 concerned the prevention of oil pollution in seawater.

Law 102 of 1983 provided the legal framework for the declaration and management of protected areas and regulates the conservation of natural resources. Since the first protected area was established in 1983 at Ras Mohammed, 19 protected areas, covering 80,000 km² have been established (Baha El Din 1998). The EEAA has full executive authority over the affairs of the protected areas (Baha El Din 1998). Law 4 of 1994 'Promulgating the Environment Law' defined the scope and responsibilities of the EEAA and established an environmental protection fund. Articles 17 to 23 require environmental impact assessments prior to development. The law also forbids hunting and habitat destruction of specified types of wild birds and animals as well as protection of air, land and water from various types of pollution.

In addition to the national laws, Egypt is also party to several international conventions and agreements. The Egyptian constitution indicates that any international convention signed by Egypt takes precedent over Egyptian law. Conventions that Egypt has signed with implications for biodiversity are the African Convention on Conservation of Nature and Natural Resources (Algiers 1968); Convention on wetlands of International Importance especially as Waterfowl Habitat (Ramsar 1971); Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Washington, D.C. 1973); Convention of the Conservation of Migratory Species of Wild Animal (CMS)(Bonn 1983); Convention on Biological Diversity (Rio 1992); Specially Protected Area Protocol of the Barcelona Agreement; and the African-Eurasian Migratory Water Bird Agreement (AEWA) (The Hague 1995).

A National Study on Biological Diversity was completed in 1996, followed by the release of the National Biodiversity Strategy and Action Plan (NBSAP) in 1998. The principal strategic goal is the proper management and protection of natural resources and biodiversity. Capacity building, improving awareness, and strengthening the

private sector, NGOs, and research institutes involved with the project are all part of the strategy and action plan. Example initiatives include a national arid lands management program, and the development of nature-based tourism. In addition, the NBSAP establishes conservation of medicinal plants as a priority. Based on this strategy, the Nature Conservation Sector of EEAA has undertaken an assessment of new potential protected areas according to established global and national criteria (Baha El Din, 1998), four of which fall within the MRMP project zone.

Patent Law 132/1972 provides for protection of inventions, industrial designs, utility models, marks and works of authorship; however no formal consideration has been given to legally recognize community intellectual property rights, such as those relating to uses of herbal and medicinal plants. Traditional indigenous knowledge forms an intricate part of the use and value of these plant resources; therefore, recognizing and protecting these rights could be an important incentive for communities to act as custodians of their natural resources.

In terms of carbon sequestration potential, given that inclusions under the Clean Development Mechanism (CDM) have been restricted to afforestation and reforestation, Egypt has included in its recently formulated National Strategy Study on CDM (supported by the World Bank and Swiss Government) a chapter on Land Use and Land Use Change Options for inclusion under CDM.

3. Sector issues to be addressed by the project and strategic choices

3.1 Sector issues

The project area is situated in the North West Coastal Zone (NWCZ), a rain fed area, which extends about 500 km from El-Saloum in the West, on the border with Libya, to Alexandria in the East. It is bound by the Mediterranean Sea on the North and the Sahara Desert, about sixty km. to the South. The natural habitat is dry to very dry rangeland, with an annual rainfall ranging from about 150mm in the NE to about 20 mm in the SE. The area is inhabited by an indigenous Bedouin population, 85% of them living off of an extensive dryland production system of sheep/goat-barley-tree (fruit) crops. Small areas along the coast, especially in the SE are being developed as tourist villages. These villages provide seasonal work for some of the (young) Bedouin.

The project area itself runs easterly along the coast from the border with Libya for about 320 km. and inland from the coast for about 44 km. The estimated total area is 1.4 million ha. (3.4 million feddan) [See Annex 2 for land use breakdown]. In 1992, the population was estimated to be 190,000, (25,000 households). By mid 2002, it is anticipated that the population will reach 230,000 (30,000 households). Thus, over the 10-year period 1992 to 2002, the population will have increased by about 40,000, although there is some uncertainty with these figures as the Bedouin move between Egypt and Libya and some people have migrated to Cairo and other urban areas. Livestock rearing is the main activity and the number of animals in sheep equivalent units is about 700,000 or 3 sheep per person. Gradually, the Bedouin population is changing from a nomadic to a sedentary lifestyle, thus the accessible area of rangeland, which is used for grazing, is diminishing. However, the animal numbers are increasing, this is putting the accessible grazing land under more pressure. And because there is insufficient feed from this area, marginal barley land is being expanded to help meet the deficit and feed is being brought in from outside. This is a major concern to the project and the GOE.

The project area differs from most other parts of Egypt in that the traditional tribal structure is still very much alive and is a culturally rich and a strong force for the integration of society. Customary laws still apply for local administration, adjudication and common issues. There are 40 tribes (*qabila*) made up of clans (*aila*), which are patri-lineages of 5-7 generations: these are further divided into extended households or lineages (*bayt*) of 3-4 generations. Leaders are designated at each tribal level, forming a customary law council (*majlis'urf*). The tribal hierarchical social structure, traditions and customary laws (*urf*) organize the Bedouin community life. Pronounced solidarity is maintained with recognized responsibility at each hierarchical level. Though the State does not formally recognize the *urf*, it allows the Bedouins to resolve conflicts through the *urf*: it is praised as a highly effective social system for conflict resolution and dispute settlement.

The rangeland is allocated for *usufruct* between tribes, clans and lineages, except in the southern part where communal rangeland still exists. The Egyptian law does not recognize tribal ownership of land. All desert land or "undeveloped land" is considered as state property. However, the GOE informally recognizes the usufruct of land

(*wad' yad*, meaning “*placing the hand*”), except in the case of the Ministry of Defense, which has taken over some land for strategic purposes.

Most of the population lives in scattered settlements. The decrease in nomadic lifestyle that occurred in the last few decades in the NWCZ has transformed traditional, ecologically balanced, pastoral systems to potentially unsustainable sedentary agriculture. This transformation has increased human and animal pressures on the fragile resource base and ecosystems of the arid environment, creating a cycle of resource degradation and human poverty, threatening biodiversity, and accelerating environmental deterioration. Furthermore, degradation has been exacerbated by the absence of strategic planning to achieve sustainable resource management. There was a lack of adaptive research to effectively integrate it with development and to devise schemes to adapt the semi-nomadic traditional production systems to a sedentary lifestyle. In addition, the Bedouin have limited experience in sustainable resource management in a sedentary environment and thus have limited coping strategies. This transition has occurred more rapidly in the eastern parts closer to Alexandria and in the Northern strip adjacent to the Mediterranean Sea. Poverty is also accentuated by limited government services, particularly for health and education, and the lack of economic opportunities other than agriculture. These various factors are now reviewed.

Issue # 1. Management of scarce land and water resources. Human settlements and land use are entirely dependent on rainfall and on various forms on water harvesting. Average annual rainfall, restricted to the winter months, is between 150 mm in the East to 75 mm in the West along the coast, and for about 20 km. inland. Towards the South, rainfall tapers off very rapidly to less than 20 mm per year. It also fluctuates widely between years. One of the main issues is to increase the efficiency of runoff water use for human and animal consumption and cultivation, and to minimize soil erosion. This is possible because the area's geography and hydrology are ideal for effective use of water harvesting systems.

Issue # 2. Degradation of rangeland and vegetative cover. Historically, the NWCZ of Egypt has been quite rich in natural habitats and biodiversity. Plant biodiversity includes a multitude of domesticated (indigenous or exotic) agricultural germplasms, and wild plant species. The vegetative cover has been exposed to a severe degradation process as a result of erratic rainfall patterns and wind erosion, combined with demographic pressure and the settlement process, which occurred without technical support to adapt to new production systems. This led to unsustainable land-use practices in these fragile eco-systems, concentrated and perhaps excessive firewood gathering and over-exploitation of the rangeland. Small but significant uncontrolled tourist development is also taking its toll with arable land lost to tourist villages and quarrying, and unregulated use of off-road vehicles, which has disturbed topsoil and incited erosion.

Natural resource degradation has been reflected in reduced bio-diversity, endangered species and declining availability of pastures for herds. The traditional extensive livestock production system has been transformed to a semi-intensive system, with over 50% of the feed requirements supplied by concentrates. Based on published information and field observations, the species that merit the highest priority for conservation action are as follows: *Allium mareoticum*, *Ebenus armitageei*, *Echinops taeckholmianus*, *Helianthemum sphaerocalyx*, *Zillia baiparmata*. A list of these and other species found in the project area are given in Annex 6.

The problem of identifying range management systems that would be sustainable, socially acceptable and economically sound still remains an important part of the agenda. Much has been achieved during the first phase of the project that can be built upon, in particular technologies have been adapted and tested, and pilot range management units have been implemented and are being evaluated.

Issue # 3. Crop and livestock production systems. New or improved technologies, adapted to the agro-climatic and socio-economic conditions, are required to intensify and diversify low output, extensive production systems that are now inappropriate, given the demographic pressure and the settlement process. A number of constraints have been identified as follows:

Crop production: low yields of local cultivars; insufficient seed supply; limited options for crop diversification; improper crop management practices; post-harvest handling and processing problems; marketing difficulties.

Animal production: inbreeding of stock; pursuit of quantity rather than quality; due to demographic pressures and new socio-economic conditions, a disequilibrium between feed resources and animal population has occurred over the last decades and has led to inefficient rangeland management.

The strategy is to adapt cultivars that are drought resistant (especially for barley), introduce new varieties or new crops (for example medicinal plants, jojoba, grapes, etc.) that correspond to a well identified market-demand, diversify the varieties for different product use (for example production of fruit for drying, pickling and processing, instead of only marketing fresh produce) and improve the quality of fruit and vegetable products, their handling and packaging. For animal production, the strategy is to identify rangeland management systems that will increase the availability of local feed resources (see issue #2), improve animal husbandry practices, and better target market niches for livestock off-take.

Issue #4. Marketing and agro-processing. For the current level of development, marketing has not been a major problem except for figs. However, if agriculture is going to become a source of increased income, marketing and agro-processing issues will be a major concern. New, market-driven, products (such as medicinal plants) will have to be identified, as well as new/increased outlets for traditional products. These include: major cities (Alexandria and Cairo), increased local market demand to cater for tourism at certain periods of the year (May to September) and the Arab Gulf countries, especially for livestock. For figs, agro-processing (drying and jam making etc.) will become necessary to absorb any increased production. Improved quality and quality control, appropriate packaging and handling will be important concerns if farmers are to obtain higher prices. For marketing purposes, producers will be encouraged to organize themselves as a bargaining unit so as to be in a better position to negotiate with traders and wholesalers. The present cooperative system, which developed around government subsidies, now suppressed, may no longer be dynamic enough. Other types of producer organizations may have to be encouraged. Accurate and timely marketing information will also become crucial. Thus, information and communication technology will play an increasing role.

Issue #5. Rural roads. There is a lack of surfaced roads, except along the coast. This curtails the supply of goods and services, increases their costs and leads to the improper alignment and haphazard construction of dirt roads (mainly for donkey cart transport). For some of the N-S roads that have been constructed, sand drifts are common in parts. Thus, proper design of such roads is important, as is the use of shrubs/trees along these roads to bind the soil and prevent drifting. Of some concern is the use of off-road all-wheel drive vehicles for hunting purposes. This is having an adverse effect upon the landscape and placing some fauna under severe pressure. Specific off-road routes should be designated and the hunting of species licensed and controlled. Shooting with a camera rather than a gun should be promoted.

Issue #6. Off-farm activities. Though there is certainly scope to increase production and marketing and to diversify production systems, agriculture alone will be insufficient to provide an adequate income to most of the rural people in the NWCZ, especially as the population is increasing at about 2% per-year. Already by the end of the eighties, 45% of household income, on average, came from non-agricultural sources. The on-going project provides support to rug weaving and handicraft production by women. However, these activities suffer from insufficient support for marketing. Capacity building, including the provision of market intelligence and more effective communication systems should be emphasized to enable rural people, especially women to take advantage of existing off-farm income generating activities. The production of products from medicinal and herbal plants will be investigated after supply surveys of such plants and market research. If the potential exists, the growing of specific plants may be encouraged.

Issue #7. Lack of cross-sectoral coordination for planning and resource management. Regional development plans are developed by central planning authorities without much feedback from the local level or the target communities. In particular, plans are devised by combining sectoral projections and needs with a lack of coordination among the different sectors, often resulting in low attention to environmental sustainability or social equity. The project will aim at building capacities at the local level for integrated ecosystem management and the building of strong public/community/private sector partnerships for the the planning and implementation of local development plans for the area.

Sector-related Issue #8. Availability of services and gender issues. In the remote areas of the NWCZ, access to education and training and health services is a major problem, especially for women and girls. Whether government services can extend their operations to these remote and low-population places in the medium-term is a moot point.

This is where the project may be of some assistance by supplying informal education and training including environmental training.

Sector-related Issue # 9. Access to rural micro-finance. There are two commercial banks operating in the NWCZ: PDBAC and the National Bank, both with offices only in Marsa Matruh, the main city. It may not be viable for them to open branch offices: the volume of operations that they would have, given the estimated potential demand for rural credit, is too low to enable them to cover their fixed costs. As a result, rural people have little access to modern rural finance, except in the close vicinity of Marsa Matruh.

3.2 Government strategy under MRMP I and the project's achievements

The GOE began to address the above issues under the current Matruh Resource Management Project (MRMP I) with IDA funding, focusing on natural resource management, agricultural development and community development. The innovative aspect of the existing project has been its participatory approach, which combines technical innovations and the socio-economic and institutional development needs of the local communities. Local communities have elected committees and prepared Community Action Plans (CAPs) for implementing resource management and economic and social activities. Within the project there are 38 registered communities. These are served by 6 sub-regional support centers as well as from project staff in Marsa Matruh.

MRMP I made considerable progress in addressing the shortage of water through its water harvesting and watershed management component: this has increased water availability to participating communities by more than 45%. It helped the local communities construct underground cisterns and reservoirs and rehabilitate some cisterns that date back to the Roman times. A total of 7,000 cisterns and 310 reservoirs have been constructed or rehabilitated, representing over 1.1 million m³, - four times the target at appraisal. There are also 218 wadis in the region running from South to North. Sixty-four wadis have been selected for watershed development, based on dike construction to retain both water and arable soil, enabling the cultivation of 4,000 feddan. The local communities have expressed a strong interest in this component. Watershed management and water harvesting investments are still likely to be the most demanded intervention under the follow-on project.

The range adaptive research and technology transfer program of the on-going project was aimed at rehabilitating rangelands to reduce the feed gap, meanwhile conserving range resources and enhancing biodiversity. The program yielded a number of adaptable research results that were extended to herders. It helped the local communities establish fodder trees and shrubs on 12,000 feddan, over-seeded 2,000 feddan of rangeland and establish 250 range management units. New stock was introduced and the swapping of rams and Billy goats for breeding purposes was encouraged. These activities are presently under evaluation.

The present project has put valuable emphasis on adaptive research and extension for crop and livestock production improvement, with the construction and staffing of the Matruh Adaptive Research Center (MARC) and the six sub-regional support centers for extension. A farming system approach guided the technology generation and transfer program: a number of technologies have been tested, adapted and extended. The packages that have been developed enabled increase productivity on farmers' demonstration plots, as follows: barley 70%, olive & fig 60%, vegetables: 27%. Now the issue is to extend these technologies to many more farmers in order to test and adapt them.

As far as access to services is concerned, the alternative to establishing sustainable government services for these areas, at least as a transition strategy, was for the project to provide these services with its resources. Thus, the project helped the local communities link with other government services to provide literacy classes for women and girls and extension workshops to increase environment, nutrition and health awareness.

Finally, the project also tackled the issue of access to micro-finance. Credit was to be made available on a pilot basis, through locally established banks, the PBDAC and the National Bank of Egypt, with the PBDAC playing a prominent role. Prolonged negotiations between the project and these institutions did not lead to any agreement on terms and conditions for loans, nor on mechanisms for credit delivery. In addition to the fact that opening branches outside the main city may not have been a viable operation, there were at least three other difficulties:

- (i) the need for a guarantee/collateral, [difficult to arrange in the project area];
- (ii) the risk associated with repayment of agricultural loans under recurrent drought conditions;
- (iii) the interest rates charged by commercial banks for urban and industrial undertakings are too high, especially in the presence of alternative soft loans and grant funding available for the same target groups under the Social Fund for Development (SFD) and the “Shuruq.”

The SFD community development program provides credit through NGOs at much lower rates [between 7-9%] instead of the 13-15% proposed to the project. Another tentative scheme to establish credit mechanisms through the Central Agricultural Cooperative also failed.

Since institutionalising micro-finance through commercial banks failed, the project established a revolving fund, which provides seed money, in particular for women, for income-generating activities, such as poultry rearing, nursery establishment, as well as incentives for environmental protection, i.e. the purchase of gas ovens. The recovery rate achieved for this credit without interest is 98% and it was well managed financially at the time of the second in-depth project review (November 2000).

The MRMP I is expected to close by the end of 2002. The GOE has requested the World Bank, in partnership with IFAD, to assist in the design and funding of a follow-on project (Second Matruh Resource Management Project (MRMP II)). This second project would build on the success of MRMP I and on the core of experienced professionals and established infrastructure. In order to highlight and mainstream environmental problems and opportunities in this second phase, a request for GEF funding of about US\$ 5 million was made under OP-12.

3.3 Strategic choices

Whilst the first project was conceived as a natural resource management project, the overarching objective of the follow-on project will be rural poverty reduction through sustainable community-driven development. Although MRMP I achieved considerable success in pioneering the participatory approach in the challenging environment of a traditional (male dominated) tribal social system and in gaining the trust and confidence of the Bedouin people, it has yet to find a way of anchoring the participatory process firmly in the local community structure. Achieving this necessary condition for sustainability entails a greater responsibility and authority being passed to local communities that have been prepared, trained and given the requisite guidance to accept such responsibilities.

Thus, the follow-on project will promote a community-driven development (CDD) approach, tailored to fit the socio-economic conditions of the communities. At the beginning, the CDD approach will of necessity be incremental and phased. Gradually, it will require a greater involvement by local communities in decision making regarding resource allocation, as well as their involvement in implementing, monitoring and evaluating all project activities. When elaborating their Community Action Plans, the communities will choose the ones that are the most relevant for their members from among a menu of activities financed under the project. The GEF funding will, amongst other things, provide training in environmental matter including best management practices. This training will be given to project staff who, with the help of specialists, will provide on-going training to stakeholders in the project area, including women and children. This will entail much training for both project staff and the community representatives, the recruitment of new/additional experienced staff and, most importantly, a willingness by project management to share the decision making process with the communities and other concerned stakeholders.

C. Project Description Summary

1. Project components (Annex 3 for a detailed cost breakdown)

The GEF initiative will be fully integrated within the MRMP II as a fully blended project. It will fill in the voids that previously have not been properly addressed and will work closely with the Nature Conservation Sector of the Egyptian Environmental Affairs Agency, as well as the Matrouh Governorate. The proposed MRMP II will comprise the following four components and sub-components to be implemented over a five-year period from 2003 to 2008. These will be described first and the role of the GEF contribution will be highlighted later.

- A. Community Development
 - Capacity Building of Communities and Species Conservation
 - Strengthening of Women’s Development Capacity

- B. Integrated Natural Resource Management
 - Water Harvesting and Watershed Management
 - Range Management
 - Bio-diversity Conservation

- C. Support for Income Generating Activities
 - Agricultural and Livestock Production and Carbon Sequestration
 - Off-farm Income Generating Activities
 - Marketing and Agro-Processing

- D. Rural Roads

- E. Development Initiatives Fund

- F. Project Management

A summary of the various components is given below. A detailed description can be found in the MRMP Formulation Report (see Annex 10 List of Documents in Project File).

Component A. Community Development (US\$5.45 m. GEF Contribution US\$ 1.85 m)

Capacity building of communities. The project is to be implemented through a community-driven development process. This approach requires the deepening of the participatory approaches initiated under MRMP I in order to develop effective mechanisms to involve all the community in decision making, enhance community ownership and enable communities to gain the skills and experience to request other local funding agencies (e.g. the Social Fund for Development, Shuruq Fund, the Governorate education and health services, etc.) for assistance and resources after the end of the project. To achieve these objectives the project will provide training to the local community representatives (*mandoubi*) and the wider community members. The initial training will focus on the overall strategy and processes to be followed under MRMP II, the roles and responsibilities of the *mandoubi* and the communities, the criteria and processes for identifying disadvantaged households, establishment of the community’s development objectives, the processes for establishing development priorities and prioritising resource allocation as the basis for the design of the Community Action Plans (CAPs). Following the initial training, further training and facilitation will be provided to:

- (i) assist the local communities to become legally recognized;
- (ii) acquire negotiating skills and management capacities of their community affairs;
- (iii) understand the basic concepts of biodiversity conservation, and environmental assessment; and,
- (iv) set in place the process for monitoring the implementation of their activities and evaluate the results.

The representation of the local communities will also be facilitated at higher levels, i.e. the sub regional center levels and regional (project) level for participation in the decision-making processes regarding project resource allocation. The project would support the construction of basic two-room social centers, with community contribution and community involvement in management, in order to provide a venue for literacy classes, training programs, environmental awareness and other community activities.

Strengthening of women’s development capacity. The project would promote a two-pronged approach to strengthening women’s development capacity by:

- (i) ensuring that women are ‘integrated’ into the overall participatory planning process (albeit through separate meetings);

- (ii) soliciting their views on such aspects as a) the criteria for defining the disadvantaged households, b) the selection of beneficiary households and c) the allocation of resources for different activities, particularly communal facilities, whilst also separately addressing the special needs and interests of women.

Women will be provided with training in the new participatory planning processes and role and responsibilities of *mandoubi*, etc. to ensure that they have the same access to information as the men and to allow them to influence processes through their informal channels.

As a key contribution to building women's capacity, the project would support literacy classes for women and education for girls, with a 5-year program aimed at providing the next generation with greater opportunities for advancement. The project would assist women to reduce work load for domestic chores through access to labour saving assets such as hand pumps, ovens and carts for transport through credit and women's own contribution. The project would also support nutrition, hygiene and health sensitisation programs, including promotion of the construction of latrines, through enlisting the support of the Health Department. It would also promote environmental awareness programs to assist women to participate in sustainable utilization and management of the resource base. The GEF activities will promote formal and informal environmental education in schools and at the 38 community centers. As part of this program an oral history initiative will be undertaken to record the use of various plants for medicinal, herbal and other uses. Also, a survey will be carried out on energy consumption and kitchen practices to determine if and what interventions are appropriate to improve the kitchen environment. Wood is still a major cooking fuel thereby posing a threat on endangered plant species for fuelwood collection. As part of the energy survey possibilities for introducing alternative energy sources for cooking at affordable prices will be examined. It was noted in a sister GEF project on Medicinal Plants in St. Katherine's Protectorate that some medicinal plants were being cut for fuel. Special attention will be given to the species of wood and shrubs used for fuel to ensure that endangered and/or valuable species are not being misused.

Component B. Integrated Natural Resource Management (US\$39.14 m GEF Contribution US\$ 2.70 m)

Water harvesting and watershed management. The lack of sufficient water is a key constraint. Addressing this key issue will continue to be a main concern of the project through a major program for water harvesting and storage and watershed management. Watershed management may require the involvement of several communities having rights over the same watershed, to assist in the designing and implementation of sustainable watershed management plans taking into consideration the different land use systems, the communities' diverse needs for water, and reducing, or eliminating potential conflicts amongst users. Implementation will be carried out using the proven successful water harvesting and storage techniques and infrastructure (underground cisterns/reservoirs and various types of dikes for water and soil retention in the *wadis*) integrated within an overall strategy of watershed management and using implementation procedures developed under the on-going project. Protection of the upper catchment areas will continue to be promoted through micro-catchment water harvesting measures, shelterbelts against wind erosion and re-seeding of range areas. Adaptive research to establish water run-off coefficients and to investigate water utilization techniques will be supported.

Range management. The approach to range management adopted under MRMP I through establishing range management units have proved technically effective in increasing the feed resources to meet the feed gap and to reduce expenditure on concentrates by farmers. But it has been costly and has reached only a relatively small number of better-off farmers. This has emphasized the need to find alternative methods that are more cost effective and more widely replicable. In response to this, MRMP II will pilot a community managed approach to rangeland rehabilitation which will focus on encouraging communities to delineate a section of degraded range land to be rested from grazing with the aid of a guardian for 1-2 years. Restoration will be aided by contour furrowing and over-seeding with small quantities of seeds of indigenous perennial plant species. Prudent management of the remaining pastures will be ensured through dialogue with the concerned communities, assisting them through participatory approaches, to develop management mechanisms which both ensure that overstocking does not take place and which can be enforced through the community's own social controls. The adoption of rotational grazing practices will be complemented by the plantation of fodder shrubs in pure stands and/or inter-cropped with barley to compensate for the reduced access to feed resources on the range. The size of such plots will be geared to the needs of smaller livestock owners. These interventions will be supported by adaptive research and extension on

assessing/monitoring the rangeland resources, germplasm resource enhancement and use in plantations and rangeland rehabilitations and management and better use of planted fodder shrubs. As part of this program, local communities will chose areas of biological interest of up to 25 km², (6,000 fd.) to be protected and used as a seed source for various types of indigenous plants, as a haven for fauna and a study area for both children and adults. Harvesting of products would not be excluded, provided the community is in agreement.

Bio-Diversity conservation. This component will have the following specific objectives:

- (i) conserve biodiversity of the unique dry land plants and animals: some of the local species identified as endangered could be used for rangeland improvements;
- (ii) help the GOE establish two of the four already identified potential Protected Areas in NWCZ;
- (iii) build national capacity for implementation of integrated ecosystem management approaches; and
- (iv) promote public awareness and a replication strategy that would enable the replication of project activities to other parts of Egypt and the Middle East and North Africa and West Asia Regions with a similar ecology.

Detailed description of this sub-component are listed under Section C.2 and Annex 4 respectively.

Component C. Support for Income Generating Activities (US\$5.43 m GEF Contribution US\$0.56 m)

Agricultural and livestock production. The principal focus of the agricultural and livestock development sub-component is the dissemination and active promotion of those technologies already developed under MRMP I that offer the best promise of improvement of existing farming systems at minimal cost and risk. This process would focus on closing the gap in productivity between the best producers and the average and poorer performing farmers. This gap in performance still offers by far the best opportunity to advance poverty alleviation, enhance income and assure resilience of family livelihoods.

During Phase II there will be greater emphasis on extension, with more farmer involvement and a new community-based extension outreach effort through the training of Community Facilitators in each of the 38 Local Communities: these facilitators will be chosen by community members with guidance from the project staff. They would serve as resource persons to handle the most common farming advisory and training demands likely to emerge from the farming systems in their particular locality. When they are unable to provide the solutions themselves, they would, in response to farmer demand, liase with their sub-regional support center and head quarters for technical support.

Extension would be accompanied by a tailoring of the adaptive research program to meet local needs plus further community and farmer-demanded research and technology development implemented through contractual arrangements with the Matruh Adaptive Research Center. The themes would focus on improving product quality and on meeting market requirements in order to improve farmers' revenues and reflect realistic assessment of probable economic benefit and farmer propensity to adopt. Upon request, start up funds will be available to local communities for testing innovations.

Livestock production. The approach to livestock production will continue focusing on less dependence on concentrates, better use of crop by-products, more value added to animal products at the farm level e.g. through fattening and ensuring the sustainability of the rangeland. Livestock productivity interventions include strengthening of the ram exchange program through the distribution of improved rams (with recipient farmers agreeing to pass on an existing good quality ram to a neighbouring herder to broaden the impact of expanding the gene pool). In order to improve the genetic potential on a wider scale, the feasibility of crossbreeding of Barki and Damascus goats through artificial insemination would be further tested. Improvements in animal nutrition would be promoted through the demonstration of feed blocks, urea treated straw and mineral blocks.

Crop production. For field crops, the emphasis will be on barley and associated crops such as vetch focusing on the testing of new varieties, improved systems of cultivation and of water supplementation, and inter-planted fodder shrubs in alley cropping systems. For tree crops and horticulture the emphasis will be on figs, olives and watermelons focusing on improved husbandry practices, quality control and market grading measures, and the testing of dried fig varieties and higher olive oil content cultivars. In addition new work on medicinal and aromatic plant domestication and culture as a means of alleviating pressure off the wild species would be supported through

the GEF contribution. The agronomic research would be complemented by farm financial and economic evaluation of adaptive research findings.

Off-farm income generating activities. Promotion of off-farm income generating activities will mainly target women through the provision of training, access to small amounts of credit and market linkages in response to women's requirements. The most likely activities would be handicraft, poultry rearing and small-scale agro-processing. Included in this section would be investigations of the potential for medicinal/herbal plants and their products. All promoted activities would be preceded by thorough market investigations and assistance in the development of sustainable institutional mechanisms for accessing markets. Credit for women would continue to be provided initially through a revolving fund mechanism, but avenues would be explored to convert the revolving fund into community managed micro-finance intermediaries to ensure sustained access to credit beyond the project period. Other possible delivery mechanisms have yet to be investigated, but a possibility is to establish a micro-finance intermediary or enter into an agreement with the Shuruq Fund to manage the credit on the project's behalf.

Proximity to the coastal development should provide future opportunities for employment, firstly in the construction phase and subsequently in service trades; people in the area should be equipped to exploit these opportunities. To this end, the project would support the training of young men (and women) in such activities as carpentry, masonry, plumbing, welding, painting, ceramics manufacture etc. Participation in regular courses may be constrained by the low educational attainment levels of the beneficiaries, requiring the project to respond by organizing such courses through contracting trainers for the duration of the courses.

Marketing and agro-processing. Marketing interventions would be directed towards ensuring that future investments in agriculture and non-farm activities are commercially driven. To this end, emphasis would be placed on improving marketing awareness and the business skills of both the beneficiaries and project staff. The focus would be on developing linkages with the private sector through the project providing market awareness, market research and market promotion services to farmers. Marketing support would focus on building farmers' appreciation of market conditions in order to improve their marketing decisions; and facilitating contact and dialogue between middlemen and producers through trade meetings to improve market linkages, to generate a better understanding of marketing opportunities, constraints and issues and to facilitate market promotion.

These activities would be complemented by support for market research and business planning to overcome the key constraints to the development of new business opportunities, namely poor knowledge of market opportunities on the part of farmers and lack of evaluation of the potential profitability of new opportunities. This would be followed by market promotion assistance to develop potential opportunities and the provision of small amounts of seed capital to assist producers in the initial uptake of activities. The project would also help communities to organize for marketing purposes, in particular to negotiate with wholesalers and traders and to bargain to ensure profitable access to market outlets. The project will also help set up a communication and information system to enable local communities to have access to information on economic opportunities, market niches, prices and relevant actors.

In addition to food processing and handicrafts, already mentioned, the project would investigate the scope for developing medicinal and herbal plant production and semi-processing in the project area based on the domestication of indigenous plants, which are in high demand by traditional medical practitioners and may have wider applications. Market investigation and test marketing would be supported by the project and research into propagation techniques would be commissioned. It would call on the experience of the sister GEF "Medicinal Plants" project at St. Katherine's Protectorate in Sinai.

Component D. Rural Roads (US\$3.30 m)

In response to the demands of communities, the project would pave around 100 km. of dirt feeder roads. It will also give advice on the alignment of new dirt roads and their protection against erosion. In view of the expected high demand for road construction, stringent selection criteria will be established to take into account access to markets, social needs, population served, cost effectiveness, etc. The alignment of existing roads will be checked and where necessary, remedial action will be taken to minimize erosion. It is proposed that the borders of roads are protected by shrubs and trees to decrease the risk of sand drifts and prevent gully erosion etc. The project will also endeavour to minimize the expansion of hunting tracks by controlling the hunting for game and birds through increased monitoring and enforcement capacity of EEAA/NCS in the field.

Component E. Development Initiative Funds (US\$0.47 m)

This is a revolving fund to promote small enterprises such as the off-farm income generating activities described under Component C above and marketing and agro-processing activities, also described under Component C.

The various investment and running costs for all the components are given in Annex 3. and an incremental cost analysis for the GEF support (see below) is given in Annex 4. An economic analysis is given in Annex 5.

2. GEF initiatives within the project

Component A. Community Development

o Capacity Building of Communities (GEF Contribution US\$ 1.5 million)

Environmental curricula development for children and adults (GEF Contribution US\$0.114 m). Both project staff and stakeholders indicated that there was a need for both formal and informal environmental education material for school children and adults. Therefore, the GEF contribution will provide funding to develop curricula for the schools and community centers. Assistance could be sought from the Ministry of Education and UNHCR (who have developed environmental education courses for refugee camps). The courses should be practical and biased to the needs of the area. Provision has been made to provide material and equipment so that the teachers will be in a position to undertake the courses. It may be advisable to start with a few schools and centers in order to get a feedback from these units, before the courses are fully introduced. One practical part of such initiatives would be for the children and adults to record oral history of important medicinal and herbal plants and where they can be found, the type of fauna seen in the area and its prevalence and areas of scenic beauty or historic importance. Such information could be of importance to the people when compiling their community action plans.

Species Conservation (GEF Contribution US\$1.386 m). Within this sub-component there are a number of activities. These include wildlife conservation, community conservation areas, biodiversity hotspots, protection/natural habitat corridors, seed collection, medicinal/herbal plant protection, biodiversity capacity building and monitoring and evaluation. A summary of these activities is given below, but more details are to be found in Annex 6.

Preliminary environmental surveys, both of plants and animals, will be undertaken by the project with the help of local people. This should reveal areas that have endangered species or species that may have commercial value. Such areas could be recommended for protection under the community. Monitoring of such areas and of endangered or valuable species will be undertaken throughout the lifetime of the project. Again this monitoring will be with the full participation of local communities.

Once the preliminary surveys have pinpointed areas worthy of protection, it is planned that Community Conservation Areas be set up by and for the community. There are 38 registered communities in the project area covering 3 million feddan (1.3 million ha.) of rangelands (excluding agricultural areas). It is envisaged that each community will protect about 100 feddan, or a project total of 3,800 feddan, about 0.1% of the rangeland area. Such Community Conservation areas were discussed with local stakeholders and they were enthusiastic about establishing and protecting them. These areas will be monitored for five years to record changes in quality and quantity of flora and fauna. These areas will be used as a practical classroom for children and adults in various aspects of environmental education.

The Biodiversity Conservation Report (Annex 6) pinpoints nine hotspots in the project area that should be protected because of their unique biodiversity or because of their potential for eco-tourism. These are relatively small covering a total of about 1400 feddan (150 fd/per site). These areas will be protected in addition to the larger Community Conservation Areas. Also, it is most likely that more hotspots or corridors for the movement of animals will be pinpointed in the preliminary environmental survey. Thus, provision has been made to protect a limited number of these new areas.

In order to encourage the protection of the environment and the indigenous plant population, the collection of seeds from endangered species and species required for re-seeding or over-seeding rangeland areas will be promoted. The

stakeholders, including children, will be recruited to collect seeds of specific species. It may turn out that new species are also discovered in the area. Such seeds will be stored and kept for project use.

One area that has potential for commercial development is the collection and sale of medicinal/herbal (M/H) plants and their products. Collaboration will be established with the sister GEF/UNDP project in St Katherine Protectorate (South Sinai) to ensure that approaches of cultivating, processing and marketing vulnerable medicinal plants are mainstreamed. A survey will be undertaken to record indigenous knowledge of M/H plants and collecting areas. These areas will be monitored to establish if, with proper management, the supply is sustainable and if not, what actions should be taken to ensure a sustainable supply. Market information will be gathered about the potential market for different M/H plants and products and this information will also be used to devise a supply strategy. It may turn out that planting M/H plants in kitchen gardens is a profitable opportunity for women.

In order to protect the area, especially fields against wind and water erosion and dust storms, the planting of shelterbelts, belts along roads and hedges around fields will be encouraged. The MRMP II proposals indicate that 100 km. of shelterbelts will be planted. This is a relatively small amount of protection for an area that is approximately 320km. long by 44 km. wide. Also the perimeters of barley fields run into thousands of kilometres. Therefore, there will be an active campaign to encourage farmers to plant shelterbelts against the prevailing winds, plant hedges round fields, protect areas that may be susceptible to erosion with grasses and shrubs and protect all kinds of roads with bushy vegetation strips. In addition, the planting of fodder plants will be encouraged. If the biomass supply survey shows that there are actual or pending shortages of fuelwood species in certain areas, then a program will be devised to plant species to ensure the sustainability of supply.

All these activities will be monitored and evaluated. By involving the people in the planning and management of such initiatives, their environmental awareness will be enhanced and hopefully they will build on this knowledge to undertake activities on their own to further protect the environment and make it more sustainable.

- **Strengthening of Women's Development Capacity (GEF Contribution US\$0.34 million)**

Undertaking socio-economic surveys, including energy and water (GEF contribution US\$ 0.24 million). Water and energy are two key household resources. It has been stated that a shortage of water curtails household activities and may adversely affect the health of the family, especially the children. Likewise, wood is still a principal fuel and if burnt 'wet' and/or in an un-ventilated kitchen could affect the health of the cook. It has also been stated that wood is being cut faster than it is growing, thus affecting the sustainability of supply and the local and global environment. Therefore, socio-economic surveys will be undertaken to obtain a detailed picture of the household's use of wood and water and their present consumption patterns of food and other basic goods and services. As a result of such surveys, interventions can be planned to improve the kitchen environment and to draw up plans to ensure an adequate and sustainable supply of water and fuel. The socio-economic survey will be repeated at two-yearly intervals to monitor the impact of the project at the household level. In parallel to the demand survey for woody biomass, a supply survey will be undertaken as part of the baseline carbon sequestration survey to estimate the amount of woody biomass and its annual production capacity. This will then be compared to demand to see if and where areas of shortages are or might occur. This knowledge can then be used to propose mitigation measures and to ensure the sustainability of the resource base.

Providing training and experience in improved stove production and kitchen practices (GEF contribution US\$0.1 million). As indicated above, the supply and demand surveys for energy and water including the recording of existing stoves and kitchen practices will provide information that can be used to devise a mitigation strategy to improve the kitchen environment and to use energy more efficiently. The supply survey will also indicate if the resource is being used sustainably and if not what measures should be undertaken to correct the situation. This may reinforce the introduction of improved biomass stoves and/or the substitution of other forms of energy such as gas.

Component B. Integrated Natural Resources Management

- **Watershed management and water harvesting (no GEF contribution, incremental co-financing by IFAD, World Bank, stakeholders and GOE US\$3.0 million)**
- **Range Management (GEF Contribution US\$ 0.03 million and incremental co-financing by IFAD, GOE and stakeholders US\$ 1.8 million)**

It has been stated in several reports that the rangelands are being over-harvested in some areas for fuel, medicinal plants and fodder. No scientific evidence is available to back up some claims, just visual interpretation. Therefore, it is proposed to establish a number of trial plots to test the regenerative capacity of rangeland plants under various management regimes in order that better estimates can be made of the carrying capacity of rangelands and their ability to supply fodder, fuel and medicinal/herbal plants etc. This information can be used to predict the sustainable supply of various products under different management regimes and the management initiatives to make the project area economically and environmentally viable.

- **Biodiversity Conservation and Integrated Ecosystem Management (GEF Contribution US\$2.69 million including PDF-B US\$ 0.3 million and incremental co-financing by GOE US\$ 0.3 million)**

Establishment of Protected Areas (GEF Contribution US\$ 1.9 million and GOE incremental co-financing US\$0.19 million). The Egyptian Environmental Affairs Agency (EEAA) has designated four sites in the project area as worthy of in-situ protection. These are at Saloum, El Qasr, El Showela and Ras El Hekma. A description of these sites is given in Annex 6 (Biodiversity Conservation, Carbon Sequestration and Environmental Protection). The Mediterranean coastal region contains many unique flora and fauna habitats. At present, there is only one declared protected area along the coast at El Omayed, 80 km. West of Alexandria. Unfortunately, due to rapid development along this strip of coastline, this protected area is under severe threat. Also, the irrigation department has routed a main canal (El Nasr Canal) through the only large fenced conservation area within the Protectorate. Thus, the viability of this reserve is in doubt. Therefore, it is vital that unique habitats along the coast be preserved now before they are lost to urban and agricultural development. It is also important that once such areas are designated as reserves, they are kept in tact. This is why it is necessary for the project to have continual dialogue with all concerned parties. It is also a reason why the GEF contribution is supporting the local presence of Nature Conservation Sector (NCS) of EEAA, as they are the entity mandated by law for the implementation of the protected area programs. Governorate capacity for on-going environmental monitoring will also be enhanced to ensure that the environmental laws are observed in all development activities in the region, both along the coast and in the hinterlands.

While it would be advantageous to include all four sites in the project area, budget, personnel and logistical constraints have limited the choice to two sites. It is proposed that the designated areas at Saloum and El Qasr be chosen as Protectorate areas, in view of their uniqueness and representativeness. While the exact boundaries of these areas have not been chosen, a preliminary investigation indicates that there are no human habitations in these designated sites. Indeed they have been chosen because they still are relatively pristine and that by protecting them, the wild animal population should increase. When the exact locations of the protected areas (PA) are chosen through a full participatory process with the relevant local communities, there will be intensive dialogue with the local population to fix boundaries. It should be noted that a protected area in one location might not be in one block. For example at Saloum, it is envisaged that the cliffs to the west of the town be part of the PA and the salt marshes to the east be another part.

The GEF contribution would support the establishment and management of two protected areas for five years. The envisaged support to NCS/EEAA in this regard includes: stakeholder agreement on boundaries etc.; protected area declaration; boundary demarcation; management plan compilation with full involvement of local communities; establishment of management structure; stakeholder involvement in protection and commercial management; protected area management and operations¹. The various investment and running costs are given in the budget in Annex 3.

Strengthening the Project, Governorate and NCS/EEAA field level environmental capacity (GEF contribution US\$0.177 m and GOE incremental co-financing US\$0.07 million). At present, neither the Project nor the Governorate is equipped to monitor activities within the project area to ensure that they comply with environmental laws and/or the best environmental practices that are being applied to project initiatives. Also, no field level presence for NCS/EEAA exists to allow for the initiation of necessary activities for the declaration of Protected

¹ It is envisaged that EEAA finances a progressively increasing percentage of the salaries of rangers and guards as well as vehicles and motorcycles operation and maintenance costs so as to reach 100% funding of these items by year 5. Recurrent costs funding will represent a yearly expenditure of 76,000 US\$ after project completion.

Areas and the setting up of participatory management plans. To overcome this problem, the GEF contribution will partially finance the secondment of three staff from the Nature Conservation Sector of the Egyptian Environmental Affairs Agency (NCS/EEAA) who will constitute the project management unit for the biodiversity activities². They will be responsible for the implementation of the activities related to the Protected Areas Management, species conservation and training in protected area management, flora and fauna conservation, and community participation in conservation. Vehicles and equipment will be provided in order to support the implementation of the new activities related to biodiversity conservation under the project. In addition, the GEF contribution will provide the Governorate's office with two part-time 'environmental' experts over the five years. It is assumed that these experts will work closely with the project staff and will be able to use project assistance if and when required. These experts will provide environmental training in environmental assessment, integrated environmental and resource management planning and environmental monitoring. They will train trainers and help with course compilation of training material for the project. The experts within the Governorate's will also perform duties outside the project area and in matters outside the project's mandate regarding development and compliance with environmental laws in urban areas.

Undertaking training in environmental matters on project programs (GEF contribution US\$0.32 m). In addition to the environmental experts within the Governorate's office, national and international experts will be contracted to provide training in a number of fields. This training will be given to project staff, field staff of NCS/EEAA and the staff in the Governorate's office. It is envisaged that training will be given in: environmental regulations; range resource inventory and evaluation; carbon sequestration and biomass inventory; socio-economic surveying; species monitoring and evaluation; protected area management; and participatory training on specific environmental issues. There will be training of trainers and refresher courses in all of the above topics.

PDF-B (GEF contribution US\$0.3 million)

Component C. Support for Income Generating Activities.

- **Arable/horticulture and Livestock Production (GEF contribution US\$0.56 million and incremental co-financing by GOE and the World Bank US\$0.3 million)**

Enhancement of the Carbon Store (GEF Contribution US\$0.56 million) Most if not all the activities described under Component B above will increase the biomass and carbon store in the project area. But there are additional activities that could enhance the store especially in farmed areas and orchards. Also, the increase in the carbon store should be quantified to see which of the various initiatives are the most successful. Therefore, a baseline survey must be undertaken at the outset of phase two of the project to determine the existing store of carbon under different land uses and soil types and rainfall regimes.

Thus, a baseline survey will be undertaken early in the first year to determine the store of organic carbon in all types of biomass and all types of soils beneath the different biomass types. Such a survey will be repeated in years 3 and 5 of the project to record changes in the carbon levels. These changes will be tested against models that will be constructed to assess the accumulation of carbon, using GIS information etc. GIS data will also be used to monitor erosion so that areas under threat can be pinpointed and remedial action taken to reduce it.

One way to increase biomass production and storage is through nutrient management. Experiments will be undertaken on arable land and in orchards throughout the project to demonstrate the costs and benefits of nutrient application for these commercial crops. These activities will take place over the five-year lifetime of the project and recommendations on the net benefits of fertilizer application will be made. If such results turn out to be positive for the farmer and they are adopted, then there will be a global benefit through increased carbon sequestration.

² Vehicles and equipment will be provided in order to support the implementation of the new activities related to biodiversity conservation under the project. Salaries and recurrent costs of this unit will be gradually taken up by the EEAA to ensure financial its sustainability. This funding will represent a yearly expenditure of 30,000 US\$ after project completion

Component	Sector	Indicative Costs (US\$ m)	% of Total	Bank- Financing (US\$ m)	% of Bank- financing	GEF financing (US\$ m)
A. <u>Community Development</u>						
- Capacity-building of communities and species conservation		2.63	5	0.76	5	1.50
- Women's capacity-building		2.82	5	1.26	8	0.34
		<i>Sub-total</i>		2.02		1.84
B. <u>Integrated Natural Resource Management</u>						
- Watershed management & water harvesting	AI	31.33	56	7.17	48	-
- Range management	AE	4.96	9	0.78	5	0.03
- Biodiversity Conservation (including PDF-B)	Env	2.96	5	-	-	2.69
		<i>Sub-total</i>		7.955		2.72
C. <u>Income Generating Activities</u>						
- Agricultural and livestock production and carbon sequestration	AE	3.63	7	1.33	9	0.56
- Women off-farm activities		1.09	2	0.11	1	-
- Marketing and agro-processing		0.71	1	0.57	4	-
		<i>Sub-total</i>		2.01		0.56
D. <u>Rural Roads</u>						
	TU	3.30	6	2.55	17	-
E. <u>Development Initiatives Fund</u>						
		0.47	1	-	-	-
F. <u>Project Management & Coordination</u>						
		1.78	3	0.46	3	-
Total Project Costs		55.67	100.0	14.99		5.12

3. Key policy and institutional reforms to be sought

The activities of the on-going project have been essentially designed and implemented by the Project Coordination Unit, with some participation from the local communities. Clearly, the new Community Action Plans (CAP) should be in the hands of the communities. The project should help the local communities to take charge in the planning, implementation, monitoring and evaluation of the activities. Initially, the PCU will still be responsible for activity implementation, but the objective should be to strengthen local community capacity in order to transfer progressively the implementation to them.

There are an estimated 30,000 households in the project area in 2002. The number has been increasing at about 2% per year. Over 18 000 households registered under MRMP I, but to date, because of budgetary limitations, only around 50% have derived benefit from the on-going project. Revised poverty analysis confirms that small and medium farmers, who represent around 70% of the households in the project area, are below the poverty line in an average rainfall year. Therefore, in MRMP II, these groups of farmers will be the primary targets for project initiatives. The aim should be to register more households with a target of at least 27,000 by 2007 with all benefiting to some extent.

Access to conventional social services (education and health) needs to be examined. Certainly, some major breakthroughs have been accomplished under the on-going project in particular with regard to women and girls' functional literacy and numeracy because of the community approach taken by the project. Investigations should be undertaken on ways to mainstream into the government health and education services, initially providing them with financial resources for their participation. The GEF funded activities incorporating environmental education into the formal and informal system could present an opening for the project to work more closely with the government's primary education service. The lessons learnt from this activity could then be used in the health sector.

The issue of the local communities' access to micro-finance on a sustainable basis remains unsolved. Initially, credit for women will continue to be provided through the revolving fund mechanism. But ways to convert the revolving fund into a community managed micro-finance intermediary will be investigated. This is to ensure sustained access to credit beyond the project period. Other possibilities include entering into an agreement with the Shuruq Fund or another NGO to manage the credit on the project's behalf.

The Matruh Adaptive Research Center (MARC), created under the present project should now be institutionalised under an existing research institute. Three possibilities will be investigated, namely the Agricultural Research Center, the Desert Research Center or ICARDA, the International Center for Arid, Rangeland and Dryland Areas. The first has the mandate for research and extension in Egypt. The second has been created with the specific mandate for desert and arid areas, covering the North Coast. The third possibility is an international research center, member of the CGIAR (Consultative Group for International Agricultural Research), with headquarters in Aleppo and which may be interested in having an outreach center. Thus, the project will no longer finance MARC operating costs directly, but hire it through contractual arrangements to undertake work on specific research themes as identified with the help of local communities. From a standpoint of attracting and maintaining staff, the third option may be the best. However, whatever is decided, MARC should have and maintain close links with national and international centers.

The on-going project is being implemented by a Project Coordination Unit (PCU), operating separately from the MALR services in Matruh. The PCU staff are MALR employees on secondment. The sub-regional support centers, under the PCU, are also staffed with seconded MALR employees. The entity has been specifically set up for this purpose. Its future will have to be discussed taking into consideration the need for continuity while recognizing that the nature and intensity of community support will decrease over time and will eventually be terminated. The GEF will fund environmental staff in the Governorate's office to assist the project team. This will be the responsibility of the Governorate after five years. Again EEAA will take full responsibility for the Protectorates after five years.

Perhaps, the most practical solution is for the project staff to gradually pass responsibilities to the Governorate and other concerned bodies, including ministries, so that by 2007 they are fully in charge. Coordination among the different sectors (local Government, Tourism Development Authority, Ministry of Planning, North West Coast Development Agency and the Army) is necessary to ensure that land use and regional development plans reflect the needs of the local communities and take into account the conservation of endangered habitats and ecosystems. At present, regional plans for the Governorate are urban in focus and centrally planned, but the proposal to support environmental officers will switch the focus to rural areas. Also, plans to adopt multi-sector environmentally centered planning for the Siwa Oasis have been initiated recently through support from the Italian Government, and will be assessed during the initial stages of this project for extension in the project zone.

4. Benefits and target population

4.1 National Benefits

The main benefits from the project are:

- (i) improved welfare for the poorest segments of the rural Bedouin population estimated at about 230,000. This project will extend the benefits of the MRMP to a larger segment of the rural population in the NWCZ of Egypt which is known for its high incidence of rural poverty; and will aim at implementing integrated ecosystem management approaches for the equitable and sustainable utilization of natural resources by the local communities;
- (ii) strengthening local community capacity to gradually plan their own development and carry out its implementation; and
- (iii) become more aware of environmental protection and the benefits such protection brings to the community through increased earning opportunities in eco-tourism, medicinal plant product earnings and an improved habitat especially in the kitchen.

4.2 Global Environmental Benefits.

The project will result in global and regional environmental benefits by combining the following outputs in an integrated manner:

- (i) achieving biodiversity conservation and improved integrated natural resource management of further areas of the NWCZ through both the improvement of water and range management, establishment of protected areas, local biodiversity hotspots and community-based species conservation initiatives;
- (ii) reducing the net emissions of greenhouse gases through greater energy efficiency and improved carbon sequestration in biomass and the soil; and
- (iii) establishing local and national capacity to ensure adequate planning and management of the resources in an integrated and sustainable manner.

Integrated Management: Through the fully integrated implementation of these interventions the project will ensure that a coherent approach to the whole project area as an “integrated management unit” is established. Benefits resulting from range rehabilitation will serve also the objectives of biodiversity conservation as well as carbon sequestration. Improvements in soil integrity and water management will ensure the sustainability of achieved global environmental benefits. Important lessons can be learned from the monitoring of multiple benefits and documentation of successful participatory management methods. These can provide valuable guidance to the global community on how to implement such complex cross-sectoral integrated management approaches.

Floral and Faunal Diversity: In terms of species diversity, the North West Coast (NWC) zone of the Mediterranean is one of Egypt’s five primary “biodiversity hotspots” containing some of the most important areas for the diversity of wild terrestrial fauna and flora in the country. 47% of the total floral species of Egypt is present in the project area. Of these, 16 species and sub-species are endemic to Egypt and the region, including the *ebenus armitagei* (near endemic to Egypt and Lybia), *zilla baiparmata* (near endemic to Egypt, Lybia and Tunisia), *allium mareoticum* (endemic to NWC zone) and *echinops taeckholmianus* (endemic to the NWC zone). Recent surveys on plots where access to communities have been prohibited (e.g. by army camps) prove the occurrence of some rare or extremely rare plant species in these ‘protected’ spots, indicating that the regenerative capacity of the region is still high, provided proper conservation and management is applied.

The western Mediterranean coast region has one of Egypt’s richest herpetofaunas, holding some 35 species (see Appendix 2 of Annex 6). The prominent components of the herpetofauna include: Loggerhead Turtle (*Carreta carreta*), the geckos (*Stenodactylus mauritanicus*, *Tarentola mauritanica*), the lizards (*Acanthodactylus scutellatus*, *A. boskianus*, *A. pardalis*), the agamid (*Trapelus mutabilis*), Desert Monitor (*Varanus griseus*), Common Chamaeleon (*Chamaeleo chamaeleon*), the snakes (*Spalerosophis diadema*, *Macroprotodon cucullatus*, *Malpolon monspessulana*) and Green Toad (*Bufo viridis*). The Egyptian Tortoise (*Testudo kleinmanni*) has virtually vanished from the greater part of its former range in the western Mediterranean coast. Very small, highly fragmented and isolated populations (or even individual animals)

might still exist in marginal habitats in the transitional zone between the more mesic coastal habitat and the xeric interior.

A total of 169 bird species have been recorded or are thought to occur in the Saloum region (see Appendix 3 of Annex 6). Of these some 35 species breed locally, the rest are passage migrants or winter visitors. Breeding species include Cream-coloured Courser (*Cursorius cursor*), Desert Wheatear (*Oenanthe deserti*) and Crested Lark (*Galerida cristata*). Thekla Lark (*Galerida theklae*) and Raven (*Corvus ruficollis*) are two species restricted in Egypt to the Saloum ridges and cliffs. Shag (*Phalacrocorax aristotelis*) probably also breeds on the sea cliffs of Saloum, the only locality in Egypt. The region supports several avian species restricted to the Mediterranean Biome, some of which have very restricted distribution in the country: Thick-billed Lark (*Ramphocoris clotbey*), Dupont's Lark (*Chersophilus duponti*), Temmink's Horned Lark (*Eremophila bilopha*) and Red-rumped Wheatear (*Oenanthe moesta*). The last species has undergone a severe decline in the past decades and has almost disappeared from its Egyptian range due to habitat degradation. The region was also an important breeding habitat for the threatened Saharan Houbara Bustard (*Chlamydotis undulata undulata*), but Gulf Arab hunters have decimated the local population. The species still occurs but breeding is localized and rare.

At least 33 species of mammals are (or were) known from the western Mediterranean coast of Egypt, roughly representing a quarter of Egypt's terrestrial mammalian fauna. The region holds by far the richest rodent community in the whole of Egypt composed of 19 species, including two globally threatened species, the Four-toed Jerboa (*Allactaga tetradactyla*) and the Greater Jerboa (*Jaculus orientalis*). These species suffer largely from habitat destruction, but are also subjected to intensive collection pressure by wild animal traders. Dorcas Gazelle (*Gazella dorcas*) is a threatened species that used to be very common in this region only three decades ago, but has since declined sharply, and probably largely disappeared, as a result of excessive hunting, disturbance and habitat destruction. (See Appendix 4 of Annex 6 for a list of threatened vertebrates found in the region).

The proposed Protected Area of *El Saloum* has been identified as one of Egypt's highest biodiversity conservation priority areas. It contains unique habitats of many floral and faunal elements only known in Egypt from this small region. The Crested porcupine (*Hystrix cristata*) and Thekla lark (*Galerida theklae*) are examples of species only known in the country on the Saloum cliffs. The region contains the largest remaining tract of relatively intact and undisturbed coastal habitats in the whole of the Egyptian Mediterranean coast, and is one of the least populated. The proposed Protected Area of *El Qasr* represents a fairly undisturbed example of a unique and restricted habitat in Egypt – the Mediterranean coastal steppe – a habitat that is being lost and degraded very rapidly in Egypt. The area extends from south of the coastal plain to some 50 km inland, and encompasses all the transitional zones from the Mediterranean vegetation belt in the north to near pure desert in the south. The area has a high conservation and scientific value. It includes a variety of landscape features and a diversity of habitat types and biological components that are marginally represented within Egypt's current network of protected areas. As the area falls on the boundary between the Mediterranean and Saharo-Sindian Biomes, it supports assemblages of fauna and flora, characteristic of both biomes. The maintenance of representative examples of these characteristic assemblages is of prime importance, equal to that of conserving threatened taxa.

Enhancement of Carbon store: a variety of water and land management options, including tillage management, erosion control, and range rehabilitation will have, in addition to their direct national benefit to the livelihoods of the population, the additional global benefit of enhancing the carbon store of the soil in the project area Using an average production value of 60 kg/feddan it is estimated that **1,494 tons of C/year** can be sequestered on the 498,000 feddan of rangeland (not including sparse rangeland and bare soil and rock areas).

4.3 Replicability

It is believed that replicability potential for the results of this project are extremely high, both within Egypt and in the region. In terms of approaches chosen, the successful implementation of an integrated management approach at the local level and the related strengthening and capacity building of local institutions is extremely useful for the Government of Egypt's efforts in decentralized management, and can

be used as a model for other remote and rural-based Governorates. This project is the first of its kind in the country to attempt the establishment of a bottom-up cross-sectoral planning and implementation mechanism that takes into consideration aspects of environmental and social sustainability as well as the full involvement of the communities. Lessons learned from this project will be documented and disseminated to decision makers and planners in Egypt to feed into the revision of the inputs and outputs of the planning process. Successful implementation of the proposed community driven development (CDD) approach is expected to be a pioneering effort to be duplicated in other WB and development projects in the region. Also, lessons learned from the implementation of integrated management plans will be cross-fertilized with the experience of the GEF/UNDP MedWet Coastal project on site-specific management and disseminated on a regional level. Finally, the introduction of a locally based Development Imitative Fund to provide access to credit to marginal disadvantaged communities will be tested in Egypt for the first time with the participation of the commercial sector.

In terms of overall technical lessons, the integrated resource management techniques, with a strong conservation bias, can serve as models in similar rainfed areas of the country and the region. Outputs of this project can be used to formulate an integrated dryland management strategy for the country, and lessons disseminated to other countries along the Mediterranean. Environmental curricula developed for the local communities will be utilized by EEAA in the awareness programmes of other Protected Areas in Egypt. Through monitoring and evaluation, an assessment of the increase in the store of carbon in plants and soil will be made and a qualitative and quantitative measure of habitat change will be obtained on different land-use types. Such methodology and results could be used in other areas, not only in Egypt, but also in the Mediterranean region and beyond.

During project implementation, a number of activities will be undertaken to ensure dissemination of results for enhanced replicability. Part of the project's activities is to bring farmers and government officials from outside the project area to demonstrate the various aspects of the project and encourage the participants to establish similar schemes in their areas. By reinforcing the environmental arm of the Governorate's office the project's initiatives can be spread to the rest of the Governorate. It is also envisaged that there will be a two-way movement of staff, government officials and other interested parties from this and other projects in the Mediterranean region so that there can be a cross fertilization of ideas and a dialogue of lessons learnt. In addition there has been and will continue to be videos, articles and newsletters, etc. expounding the successes (and failures) of various interventions. Common activities will be planned with the related GEF/UNDP projects in biodiversity conservation to share results and experiences. The very fact that the project is going into its second phase, especially with a greater emphasis on environmental issues, bodes well for its ability to be used as a model for other similar projects.

Thus, the replication potential is large for all strata of the community, for government officials, for NGO's and for other national and international bodies.

5. Institutional and implementation arrangements

Project management arrangements will largely follow the structure established under MRMP I, but there will be a widened involvement of stakeholders to reflect the enhanced focus on environmental and participatory aspects. Execution responsibility will be assigned to the Egyptian Environmental Affairs Agency (EEAA) for the implementation of the biodiversity conservation activities with autonomous funding, and coordination will be enhanced with the Governorate and relevant Ministries to ensure the sustainability of services beyond the project life.

Under MRMP I, a Project Coordination Unit (PCU), under MALR has been responsible for the project performance. It has full administrative and financial autonomy, including the disbursement of project funds. Over the years, it has acquired considerable experience with the implementation of an IDA funded project and is very well suited to continue with the extension of the project. The PCU would seek the services of local and foreign technical assistance and further training for its staff and beneficiaries. As mentioned above, some modifications should be made to the organizational structure of the PCU under MRMP II to

reflect the changed emphasis of the project activities. The biodiversity conservation unit will be headed by a EEAA seconded manager and consist of staff in the required technical subject matter, in addition to two rangers. This unit will be located in the PCU to enhance coordination and the adoption of multi-disciplinary approaches to implementation, however, it will have financial and institutional autonomy, with funding provided through EEAA to facilitate the gradual development into a fully operational separate Protected Area branch office by the end of the project life. The GEF contribution will partially finance the secondment of three staff from the Nature Conservation Sector of the Egyptian Environmental Affairs Agency (NCS/EEAA) who will constitute the project management unit for the biodiversity activities. They will be responsible for the implementation of the activities related to the Protected Areas Management, species conservation and training in protected area management, flora and fauna conservation, and community participation in conservation. The recurrent costs of this unit will be gradually taken up by EEAA so as to ensure financial sustainability of this supporting structure. It is proposed to designate two of the four areas identified for protection by EEAA as protected areas (Saloum and El Qasr). The EEAA will be responsible for delineating the boundaries after detailed discussions with the local people and with their full agreement. The EEAA will also establish a presence in these areas through local rangers who will help the local communities manage them. The EEAA field staff will be incorporated into the project structure, however the funding for salaries and recurrent costs will be gradually taken up by EEAA.

The increased emphasis given to participatory planning and community capacity building would be reflected in the establishment of a separate Community Planning Facilitation Unit. This Unit would be responsible for working with communities to develop their annual Community Action Plans and compiling these into the annual work plan for the entire project. Each of the six sub regional-support centers would have two social scientists or community development specialists who either will come from existing staff or be recruited. But these specialists must have undergone training in participatory development planning and community capacity building.

In addition, the broader focus on natural resource management and conservation would be reflected in a Natural Resource Management Unit with sections for Water Harvesting and Watershed Management, Range Management and Bio-diversity Conservation and Environment.. In order to reflect the greater prominence given to building women's development capacity, a separate Gender Unit will be established with its own budget and greater operational autonomy.

The Project Implementation Plan will include detailed arrangements for project and financial management, procurement and accounting procedures.

At the Governorate level there is a Project Coordination Committee (PCC). An update of the mandate and membership of this committee will be undertaken to ensure the full representation of various actors in the region (Governmental, Non-governmental, donors, Research institutions). It is also envisaged that under MRMP II, local community representatives will be included in the Project Coordination Committee. Now that the project will support the Governorate Environmental Management Unit (EMU) and that the NCS/EEAA will be directly responsible for the set-up and management of the proposed two Protectorates and related activities, it is essential that these bodies become full partners in project implementation. Overall, it must be realized that the Project is vesting more and more responsibility to the communities. Thus the aim of the NCC, PCC and the Project Coordination Unit (PCU) is to help the people make decisions, not direct them.

The PCC would coordinate the project implementation among the participating executing agencies, review and approve annual work programs with budgetary allocations based upon the Community Action Plans. It would also facilitate cooperation between the project and other projects and government agencies in the project area, in particular regarding health sensitisation programs and women and girls literacy programs. Initially the PCC should meet once a month and subsequently once every quarter.

The National Coordination Committee under the chairmanship of the National Coordinator appointed by MALR will remain in place, but under MRMP II the National Coordination Committee (NCC) (and the Project Coordination Committee) must take a more active role in the affairs of the project. The NCC

includes representatives of the Ministry of Planning and International Cooperation, the Egyptian Environmental Affairs Agency (EEAA)-central level, the General Manager of PDBAC, the Secretary General of Matruh Governorate, the Project's Director General and Deputy Director General and where appropriate, representatives of bi/multi-lateral projects being executed in the project area.

D. Project Rationale

1. Project alternatives considered and reasons for rejection

Except for the alternatives envisaged under *Section 3. Key policy and institutional reforms to be sought* and the progressive transfer of implementation responsibilities to the communities, no alternative to the present project set up is being considered. As mentioned previously, the MRMP II will emphasize a community-driven development approach. This presupposes that the communities decide on resource allocation, and that the responsibilities for implementation get progressively transferred to them. In addition, the MARC, which operated under the project, may become a unit of an established research institute.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed			
Natural Resource Management	Matruh Resource Management Project	S	S
Agriculture	Agricultural Modernization	U	U
Agriculture	East Delta Agricultural Services Project	U	U
Irrigation	Irrigation Improvement Project	S	S
Drainage	Second National Drainage Project	S	S
Drainage	National Drainage Project	HS	HS
Irrigation/Drainage	Second Pump Station Rehabilitation Project	HS	HS
Irrigation/Drainage	Third Pump Station Rehabilitation Project	S	S
Other development agencies			
UNDP/GEF Biodiversity Conservation	Conservation of Wetlands and Coastal Ecosystems in the Mediterranean Region (MedWet)		
UNDP/GEF Biodiversity Conservation	Conservation and Sustainable Use of Medicinal Plants in Arid and Semi Arid Areas of Egypt		
Italian Cooperation	Sustainable Development of the Siwa Region		
Multi donor Financed	Mediterranean Basin Regional Drylands Management Project		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3. Lessons learnt and reflected in proposed project design

The World Bank MENA region recently financed a review of eight projects with a community-driven development (CDD) approach, including the MRM project. The region organized regional workshops as well as a workshop at headquarters, based on the conclusions and recommendations of this study (see in particular: Moncef Zghidi, *Review of Community-Driven development Projects in MNA: Case study of Matruh Resources Management Project (April 2001)*). In addition to the lessons already incorporated in *Section 3: Key policy and institutional reforms to be sought*, the following supplementary lessons from this review were taken into account in project preparation:

(i) *Effective demand-driven approach.* If the project is to be effectively demand-driven, a rigid budget designating specific activities at the initial design phase of the project is not possible. Hence initial budget allocation among components and cost tables (Costab) can only be indicative. Thus, to minimize the conflict between the need for flexibility and the requirements of project design and budgeting, the project preparation process puts considerable emphasis on the assessment of demand, with a participatory review of existing CAPs and their reformulation. In addition, the need for flexibility in the implementation will be highlighted in the project description section of the loan agreement, thus giving enough leeway for budget reallocation based on communities' requests, reviewed by PCU during implementation.

(ii) *Capacity-building, targeting communities.* MRMP I emphasized capacity building of a technical nature for project staff, but little was done for capacity building of the communities themselves other than for women. Thus, MRMP II will put the main emphasis on local community capacity building. (Component A).

(iii) *Criteria for resource allocation to target the poorest and independent external evaluation of their implementation.* Project managers as well as community representatives can be under considerable political and social pressure to allocate resources in ways that will not necessarily target the poorest. Elite capture is a common phenomenon. Therefore, while the problem of political and social pressure, and elite capture cannot be completely avoided, project preparation will emphasize the definition of criteria for resource allocation and agreement thereupon with the communities. External independent evaluations will be scheduled during implementation to monitor compliance. See Section E.6.4. *Summary Project Analysis - Social.* (Page 29).

(iv) *An isolated and marginal entity vis a vis the "conventional" government services.* See paragraphs # 3 and # 6 in Section 3. (Page 20/21).

(v) *A design and implementation by the PCU, for the communities rather than by the communities.* As discussed under Section 3, paragraph #1 (Page 20), the preparation of a follow-on project will provide the opportunity to make progress towards an effective and integrated community-driven development approach.

(vi) *Rural micro-finance.* Implementing any action regarding micro-finance through the present banking system is difficult; the project will need to identify practical rural finance mechanisms (see Section 3, paragraph # 4, Page 21).

(vii) *Marketing issues.* Promoting increased agricultural production, agricultural diversification and handicrafts will run in to difficulties if marketing issues are not addressed up-front. Therefore, marketing will be given special attention, with a specific sub-component.

4. Indications of borrower commitment and ownership

The following are positive indicators of the borrower's commitment and ownership for the project:

- (i) The GOE, going by the highly successful results of the current MRMP, has officially requested the Bank to take a lead role in preparing the follow-on project and to cooperate with other donors such as IFAD.
- (ii) The GOE has also requested the Bank to obtain a Japanese PHRD grant for preparation of the project. The grant has been approved as part of the April 2000 tranche of PHRD grants.
- (iii) The GOE is prepared to utilize funding under the TA component of the current IDA credit for the MRMP (Cr 2504 Egt) to start up preparation work for the project till such time as the PHRD grant becomes effective to ensure that preparation work starts as soon as possible.
- (iv) The GOE has provided additional funding of about LE 11 million to enable the continuation of project activities in the remaining period to closure of the MRMP I, which has been extended by one year to close on December 31, 2002. This additional funding will ensure project activities will continue to avoid any discontinuity of project activities until the follow-on phase (proposed project) becomes effective.
- (v) The GOE also requested GEF to consider funding the activities of the project. A GEF PDF-B preparation grant in the amount of US\$ 300,000 was approved in July 2000.

5. Value added of Bank and Global support in this project

The Bank is involved in the implementation of community-driven development projects and natural resource management projects in many countries, in the Mediterranean and North Africa Region (MNAR) and other regions. The MNA region recently financed a review of eight projects with a community-driven development (CDD) approach (see above, lessons learnt). The Bank will also play a leading role, mobilizing other donors, given its experience in the first project.

The GEF value added comes from its global experience in the design, implementation and financing of biodiversity, climate change and international waters projects. The GEF support is justified by the total regional and global benefits attained from the integrated approaches to land, water and biodiversity management in the project area. Coordination with other GEF projects in the country and region will enhance the opportunities for exchange of ideas, information and integrated monitoring and oversight.

E. Summary Project Analysis (Detailed assessments are in the project file; see Annex 8)

1. Economic (see Annex 5): ERR =12%

The economic rate of return (ERR) for the current MRMP is estimated to be 12%. It is not anticipated that it will be any lower for the proposed second phase of the project. A full economic analysis for the proposed project is given in Annex 5. This examines the economic viability of the proposed interventions. For social development actions, with little if any direct economic impact, a cost-effective assessment would be carried out instead of an economic and financial analysis. Similarly, the financial impact of establishing the two proposed Protectorates will only begin to be felt after the area has had chance to recover and the flora and fauna has recuperate from the current degraded state. Never the less there will be some national and global benefits and an attempt is made to quantify them, bearing in mind the long time horizon required for rangeland regeneration, especially in low rainfall areas.

An Incremental Cost Analysis was undertaken for GEF funded project activities with global benefits. These include increasing biomass cover in rangeland areas and a greater cover of woody biomass in hedges, along roads, as shelterbelts and in orchards. The baseline expenditure was calculated to establish the current and planned funding amounts for integrated resource management having a national benefit. The GEF alternative proposes complimentary or substitution activities that are required to ensure that global environmental benefits are attained. The difference between the cost of the baseline scenario and the cost of the GEF alternative represents the incremental cost. The GEF contribution towards the Incremental Cost is US\$ 5.15 million, while GOE, IBRD and IFAD are committed to funding the baseline scenario (US\$ 46.20 m) as well as to co-financing part of the increment costs (US \$ 4.42 m). (See Annex 4 for an IC analysis).

2. Financial

Cost sharing of investments in water harvesting, environmental and watershed management activities are ongoing activities under the MRMP I. Some activities, such as gas stove purchase and other women activities are being implemented at full-cost recovery, through a revolving fund managed by the project. During preparation, the cost-sharing arrangements that can be supported by the local communities will be reviewed. The preparation phase will also look at the modalities of rural micro-finance to serve these local communities. Agro-processing and other income-generating activities for households such as seed collection, handicraft production and medicinal/herbal plant product production must prove their financial viability to be considered for support under the project.

3. Technical

Under the on-going project, identifying sustainable rangeland management practices that are effective and appropriate for the herders has been one of the key issues addressed by the research and extension teams. A number of technologies have been proposed to farmers/herders including fodder trees and shrub plantations, inter-cropping barley with nitrogen fixing annuals such as vetch, alley-cropping with nitrogen fixing trees and over seeding existing rangelands. The on-going project also tested a variety of management systems in 250 units termed "selected range management areas." These systems will be evaluated thoroughly with the communities as to their economic and technical viability and sustainability. Potential alternatives will be identified and assessed. Water harvesting will be refined as a result of experience gained under MRMP I. This should increase the supply of water for crops and kitchen gardens (as well as households) and reduce the incidence of erosion.

4. Institutional

4.1 Executing agencies:

The Ministry of Agriculture and Land Reclamation (MALR) will have the overall responsibility for the execution of the project, which would be entrusted to the Project Coordination Unit (PCU) in Marsa Matruh, established to implement the current MRMP. The Egyptian Environmental Authority Agency (EEAA) will be a full partner in the implementation of the Biodiversity Conservation activities, with separate funding. Eight EEAA personnel will staff the two Protectorates and these will be assisted by locally recruited rangers. Support for two part-time four environmental experts in the Governorate's Environmental Management Unit (EMU). These will assist the PCU, the six sub-regional support centers and the 38 communities in environmental matters. t.

4.2 Project management (See Section C. 4. for details)

The project management will be carried out by the PCU, situated at Marsa Matruh with the Matruh Applied Research Center (MARC) and its associated Training Center and the six sub-regional support centers. The PCU will be appropriately staffed or backstopped to ensure effective coordination of project components; it has acquired considerably experience during the first phase of MRMP in the management of an IDA funded project.

4.3 Procurement issues

All procurement will be done in accordance with Bank guidelines. As local communities' capacity is strengthened as part of the project's objectives, it is envisaged that some communities will have the capacity to carry out implementation and therefore, will be able to recruit contractors and other service providers directly. During preparation, the extent to which the Bank's simplified guidelines for community procurement procedures can apply in this case will be examined. A procurement plan will also be prepared during pre-appraisal.

4.4 Financial management issues

The second in-depth review of the present project underscored that the existing Financial Management System (FMS), while meeting local regulations, is still incomplete. It does not allow an easy access to current and cumulative statements (in local and foreign currency) and their analysis such as: the use of funds by components and by category; a summary of amounts committed and disbursed; and the remaining balances by components. A considerable amount of work is still needed in order to provide any coherent statements from data recorded in the accounting books. Furthermore, even if data are available, there is no statement showing the disbursed amounts in U.S. Dollars by category as required in Section 4 of the credit agreement.

Therefore, the second in-depth review mission indicated that the accounting and reporting practices must be improved in order to build a sound financial management system. It has been agreed that the implementation of a suitable accounting system, led by a qualified consultant will be carried out as part of project preparation. Also, this consultant will also be in charge of the training and coaching of the project's accountants.

If the transfer of responsibilities to the local communities is to be realized in the medium-term, then the flow of funds, disbursements, accounting procedures and reporting practices will have to be re-examined and codified in order that local communities will be able to comply with the procedures.

5. Environmental

5.1 Significant environmental issues

Summarize significant environmental issues and objectives and identify key stakeholders.

At present, because of the settlement process by the nomads and because of an increase in the human and farm animal population, more and more pressure is being placed on a diminishing area of accessible rangelands. Also, the better rangelands are being converted to 'marginal' arable land or permanent orchards of figs and olives etc. The end result is that without interventions such as bringing in feed from outside, the pastoral system is not sustainable. Feed is no longer subsidized by the GOE and therefore, the pastoralists are trying to fill the gap by growing barley for feed and by over-grazing the accessible rangelands. Also, the price of sheep and goats has been falling so that it is unprofitable for the farmers to transport the animals to distant pastures by vehicle.

There has been a noticeable reduction in the carrying capacity of the land, the natural flora and fauna is being reduced in both quality and quantity, some species have become endangered and other are now extinct such as the cheetah (*Acinonyx jubatus*). The scimitar horned oryx and the addax also disappeared from the area some time ago. (Annex 6). Without the project's intervention, more species will be under threat.

Systems have been developed under MRMP I to rejuvenate the rangelands, to manage the precipitation better through water management and to grow more drought tolerant barley. The second phase of the project (MRMP II) will promote all these measures with the active participation of the stakeholders. The GEF component will emphasize best arable and pastoral farming practices and provide hands-on training to all communities and all sectors of the community. Thus, the environmental impact of the project is expected to be strongly positive. By reducing runoff and increasing vegetative cover, the project would restore the productivity of degraded soils and improve prospects for sustainable natural resource management of these degraded land in watersheds and rangelands. The promotion of water management and conservation with fruit tree plantations in the coastal zone, as foreseen under the project, would support the transition to an ecologically more appropriate system of settled agriculture and, at the same time, help to reduce erosion. Furthermore, the introduction of water conservation methods and the planting of forage shrubs, shelterbelts and improved rangeland management practices will contribute to combating desertification. An environmental mitigation plan will be prepared for appraisal. In addition, the project's

many activities will enhance bio-diversity in the NWCZ. These include putting into practices the findings of the adaptive research center (MARC) through vigorous extension efforts, especially aimed at the small farmers to improved management of rangelands. The GEF component will assist through the protection and use of seed sources in rangelands (including medicinal/herbal plants), the establishment of two Protectorates and many Community Protection Areas and raising the environmental awareness of the stakeholders. In addition, the promotion of non-agricultural income-generating activities aims to conserve environmental resources.

5.2 Environmental category

Environmental category and justification/rationale for category rating.

Environmental screening B

The project was placed in environmental screening category "B" and after a field based environmental review, it remains in that category. The overall environmental impacts of the project are expected to be positive. Two (preliminary) environmental reviews were undertaken at the various sites, particularly at the proposed Protectorates and in orchards and areas being prepared for crops. Concern has been expressed that there may be involuntary relocation of people from the proposed protectorates, but this turned out to be unfounded. Indeed, the local people in the areas of the protectorates agreed in principal to their establishment and were enthusiastic about being involved in their planning and protection. No chemical pesticides or herbicides are used in the project area, but integrated pest management (IPM) is being experimented with and the local people have been practising IPM on a small scale. The rangelands are under threat in parts through over-grazing but the project has developed systems to mitigate this. Thus, there will be no adverse impacts because of the project. Indeed, by having seconded staff from EEAA and by supporting environmental staff in the Governorate, this should provide a positive impact on the area and ensure that urban development and the promotion of small-scale infrastructure complies with the environmental laws of Egypt. This should guarantee that environmental assessments are undertaken before projects are approved, rather than being done as an afterthought.

5.3 Environmental Assessment Status

For Category A and B projects, timeline and status of Environmental Assessment (EA).

EA start-up date:	March 1, 2002
Date of first EA draft:	March 31, 2002
Expected date of final draft:	April 30, 2002

5.4 Environmental management plan

Determine whether an environmental management plan (EMP) will be required and its overall scope, relationship to the legal documents, and implementation responsibilities. For Category B projects for IDA funding, determine whether a separate EA report is required. What institutional arrangements are proposed for developing and handling the EMP?

A project environmental assessment will be carried out at the same time as the pre-appraisal (draft) and finalized before appraisal. The recommended actions will be incorporated into an Environmental Management Plan (EMP). The EMP will be prepared during the preparation phase by the PCU supported by consultants with the necessary technical assistance, training, equipment and materials being provided under the proposed project. It should be emphasized that each Protectorate will have a Management Plan (MP), incorporating an EMP. The local people, with the help of EEAA and project staff will draw this up. Similarly for community protection areas (CPA) MP's incorporating EMP's will be compiled by the concerned communities with the help of project and Governorate staff.

5.5 Stakeholder consultation

How will stakeholders be consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed EMP?

The proposed project, as in MRMP I will be prepared using the now well established participatory rural assessment procedures under the MRMP, whereby local representatives will take part the preparation exercise. Any identified environmental issues will be discussed with the local community representatives during the preparation stage.

5.6 M & E mechanisms

Are mechanisms being considered to monitor and measure the impact of the project on the environment? Will the indicators reflect the objectives and results of the EMP section of the EA?

A thorough M & E system has been established and will be enlarged under MRMP II. Lessons learned from the implementation of the M&E system under MRMPI will be incorporated into the design of the enhanced system. Impact measurements of all project components and activities will be monitored and reported in the PCU's bi-annual progress reports and reviewed by Bank supervision missions. Also, monitoring results will be disseminated to other stakeholders outside the PCU to ensure that information can be used by a broader base. Within that context, a specific monitoring program including verifiable indicators to help evaluate the extent to which progress in achieving and sustaining expected global environmental benefits under GEF will also be established.

6. Social

6.1 Social issues

Summarize key social issues arising out of project objectives, and the project's planned social development outcomes. If the issues are still to be determined, describe current or planned efforts to do so.

The on-going project has built upon the indigenous tribal organization, identifying 38 "local communities." A "local community" is a geographically and socially coherent unit. It corresponds to a "territory" with its watersheds, and the people who live from its territorial resources. Most of the 38 local communities are

made of clans that belong to two or three tribes. Each community prepared a Community Action Plan (CAP), presently under implementation under the on-going project. These CAP's will be updated and refined on a yearly basis.

The main issue is for the project to evolve towards a more community-driven process, building upon the existing tribal social structure. To this end, the follow-on project will focus on strengthening the capacity of the local communities to:

- (i) plan, manage, implement and monitor their own development activities;
- (ii) manage their resources and their economic activities; and,
- (iii) enhance their abilities to access other public and private services to ensure continuation of their development beyond the life of the project.

The capacity of communities will be strengthened. This will be done to:

- (i) enable them to analyse their constraints;
- (ii) identify their objectives;
- (iii) establish their priorities; and
- (iv) decide on the allocation of resources allocated by the project within a framework of established criteria and conditions, including a clear indication of the menu of eligible activities for project financing.

Inputs from the project's technical staff will provide communities with the necessary information on natural resource availability e.g. the limits on water run-off that can be captured by cisterns and limitations to or on the optimal level of dikes in *wadi* development, and other development possibilities. During project preparation, the organization and process for the communities to make decision themselves will be identified.

6.2 Consultation mechanism

How does the project involve consultations or collaboration with NGOs or other civil society organizations?

Further and gradual participation of the local communities is advocated and will build upon the existing mechanisms that evolved during the on-going project. On the basis of a participatory evaluation of the implementation of the existing Community Action Plans (CAP), an initial participatory planning exercise will establish the development framework for each community and a CAP for the first year. The purpose of this initial participatory exercise will not only be to obtain feedbacks from the communities and draw lessons, but also to register their priorities for future activities and obtain their ideas regarding implementation, incorporating their indigenous knowledge. It should be noted that part of the GEF proposal is to record this indigenous knowledge, so that it can be used by the project and if applicable in other areas.

Subsequent CAPs will be prepared on an annual basis related to annual resource allocations. These will be incorporated into MP's and EMP's. This process will allow for modifications in communities' priorities as new opportunities develop as a result of project's interventions. The CAPs will be presented to meetings of the entire community for approval prior to submission to the project management (a series of meetings may be necessary in dispersed communities). Resource allocation would be decided by the communities themselves, which requires that each community knows the amount of funding available to them, so that they can decide how much they want to allocate to each of their priorities. However, self-help initiatives will be encouraged. This is important as the whole idea is to wean the people away from dependency to one of self-reliance. The implementation of the CAPs will be jointly monitored and evaluated by the communities and the project.

As stated above, the CAPs will form the basis of the annual work plan (WP) and the budget for the ensuing year, which will be an amalgamation of the CAPs. The CAPs will be the sole mechanism for allocating resources to farm and community investments, but private investments will also be encouraged. The CAPs

will not only include requests for infrastructure investments, but also provide information on the farmers'/households' concerns related to agriculture and other activities: this will be used to guide the focus and content of the adaptive research and extension programs for the coming year.

The collaboration with the local communities involves cost sharing. The levels of participants' contributions depend on the type of activities. If it is an immediate revenue-earning activity, the benefit can be individually appropriated and paid quickly. However, an environment conservation measure may only have long-term and collective benefits, thus payment may be forgone.

Due to limited NGO activities in the region, any significant collaboration with NGOs is unlikely, other than for the support to women off-farm activities

6.3 Institutional assessments

What institutional arrangements are planned to ensure the project achieves its social development outcomes?

The local communities are becoming well organized as a result of the interventions of MRMP I with CAPs being implemented and community centers having been constructed in 15 out of 38 communities, with the remainder to be constructed under the follow-on project. A Women Development Unit has been established, which has carried out women activities and has managed to achieve considerable progress, included literacy classes and health and nutrition awareness programs. These activities will continue under the follow-on project.

The issue of targeting the poorest is critical. To ensure targeting of the relatively more disadvantaged people, communities will be responsible for establishing the criteria for identifying the disadvantaged households within their community, undertaking wealth ranking to categorize these households (to be verified with the project's data base) and for selecting beneficiaries in accordance with the outcome. This will be discussed with community representatives during workshops to be conducted during project preparation. The project will then come to an agreement with the local community representatives. This will be used when deciding resource allocation within their community. The project will have independent external consultants to monitor the procedures and criteria for resource allocation and to verify (or otherwise) if these procedures are being adhered to.

In the process of resource allocation, communities will address the requirements for beneficiary contributions to project investment e.g. cisterns. The emphasis will be on equity issues through making provision for poorer households to contribute less (in kind mainly through labour) whilst better off households would contribute more, in line with their greater ability to pay. Communities will be required to make a specific resource allocation for women's development activities and the staff of the Women's Unit will assist the women prioritising their development activities.

6.4 M & E mechanisms

What mechanisms are proposed to monitor and measure project performance in terms of social development outcomes? If unknown at this stage, please indicate TBD.

An active Monitoring and Evaluation Unit has been established under MRMP I, which currently carries out M&E work, Beneficiary Contact Surveys and Case Studies to evaluate the value of project interventions. In addition, as part of project preparation, a process by which local communities can self-assess the impact of their activities on the well being of their members will be designed with the assistance of the communities.

In view of the difficulties encountered in recruiting an experienced socio-economist under the on-going project, and in order to provide an independent assessment, a specialist institution would be contracted to undertake the process of impact evaluation for the project activities. This would include undertaking a small sample baseline diagnostic survey to update the project's knowledge of the socio-economic circumstances of households within the project area, with a particular emphasis on the coping strategies of

poor households. A small, but fixed sample of households would be surveyed on an annual basis to determine the impact of participation in the project on their livelihoods. In addition, an interim and completion impact evaluation will be undertaken of the project's activities prior to the Mid-Term Review and in the final year. The data and information collected will be used to measure, on a yearly basis, the impact of the project on different stakeholders and to make adjustments if and when needed. Part of the GEF contribution will be to undertake socio-economic surveys, especially dealing with fuel use, water use and kitchen practices. Also, as the figures of the population and household size in the project area are somewhat vague. Thus, the 38 different registered communities will be asked to undertake a yearly census in their areas.

Cross-fertilization with similar M&E systems in other World Bank implemented rural development projects in Egypt will be undertaken to enhance the sharing of information on set-ups and systems.

The proposed social monitoring indicators are given in the Annex 1. At this stage, these are only indicative since they will have to be discussed and agreed upon with the local communities during project preparation.

7. Safeguard Policies

7.1 Safeguard Policies

Do any of the following safeguard policies apply to the project?

Policy	Applicability
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	Yes
Natural habitats (OP 4.04, BP 4.04, GP 4.04)	No
Forestry (OP 4.36, GP 4.36)	No
Pest Management (OP 4.09)	No (IPM used)
Cultural Property (OPN 11.03)	No
Indigenous Peoples (OD 4.20)	Yes
Involuntary Resettlement (OD 4.30)	No
Safety of Dams (OP 4.37, BP 4.37)	No
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	No
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)	No

7.2 Project Compliance

Describe provisions made by the project to ensure compliance with safeguard policies, which are applicable.

An environmental assessment will be carried out and an Environmental Management Plan will be prepared for implementation. The project will encourage the protection and increased seeding from indigenous vegetation of natural rangelands, utilizing the information gathered through the Herbarium and the cataloguing of natural plants established in the MARC under MRMP I. In MRMP II the local population will be encouraged to protect areas and collect seeds of useful and endangered species, so that they can be used for re-seeding and for some medicinal or herbal plants to grow in kitchen gardens. The project will be involved with the rehabilitation and management of the range resources of the NWCZ. Two Protectorates will be established and community protection areas will be managed by the local communities themselves. Project and Governorate staff, with environmental expertise, will assist the communities when formulating and undertaking CAPs.

With regard to OD 4.20 "Indigenous People", the rural population of the North West Coastal Zone, i.e. the project beneficiaries, belong to the Awlad Ali tribe. There are no other beneficiaries under the project. Thus, the project is designed for them, building upon their social organization, their production systems and natural resource use with the objective of helping them manage their resources more productively and

sustainably. The team's assessment is that though the Indigenous Peoples OD is triggered, there is no need for an Indigenous Peoples Development Plan because the Project in itself is an Indigenous Peoples Development Plan. To ensure that social concerns are well taken into account, there is a Social Scientist and a Community-organization specialist on the World Bank team. On the side of the GOE, the preparation team includes a sociologist who prepared a specific annex "Participatory planning and community capacity building." This is given in the MRMP II Formulation Report [Main report] (Annex III).

The pest management safeguard policy is not triggered because the project does not promote the use of agro-chemicals nor any agricultural intensive practices. Project staff and interviewed farmers maintain that no chemical pesticides/herbicides are being used to control pests, only biological products. However, this information will be checked further when undertaking the environmental assessment: some farmers are practicing integrated pest management (IPM).

8. Business Policies

8.1 Check applicable item

√ Financing of recurrent costs	(OMS 10.02).
√ Cost sharing above country 3-yr average	<u>(OP 6.30, BP 6.30, GP 6.30).</u>
Retroactive financing above normal limits	<u>(OP 12.10, BP 12.10, GP 12.10).</u>
√ Financial management	<u>(OP 10.02, BP 10.02).</u>
? Involvement of NGOs	<u>(GP 14.70).</u>

8.2 Issues

For the business policies checked above, describe issue(s) involved.

To ensure that the PCU is fully funded and able to carry out implementation, the project will provide financing of recurrent funding on a descending scale as was the case for MRMP I. The details of this procedure will be reviewed during the preparation stage. Some of the project activities such as water harvesting and income generating activities will be funded on a full cost-sharing basis. For other activities, in the area of natural resource management (range rehabilitation for example) or training and capacity building, the extent of the cost sharing will be less and will be assessed during project preparation. The accounting and financial management needs strengthening (see above). Also, investigations will be made on the practicability of involving NGOs. The various requirements will be reviewed during preparation.

F. Sustainability and Risks

1. Sustainability

Sustainability will be effectively achieved when the local communities, after an initial support from the project, are able to plan and manage their own development and finance at least part of it. The principal objective of MRMP II is to build the capacities of the communities and progressively devolve implementation responsibilities, so that they can manage their own development. To what extent this can be achieved will be assessed during preparation (see Sections C 3 and E 2).

The sustainability of services provided to the communities will depend on the institutionalisation of the Matruh Adaptive Research Center and of some of the services now managed by the PCU, in particular the services provided by the Sub-regional support centers. This issue will also be looked into during project preparation (see above section C 3).

Sustainability of services and mechanisms established under the GEF will depend on the capacities of local communities and Government agencies to continue the formulation and adoption of integrated management plans in the area; it will be addressed through targeted capacity building programs, as well as the inclusion of the relevant Government agencies in the implementation from the start. As previously stated this

includes supporting field presence of the NCS/EEAA for the management of protected areas with support of the communities, as well as ensuring that communities themselves undertake their own ‘informal’ conservation schemes. Support for the enhanced environmental management capacity in the Governorate will also hopefully have a positive impact on the quality of services and mechanisms of development planning in the future.

2. Critical Risks

Reflecting the failure of critical assumptions in the fourth column of Annex 1

Risk		
From Outputs to Objective	Level	Mitigation measures
Local community representatives do not apply the criteria and procedures agreed upon during project preparation to target the poorest and the women for project resource allocation.	M	- Contract signed with the local community representatives specifying the criteria to be used for resource allocation. - Sensitisation workshops and regular evaluation meetings with the local community representatives conducted by external independent consultants. - Monitoring surveys by the M&E unit.
Project management does not properly monitor the effective implementation of criteria to target the poorest.	L	The PCU will monitor the local communities’ resource allocation as part of the Project Implementation Plan. It will be checked at each supervision.
Local community capacity is inadequate to transfer implementation responsibilities.	M	Training programs and NGOs to provide assistance and support.
Project Coordination Unit is unwilling to transfer responsibilities.	H	The PCC, with representation from the local communities will monitor and assess continuously the situation and decide when it is time to transfer responsibilities. This transfer will be done step by step. In addition to the Mid-Term Review, decide in principle on an Annual Review system where adjustments and amendments can be made based on recommendations of the PCC
Existing financial management and administrative procedures do not allow transfer of management responsibilities to communities.	M	Agree upfront on procedures that will be used when time will come for transfer of responsibilities. Use the Annual Review system to make adjustments.

From Components to Outputs		
Arable/Pastoral farmers are unwilling to accept improved environmentally practices.	N	Careful validation of proposed environmentally friendly practices; staff and farmer/herder training; public awareness campaigns.
Stakeholders do not agree to establish National Protectorates and/or community conservation areas/ environmental hotspots.	N	Agreement in principle already given, provided boundaries are agreed and communities involved in compiling management plan and management
Protectorates and conservation area boundaries not respected	N	Communities agreed to boundaries and management plans that includes guarding system, rewards and penalties
Protectorates and conservation areas fail to attract tourists	M	Long-term development plan agreed with Ministry of Tourism; quick results not expected until areas recover
Medicinal/herbal plants initiative unsuccessful.	M	Detailed market analysis undertaken and seeding systems and demonstration plots established; processing methodologies developed and affordable
Environmental education not introduced.	M	Work closely with Min. of Education to ensure curricula acceptable and that materials and equipment provided
Overall risk rating	M	

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N(Negligible or Low Risk)

□

G. Project Preparation and Processing

1. Has a project preparation plan been agreed with the borrower?

The project preparation plan is being discussed with MRMP project management.

2. Advice/consultation outside country department

Peer reviewers:

Jitendra Srivastava (ECSSD), Karim Oka (Africa), Krezentia Duer (ESSD/SDV).

Procurement:

Frederic Kranz

3. Composition of Task Team

4. Quality Assurance Arrangements

QUALITY ASSURANCE TEAM

Samia Msadek	MNSRE	Financial Management specialist
Arbi Ben-Achour	MNSRE	Social development and WID specialist
Frederic Kranz	MNSRE	Procurement specialist
Idah Psawarayi-Riddihough	MNSRE	Environmental specialist

5. Management Decisions

Issue	Action/Decision	Responsibility
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Total Preparation Budget: \$ 000. **Bank Budget: FY02** \$85,000; GEF \$68,000. **Trust Fund:** Phrd \$360,000. GEF Block B \$300,000

Cost to Date: (US\$000)

Further Review [Expected Date]

Marie-Helene Collion
Team Leader

Petros Aklilu
Sector Manager

Salah Darghouth
Acting Director

ANNEX 1: PROJECT DESIGN SUMMARY

Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
Sector-related CAS Goal	Sector Indicators	Sector/ country reports	(from Goal to Bank Mission)
Rural poverty alleviation	Poverty rates reduced Rural well-being increased	MALR Reports and statistics	Continuation of GOE's strategy for rural development, natural resource management, and poverty alleviation
Project Development Objective	Performance Indicators	Project reports	(from Objective to Goal)
Reduce rural poverty. Sustainable and increased use of resources. Comprehensive involvement by all sectors of the community	Rural well-being increased, especially for the poorest segments of the society, as measured by the following proxies: literacy and numeracy rates (especially for women and girls); access to water increased; nutrition levels enhanced; housing condition improved; access to health services increased; better access for women to income generating activities.	Reports from the M&E unit of the PCU. Income and Expenditure surveys Socio-economic surveys.	Local community representatives apply the criteria and procedures agreed upon during project preparation to target the poorest and the women for project resource allocation. Project management recruits external consultants to monitor the implementation of criteria to target the poorest
GEF operational program Protected areas establishment. Species conservation. Environmental training. Enhanced carbon store/ improved energy efficiency.	Protectorates, community conservation areas/hotspots established. Environmental training, both formal and informal enacted. Carbon sequestration quantified. Improved stoves introduced.	Reports from NCS/EEAA Report from M&E unit. Field Surveys & inventories. Maps/data of flora and fauna. Soil & biomass monitoring. Data on quality and quantity of improved stoves.	Government's and Projects ability to fully integrate community into programs and initiatives. Sustainable effort to raise stakeholder's environmental awareness.
Global objective Comprehensive eco-systems management. Sustainable use of natural resources. Enhanced carbon sequestration and improved energy efficiency	Increased awareness of environmental issues in pastoral/arable agriculture. Increased adoption of environmental-friendly farming and conservation practices. High and increasing percentage of participating farmers by year 5.	MALR reports. Project Reports. Economic and financial assessments. Socio-economic surveys.	Other relevant stakeholders willing to participate. Increase in national and international eco-tourism.
Outputs from each component	Output Indicators	Project reports	(from Outputs to Objectives)
Component A: Community Development			
<u>Sub-component A 1</u> Community capacity building	Process of resource allocation involving local communities.	Reports from local community representative meetings at the sub-regional	Local community capacity adequate to transfer responsibilities for

Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
	<p>Percentage of Community Action Plans implemented by the communities themselves.</p> <p>Environmental awareness enhanced.</p> <p>Formal and informal Environmental education</p> <p>Knowledge of economic opportunities.</p>	<p>and regional levels.</p> <p>Reports from the PCU management unit</p> <p>Reports from Governorate's office and EEAA adviser</p> <p>Reports from Sub-regional support centers</p>	<p>implementation.</p> <p>Project management unit willing to transfer responsibilities.</p> <p>Environmental concerns mainstreamed into decision-making process of communities.</p>
<p><u>Sub-component A 2</u> Woman's development capacity</p>	<p>Difference in literacy rate.</p> <p>Level of health and nutrition awareness.</p> <p>Improved kitchen practices and stoves.</p> <p>Knowledge of opportunities and capacity to organize to take advantage of them.</p>	<p>Reports from M & E unit</p> <p>Socio-economic surveys</p> <p>Reports from Governorate's office</p>	<p>Existing financial and administrative management procedures allow transfer of responsibilities to communities.</p>
Component B. Integrated Natural Resource Management			
<p><u>Sub-Component B 1</u> Water harvesting and watershed management</p>	<p>Additional volume (in m³) of underground water storage from water runoff collection.</p> <p>Number of wadis and area under cropping (in feddan) as a result of water harvested by dikes/bunds.</p> <p>Area of woody biomass increase (Fd. & m³).</p>	<p>M&E reports</p> <p>Reports from PCU</p> <p>Consultant's reports</p>	<p>Communities actively involved in self-help water-harvesting and watershed management schemes.</p> <p>Areas of biological importance delineated by local communities and used as plant source.</p>
<p><u>Sub-Component B 2</u> Range management</p>	<p>Additional tree and shrub plantation (fedddan)</p> <p>Range over-seeding (Fd.)</p> <p>Rangeland area under improved management practices (feddan).</p> <p>Percentage increase of feed requirements from range.</p>	<p>M&E reports</p> <p>Reports from PCU</p> <p>Consultant's reports</p>	<p>Communities actively involved in self-help rangeland management and improvement schemes.</p> <p>Areas of biological importance delineated by local communities and used as plant source.</p>
<p><u>Sub-Component B.</u> Environmental and biodiversity improvements</p>	<p>Area of biodiversity improvement (feddan).</p> <p>Protectorates and community conservation areas/hotspots established (feddan).</p> <p>Number of endangered species protected</p> <p>Increased carbon store in biomass & soils (t/fd/year)</p>	<p>M&E reports</p> <p>Reports from PCU</p> <p>Sequestration surveys</p> <p>Consultant's reports</p> <p>NCS/EEAA reports</p>	<p>Local communities actively involved in protection and undertaking flora and fauna surveys.</p> <p>Sustainable collection of seeds, fibres and herbal plants.</p> <p>Eco-tourism catered to by local communities.</p>
Component C: Income generating Activities			
<p><u>Sub-Component C 1</u> Agricultural and livestock production</p>	<p>Improvements to yield and quality of barley.</p> <p>Improvements in yield &</p>	<p>M&E reports</p> <p>Reports from PCU</p> <p>Consultant's reports</p>	<p>Farmers experiment with new varieties of crops and farming systems.</p>

Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
	quality fruit trees plus products and vegetables. Crop diversification (number of new crops, area in fd.). Improvements to animal stock & quality of products.		Take-up new breeding program for animals. Add value to their crops. Apply for commercial loans.
<u>Sub-Component C 2</u> Off-farm Income-generating Activities	Additional number of women and men involved in off-farm economic activities More income per person	M&E reports Reports from PCU Consultant's reports Community reports	Individuals and communities seek new ways to increase income. M/H plants commercialized. Handicraft production increased.
<u>Component C 3</u> Marketing and agro-processing	New outlets for farm products Change in production systems associated with increased or diversified outlets for goods. Income composition change associated with improved marketing and processing. Increase in cottage industries or economically-oriented producer organizations.	M&E reports Reports from PCU Consultant's reports Community reports Individual reports	Appropriate technologies adopted by farmers. Market intelligence adopted and used by communities. Markets and prices provide sufficient incentives for producers and processors.
Component D. Rural Roads			
<u>Sub-Component D 1</u> Rural roads	Length of new surfaced roads built. Length of dirt roads built Length of existing roads improved/realigned. Length of roads protected with trees, shrubs & grass	M&E reports Reports from PCU Consultant's reports Reports from communities	Communities actively involved in self-help road building and road protection. Of road tracts made by all terrain vehicles controlled by local communities.
Component E. Development Initiatives Fund			
<u>Sub-Component E.1</u> Developments initiatives fund	Fund channelled through development bank and/or through the Shuruq. Loan requirements agreed by communities. Take-up by individuals and groups increasing. Loan repayment rate financially acceptable.	Bank annual reports Reports from PCU Consultant's reports	Communities able to put up collateral in the form of stock and orchard assets and guarantees from the 38 community groups.
Component F. Project Management			
<u>Sub-Component F 1</u> Well managed project	Increased support to the PCU from the NCC, PCC, EEAA, the Governorate's office Communities gradually take more responsibilities	Supervision reports	Communities trained to take on management responsibilities and increasingly do so.
Component A: Community Development. US\$5.45 m			

Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
A 1. Community capacity building	US\$2.63 m.	PCU reports Socio-economic surveys Consultants reports	Continued support from implementing agencies. New environmental initiatives accepted
A 2. Strengthening of woman's development capacity	US\$2.82 m	PCU reports Socio-economic surveys Consultants reports	Continued support from implementing agencies New environmental initiatives accepted
Component B. Integrated natural resource management US\$39.14 m			
B 1. Water management and water harvesting	US\$31.33 m	M & E reports PCU, EEAA and Governorate reports Consultant's reports	Project incentives sufficient to motivate farmers to participate in continuation of project with environmental activities.
B 2. Range management.	US\$4.96 m.	M & E reports PCU, EEAA and Governorate reports Consultants reports	Project incentives sufficient to motivate farmers to participate in continuation of project with environmental activities
B 3. Biodiversity conservation, environmental protection and carbon sequestration	US\$2.86 m.	M & E reports PCU, EEAA and Governorate reports Consultants reports	New environmental initiatives accepted by communities
Component C: Income generating Activities US\$5.43 m			
C 1. Agricultural and livestock production	US\$3.63 m	M & E reports PCU reports Consultants reports	Increased quality and quantity of products and marketing initiatives expand income base.
C 2. Off-farm income generating activities	US\$1.09 m	M & E reports PCU reports Consultants reports	Increased quality and quantity of products and marketing initiatives expand income base.
C.3. Marketing and agro-processing	US\$0.71 m.	M & E reports. PCU reports Consultants reports	Appropriate technology and market intelligence, plus access to loans increases income base
Component D. Rural Roads. US\$3.30 m			
D.1 Rural roads	US\$3.30 m.	PCU reports. Community reporting	Improved access enables more marketing of goods & services.
Component E. Development Initiatives Fund US\$0.47 m			
E 1. Development initiative fund	US\$0.47 m	Bank reporting. Loan repayment information	Access to funds enables individuals and communities to obtain loans for enterprise use.
Component F. Project Management US\$1.62 m			
F. 1. Project management	US\$1.78 m	Progress reports	Management functions gradually handed over to communities.

ANNEX 2: INCREMENTAL COST ANALYSIS

A. Introduction

An incremental cost analysis of the activities for which incremental funding is requested from GEF was carried out. The baseline is described in section B. Section C illustrates the alternative course of action for which funding from GEF and other donors is requested. In section D, the comparison of baseline and alternative activities is carried out broken down according to the MRMP-II components. An incremental costs matrix is presented in section E.

B. Baseline scenario

The legislative framework for environmental protection includes Law 102/83 for the Natural Protectorates, Law 4/1994 for the Environment and the adoption of the Biodiversity Convention (CBD). The regulatory framework includes the establishment of natural protectorates over 8% of the total area of Egypt, the adoption of EIAs in all new development projects as well as regulated hunting of protected species and the “National Study on Biological Diversity”, completed in 1996, followed by releasing the “National Biodiversity Strategy and Action Plan” in 1998. Institutional capacity in the project area is limited. The Environmental Management Unit (EMU) of the Matruh Governate has a legal mandate for ensuring environmental protection including water and air pollution, solid waste management, and environmental monitoring but lacks both financial and human resources to carry out its mandate. Within the proposed project area, there are two initiatives worth mentioning in terms of contribution to the baseline namely, the establishment of a protected area network by EEAA and the MRMP-II.

Egyptian Environmental Affairs Agency (EEAA)

EEAA has identified four sites within the project area with unique biodiversity and ecological characteristics to be declared in the future as Protected Areas as part of its framework to create a Protected Areas network consisting of 28 additional protected areas in the country. It is anticipated that under the current plan of the Agency, the declaration of these PA will be undertaken over the coming five to ten years depending on priorities and availability of funding at both central and local level. Limited capacity exists at the national level to address needed institutional strengthening, capacity building, improving awareness and fostering private sector, NGO’s and research institutes to support the implementation of the strategy and action plan. In addition, funding for recurrent costs of present and future PA can not be fully met under the present budget constraint. This situation is thus likely to increase the risk that the “National Biodiversity Strategy and Action Plan” generates a protected area network through decrees with very limited actual biodiversity conservation actions taking place. For these reasons, no funding to the baseline scenario has been considered from the EEAA in this analysis.

Matruh Resource Management Project (MRMP-II)

MRMP-II will devote substantial efforts in the conservation, rehabilitation and sustainable utilisation of the natural resources through (a) the development of water harvesting and watershed management practices; (b) the livestock and range activities specifically designed to arrest the present rate of degradation and to start to return the natural resource base to something nearer to its former status; (c) discouraging the accumulation of additional numbers of sheep and goats; (d) the provision of gas stoves to women that will reduce the destruction of the rangeland through the present practice of uprooting shrubs; and (e) the promotion of medicinal plants.

The proposed MRMP-II thus lends itself to the adoption of a comprehensive approach to ecosystem management, as it combines integrated management of biological diversity, land, water and energy resources in agricultural production systems and pastures through the shift to multiple cropping featuring legumes, agroforestry development, pasture regeneration, non timber products development, fuelwood

production and soil and water conservation. In addition, the overarching participatory approach will provide a forum for engaging the inhabitants to conserve, rehabilitate and sustainably use and manage the natural resource base. These combined actions will have a positive impact on the local ecosystems by ensuring that the available natural resources (water, pasture, agricultural land, wild resources) are utilised in an equitable and sustainable manner. In addition, these activities will produce limited global environmental benefits in the form of increased carbon sequestration potential and some endemic species protection in pastures. However, implementing the baseline scenario would result in limited protection of biodiversity, no monitoring or assessment of carbon sequestration potential, and will not address the lack of capacity in environmental planning, management and monitoring needed to control urban encroachment, tourism development and other human activities that pose serious threats to the ecosystems. Furthermore, the traditional approach of addressing the resource challenges in a sector-by-sector manner will inevitably result in fragmentation of the policies and interventions.

C. Alternative scenario

With the introduction of the GEF alternative, a set of complementary as well as substitutional activities could be implemented to ensure that global environmental benefits are attained. The GEF alternative will build on the baseline scenario to (i) achieve biodiversity conservation and improved integrated natural resource management of further areas of the NWCZ through the establishment of protected areas, community-based species conservation initiatives and various type of soil and water management practices in both the agriculture and livestock sectors; (ii) reduce the net emissions of greenhouse gases through greater energy efficiency and improved carbon sequestration in biomass and the soil and develop methods to quantify carbon sequestration potential in dryland areas under different land use types; and (iii) establish local and national capacity to ensure adequate management of the resources in a sustainable manner. The support of GEF will also ensure that lessons learned in this project can be replicated in other areas with similar characteristics within Egypt and in the region. This potential replicability is one of the major strengths of the project.

Replicability will occur on a number of levels. At the local level, the beneficiaries will undergo formal and informal training in environmental matters, including environmental friendly farming practices, the protection of flora and fauna and the sustainable use of natural resources. All this should lead to project initiatives being extended in the project area. Farmers from outside the area will be brought to the project and shown various demonstrations. Training will also be given to them. Thus, elements of the project will be applied in other parts of the country and beyond. Indeed it is noticeable how the planting of olives etc has spread far beyond the project area.

Because protected areas will be established in the project area, training will be given to EEAA staff on their establishment and management. People from other countries will be offered training and project staff will also be sent to 'National Parks' in other countries, so there will be a two-way learning process.

Governorate environmental staff will be trained by the project and it is anticipated that they will apply their training to the rest of the Governorate and beyond.

Carbon assessment will be undertaken and the methodology could be used elsewhere. One major outcome of carbon assessment is to measure the amount of organic carbon sequestrators in the project area. This carbon could be traded on the national and international market, thus setting a model for carbon trading which can be replicated in other similar areas.

At the national and regional level training will be offered and the initiatives of the project will be expounded through videos, articles, newsletters, by the GEF and the World Bank and other communication channels. Thus it is anticipated that the project will have a large replicability potential.

D. Incremental costs

The baseline and GEF alternative are synthetically described below according to the six MRMP-II components in order to define the incremental costs for which funding from GEF and other donors will be requested³.

I. Community Development

Capacity Building of Communities (Baseline cost US\$1.1 million, cost of alternative US\$2.6 million). The main objectives of this sub-component of the baseline scenario is to strengthen the communities capacities to plan and manage natural resources to achieve improved and sustained local development. These community development activities will mainly contribute to achieve sustainability under the form of increased attention to natural resources use at community level and enhanced resources planning and management capacity.

The GEF alternative will build on these activities to improve community awareness and interest on global environmental issues by (a) funding an environmental education programme, (b) promoting community species conservation activities including wildlife conservation, community conservation areas, biodiversity hotspots, protection/natural habitat corridors, seed collection, medicinal/herbal plant protection; and (c) strengthen community biodiversity capacity building as well as monitoring and evaluation. The baseline cost is US\$ 1.1 million while the cost of the alternative is US\$ 2.6 million. This gives an incremental cost for GEF financing of US\$ 1.5 million. The main global environmental benefits include the increased community awareness and education on the global environment and improved conservation of endemic species.

Strengthening of Women's Development Capacity (Baseline cost US\$2.5 million; cost of alternative US\$2.8 million). As part of baseline activities, the Project would contribute to building women's capacity through (a) the support of literacy classes for women (for 3 years) and basic education for girls, (b) nutrition, hygiene and health sensitisation programmes, including promotion of the construction of latrines, and (c) environmental awareness programmes to assist women to participate in sustainable utilisation and management of the resource base. These activities will provide domestic environmental benefits such as improved use of energy and decreased pressure and sustainable use of wood resources. The baseline cost is US\$ 2.5 million.

The GEF alternative will build upon the baseline activities by undertaking socio-economic surveys, including energy and water surveys which results will be used to propose mitigation measures and to ensure the sustainability of the resource base. Promotion of a better use of woodstoves will also be undertaken. The GEF funded incremental cost associated with these activities is US\$0.3 million, which brings the cost of the alternative scenario from a baseline of US\$2.5 million to US\$2.8 million. The main global environmental benefit is the enhanced endemic range species conservation deriving from the reduced pressure from energy wood collection.

II. Integrated Natural Resource Management

Watershed management and Water harvesting (Baseline cost US\$28.3 million, cost of alternative US\$31.3 million). The activities identified in this component include (a) the construction of water harvesting and watershed management measures (cisterns, reservoirs, dykes, terraces, reseeded of range areas and shelterbelts against erosion), (b) adaptive research on watershed management issues, (c) training for beneficiaries on maintenance of the water management structures; and (d) support to the creation of Watershed Management Associations. These baseline activities will produce substantial domestic benefits in the form of sustained agricultural production in areas threatened by soil erosion, improved animal

³ For a more detailed description of these activities, see section 2 of the PAD.

husbandry and productivity and satisfy demand for domestic water in rural areas. The contribution to the baseline scenario from this component is estimated at US\$ 28.3 million.

In the GEF alternative, the incremental costs associated with global environmental benefits such as increased biomass and carbon sequestration potential and enhanced endemic species development are considered. These costs have been estimated at 10% of the water harvesting and watershed management works, watershed management equipment as well as the maintenance cost of the infrastructure⁴. This would represent an incremental co-financing of US\$3.0 million (this cost is already accounted for in the MRMP-II and will be funded by IFAD, World Bank, stakeholders and GOE). That would bring the cost of the alternative to US\$31.3 million. The main global environmental benefits include biodiversity conservation through better soil and water management and increased carbon sequestration capacity due to additional moisture availability.

Range management (Baseline cost US\$3.1 million; cost of alternative US\$5.0 million). The baseline scenario will include the establishment of Range Rehabilitation and Management Units (RRMU) rested from grazing and protected by a guardian and Protected Range Areas (PRAs) to provide an in situ source of germplasm. These interventions would be supported by adaptive research as well as technical assistance and extension on assessing the rangeland resources conditions. These activities will generate domestic benefits such as restoration and sustained productivity from pastures, higher income from open range activities, and reduced expenditure on animal feed for farmers. The cost of the baseline has been estimated at US\$ 3.1 million.

In the GEF alternative, global environmental benefits such as the conservation of desirable perennial range plant species and the increased carbon sequestration potential of the range vegetation will be generated. The cost of the rangeland improvement activities (plantation of fodder shrubs, establishment of range rehabilitation and management units and rangeland protection units) that would generate the above mentioned global environmental benefits has been estimated at US\$1.8 million and will represent an incremental co-financing (these costs are already accounted for in the MRMP-II and are funded by IFAD, GOE and stakeholders). The cost of the alternative is US\$ 5.0 million⁵. The main global environmental benefits include biodiversity conservation and carbon sequestration through improved range management and enhanced germplasm resources, protection of endangered species, collection and dissemination of local seeds and reseedling activities with endemic species.

Bio-Diversity Conservation. (No baseline cost; cost of alternative US\$2.9 million including PDF-B US\$0.3 million). This sub-component is divided into two sections namely: (a) capacity building in environmental management; and (b) establishment of protected areas. Both these include complementary activities that are not present in the baseline scenario and represent incremental costs to be funded by GEF.

Capacity building in environmental management includes: (a) Strengthening the Project, Governorate and EEAA/NCS field level environmental capacity; and (b) Undertaking training in environmental matters on project programs;

- Strengthening the Project, Governorate and EEAA/NCS field level environmental capacity (GEF contribution US\$0.177 m and GOE incremental co-financing US\$0.07 million). The GEF grant will partially finance the secondment of three staff from the Nature Conservation Sector of the Egyptian Environmental Affairs Agency (NCS/EEAA) who will constitute the project management unit for biodiversity activities. In addition, the GEF contribution will provide the

⁴ The training, the technical assistance, cost of vehicle purchase and operation and maintenance, the staff and office recurrent costs were not considered as contributing to these global benefits.

⁵ Differences due to roundings.

Governorate's office with two part-time 'environmental' experts over the five years⁶. The incremental co-financing by EEAA covering the recurrent costs of the biodiversity unit on an increasing scale is US\$ 0.07 million⁷.

- Undertaking Training in Environmental Matters on Project Programs. (GEF contribution US\$0.32 m) In addition to the environmental experts within the Governorate's office, national and international experts will be contracted to provide training in a number of fields⁸.

Establishment of Protected Areas GEF contribution US\$1.9 m and GOE incremental co-financing US\$0.19 million). It is proposed that the designated areas at Saloum and El Qasr be chosen as Protectorate areas. The GEF grant would support the establishment and management of these two protected areas for five years. The envisaged support includes: stakeholder agreement on boundaries etc.; protected area declaration; boundary demarcation; management plan compilation with full involvement of local communities; establishment of management structure; stakeholder involvement in protection and commercial management; protected area management and operations. The government incremental co-financing covering the recurrent costs of the biodiversity management unit is US\$ 0.19 million⁹. The global environmental benefits would include the conservation of unique habitat, a variety of indigenous species identified, conserved and managed and the reduction of the erosion of germplasm.

PDF-B (GEF contribution US\$0.3 million)

III. Support for Income Generating Activities

Agricultural and livestock production and carbon sequestration (Baseline cost US\$2.8 million; cost of alternative US\$3.6 million including incremental co-financing US\$0.3 million). The baseline activities will provide a safer and environmental friendly agricultural production environment, enhanced environmental attention on agricultural products and encourage integrated pasture-crops practices bringing about more environmentally stable production systems. The cost is estimated at US\$2.7 million.

As Agricultural improvement activities will produce global environmental benefits such as conservation of agrobiodiversity, reduced GHG emission, use of indigenous species in various formations in arable agriculture orchards and along roads and around compounds, the GEF alternative will include incremental co-financing costs associated with the above mentioned benefits equivalent to US\$0.3 million. These costs are already accounted for in the MRMP-II and will be financed by GOE and the World Bank.

In addition, most if not all the agricultural and livestock improvement activities will increase the biomass and carbon store in the project area. Modelling of carbon store capacity under different land uses and soil types and rainfall regimes will be financed. Experiments will also be undertaken on arable land and in orchards to demonstrate the costs and benefits of nutrient application for these commercial crops. These GEF funded carbon content modelling and demonstration activities will have a cost of 0.6 million. This puts the cost of the alternative to an estimated US\$ 3.6 million.

⁶ These experts will provide environmental training in environmental assessment, integrated environmental and resource management planning and environmental monitoring. They will train trainers and help with course compilation of training material for the project.

⁷ Vehicles and equipment will be provided in order to support the implementation of the new activities related to biodiversity conservation under the project. Salaries and recurrent costs of this unit will be gradually taken up by the EEAA to ensure financial its sustainability. This funding will represent a yearly expenditure of 30,000 US\$ after project completion

⁸ This training will be given to project staff and the staff in the Governorate's office. Training will be given in: environmental regulations; range resource inventory and evaluation; carbon sequestration and biomass inventory; socio-economic surveying; species monitoring and evaluation; protected area management; and participatory training on specific environmental issues. There will be training of trainers and refresher courses in all of the above topics.

⁹ It is envisaged that EEAA finances a progressively increasing percentage of the salaries of rangers and guards as well as vehicles and motorcycles operation and maintenance costs so as to reach 100% funding of these items by the year 5. Recurrent costs funding will represent a yearly expenditure of 76,000 US\$ after project completion.

The global environmental benefits include the conservation of agro-biodiversity, reduced GHG emissions and the use of indigenous species in various formations in arable agriculture, orchards and along roads and around compounds.

Off-farm income generating activities (Baseline cost US\$ 1.1 million). Promotion of off-farm income generating activities would mainly assist women to increase family income through engaging in income generating activities such as poultry production, handicrafts, and small-scale agro-processing e.g. jam making, through access to small loans, skill and management training and marketing advice. These activities will contribute only to the baseline course of action as they are not generating any global environmental benefits beside a possible positive impact on the rangeland endemic species (very limited and not accounted for as global environmental benefit).

Marketing and agro-processing (Baseline cost US\$ 0.6 million; cost of alternative US\$ 0.7 million). The focus of the baseline scenario would be on developing better linkages with the private sector through the Project providing market awareness, market research and market promotion services to farmers. Two key areas offering potential for development are handicrafts and food processing to add value to farmers' produce. The Project would also investigate the scope and action required for developing a medicinal plant industry in the Project area based on the domestication of indigenous plants. Baseline cost is US\$ 0.6 million.

In the GEF alternative, global environmental benefits under the form of a new replicable export-oriented development model for herbal and medicinal products of global significance will be produced (GEF incremental funding for medicinal plants is already included in the Capacity building of Communities). The cost of this model, estimated at 50 % of the cost of the medicinal plant development programme, is considered an incremental co-financing by the World Bank. This will bring the cost of the alternative to US\$ 0.7 million.

IV. Rural Roads (Baseline cost US\$ 3.3 million)

In response to the demands of communities, the Project would construct around 100 km of asphalt feeder roads. In view of the expected high demand for road construction, stringent selection criteria will be established to take into account access to markets, social needs, population served and cost effectiveness. No contribution to the alternative course of action is envisaged from this component.

V. Development Initiatives Fund (baseline cost US\$0.5 million)

The Development Initiatives Fund (DIF) would be used primarily to explore the scope and feasibility of extending technologies and approaches introduced under MRMP to other rainfed areas in Egypt, principally North Sinai and parts of the Red Sea coast. No contribution to the alternative course of action is envisaged from this component.

VI. Project Management (Baseline cost US\$1.8 million)

As part of the baseline, the Project would fund the necessary staff, premises, equipment, vehicles, staff development, technical assistance and monitoring and evaluation systems for efficient and effective management of the Project. No contribution to the alternative course of action is envisaged from this component¹⁰.

E. Incremental cost matrix

As explained above, the incremental costs of the alternative scenario were derived according to each MRMP-II component. These costs and the domestic and global environmental benefits are displayed in the following matrix.

¹⁰ There is the possibility that the improved environmental management capacity of development institutions related to the project could generate global environmental benefits.

Components of MRMP -II		Baseline	Alternative	Increments	
				GEF	Others
A. Community development					
Capacity building of communities					
	Global Environmental Benefits	Limited species protection and biodiversity conservation	Increased community awareness and education on the global environment; improved capacities of managing biodiversity at community level; better conservation of endemic species		
	Domestic Environmental Benefits	Enhanced education leading to better use of local natural resources; enhanced skills in natural resources planning and use for communities and MRMP staff;	Increased priority being put on biodiversity conservation through community participatory approach; Improved capabilities of communities individually and communally to manage resource conservation; better use of water and fuelwood		
	Total costs ('000 US\$) including physical and price contingencies	1,128	2,630	1,502	
Strengthening of Women's Development Capacity					
	Global Environmental Benefits	Environmental awareness enhanced through workshops; Positive long term impact of environmental education on the global environment;	Enhanced endemic range species conservation deriving from reduced pressure for energy wood; substitution effect decreases pressure on collection of threatened plants		
	Domestic environmental Benefits	Improved community hygienic conditions; improved education increasing chances of employment for women in rural areas	Improved use of water and energy and decreased pressure as well as sustainable use of wood resources		
	Total costs ('000 US\$) including physical and price contingencies	2,478	2,823	345	
B. Integrated Natural Resources Management					
Watershed management and Water harvesting					
	Global Environmental Benefits	Limited benefits in terms of reduced land degradation	Biodiversity conservation through better soil and water management; limited species protection; increased carbon sequestration capacity due to additional water availability; decreased land degradation		
	Domestic Environmental Benefits	Better managed resource base in water scarce ecosystems; increased water infiltration; reduced soil erosion; increased land productivity, more secure household water supply; increased fuelwood production	Increased efforts to mitigate soil erosion and protect soil		
	Total costs ('000 US\$) including physical and price contingencies	28,352	31,326		2,974
Range Management					
	Global Environmental Benefits	Limited conservation of biodiversity in rangeland	Biodiversity conservation and possible carbon sequestration through improved range management and germplasm resource enhancement; protection of endangered species; collection and dissemination of local seeds; aggressive reseeding activities with endemic species		

Components of MRMP -II		Baseline	Alternative	Increments	
				GEF	Others
	Domestic Environmental Benefits	Rangeland productivity increased; reduced pressure on rangeland ecosystem; establishment of community based range management systems	Enhanced sustainability and increased carrying capacity of rangeland use		
	Total costs ('000 US\$) including physical and price contingencies	3,131	4,955	28	1,797
Biodiversity conservation and environmental protection					
	Global Environmental Benefits	Unique habitat and endangered flora and fauna under threat; limited retention of C in soil and vegetation; biodiversity reduced; negative environmental impact of land use changes	Unique habitat and endangered flora and fauna conserved; variety of indigenous species identified, conserved and managed by the communities and in Protected Areas; Community conservation to halt erosion of globally significant germplasm ; Enhanced skills in EIA and M&E for environmental protection of the global environment; framework in place to measure carbon sequestration		
	Domestic Environmental Benefits		Employment opportunities from the establishment of two Protected Area both in conservation activities and in ecotourism; enhanced livelihood of communities; enhanced institutional capacity for environmental management and protection on resource utilisation but also urban, water and air pollution.		
	Total costs ('000 US\$) including physical and price contingencies	0	2,955	2,693	262
C. Support for income generating activities					
Agriculture and livestock production					
	Global Environmental Benefits	Increased use of indigenous species in agriculture and livestock production processes;	Agro-biodiversity conserved and used in ways that can be shared with other countries; reduced CO2 and CH4 emissions; use of indigenous species in various formations in arable agriculture, orchards, along roads and around compounds		
	Domestic environmental Benefits	Increased agricultural production from cereals, livestock and agroforestry; safer and environmental friendly agricultural production environment; enhanced environmental attention on agricultural products; improved integrated pasture-crops practices bringing about more environmentally stable production systems.	Germplasm system operating to receive dryland plant material and multiply both in situ and ex situ		
	Total costs ('000 US\$) including physical and price contingencies	2,761	3,629	561	307
Off-farm income activities					
	Global Environmental Benefits	Limited positive impact on rangeland endemic species			
	Domestic Environmental Benefits	Reduced pressure on the range and reduced fuelwood gathering due to improved cooking conditions			

Components of MRMP -II		Baseline	Alternative	Increments	
				GEF	Others
	Total costs ('000 US\$) including physical and price contingencies	1,094	1,094	0	0
Marketing and agro-processing					
	Global Environmental Benefits		New replicable export-oriented development model for herbal and medicinal products of global significance		
	Domestic Environmental Benefits	New domestic markets and uses developed for herbal and medicinal plants			
	Total costs ('000 US\$) including physical and price contingencies	655	710		55
D. Rural roads					
	Global Environmental Benefits	Use of indigenous species in road protection			
	Domestic Environmental Benefits	Limited contribution to ecotourism			
	Total costs ('000 US\$) including physical and price contingencies	3,303	3,303		0
E. Development initiatives Funds					
	Global Environmental Benefits				
	Domestic Environmental Benefits	Possibility of extending environmental friendly technologies to other parts of the country			
	Total costs ('000 US\$) including physical and price contingencies	471	471		0
F. Project management					
	Global Environmental Benefits	Improved management capacity of environmental protection through a participatory approach			
	Domestic Environmental Benefits	Better trained personnel in environmental affairs			
	Total costs ('000 US\$) including physical and price contingencies	1,777	1,777		0
BASELINE, ALTERNATIVE AND INCREMENTS: Total costs ('000 US\$) including physical and price contingencies		45,149	55,673	5,129	5,395
PERCENT				48%	52%

ANNEX 3. STAP REVIEW AND RESPONSE

INDEPENDENT TECHNICAL REVIEW

(Dr. J. Michael Halderman, Independent Consultant, Berkeley, California)

Key Issues

1) Scientific and technical soundness of the project

The second Matruh Resource Management Project (MRMP-II) has been carefully and thoroughly designed following sound technical and scientific principles. This conclusion is based on a careful review of the February and March versions of the Project Appraisal Document, including relevant annexes. The project's main objective is to improve the welfare of stakeholders, especially the more disadvantaged in rural areas, and contribute to poverty alleviation. The approach will be based on community-driven development (CDD) that aims at strengthening communities' capacities to organize themselves and participate effectively in community-based planning, implementation and monitoring of activities aimed at development and the conservation, rehabilitation and sustainable management of the natural resources. The MRMP-II intends to achieve these goals through (relevant to GEF funding) three components: (1) community development, (2) integrated natural resource management, and (3) income generating activities mainly targeting women. The indicative financing plan totals nearly US\$56 million over the five year project implementation period (2003-2007).

Scientific and technical aspects relating to environmental protection, biodiversity conservation, carbon sequestration etc in the arid area of the northwest coastal zone of Egypt in which the project is located are sound. The approach to community-driven development is appropriate, and the project's heavy emphasis on CDD reflects the emerging (but long overdue) recognition that decentralized, participatory approaches to rural development and natural resource management (NRM) are much more effective and sustainable than other approaches. The project's CDD approach and technical aspects, in particular those for which GEF funding of US\$ 5 million are requested, are fully consistent with the GEF's Operational Program # 12, Integrated Ecosystem Management.

2) Identification of the global environmental benefits and/or drawbacks of the project

By supporting activities aimed at achieving global environmental benefits, the GEF funding sought is intended to complement the activities of the "baseline project" funded by The World Bank, IFAD, stakeholders and the Government of Egypt. The project is designed to achieve several local, national and global environmental benefits, all consistent with Operational Program # 12: (a) conservation and sustainable use of biological diversity, as well as equitable sharing of benefits arising from the use of biodiversity; (b) reduction of net emissions and increased storage of greenhouse gases in terrestrial ecosystems, (c) conservation and sustainable use of water bodies, including watersheds and coastal zones. The March revision of the Incremental Cost Analysis (Annex 4) describes and explains in considerable detail the specific national and global environmental benefits the project intends to achieve from the different project components. The Project Appraisal Document and Annex 4 helpfully distinguish between the baseline project and the GEF alternative, and they clearly explain for each component the complex funding situation.

3) Project fit within the context of GEF goals, operational strategies, programme priorities and relevant conventions

The MRMP-II project in general, and the GEF-funded components in particular, fit well with the above criteria. The project and GEF-funded components incorporate the principles, and are clearly directed toward achieving the potential benefits, of Integrated Ecosystem Management (IEM) presented in Operational Program # 12. Economic and social factors are integrated into ecosystem management, and the IEM activities at various levels are intended to be flexible and to incorporate lessons learned into project efforts. It is significant in regard to flexibility and incorporating lessons learned that: (a) the proposed MRMP-II is based heavily on lessons learned in the course of implementing the first Matruh Resource Management Project, (b) the design of MRMP-II is also based on the

conclusions and recommendations of a recent World Bank financed study of eight projects with a CDD approach in the Bank's Middle East and North Africa region.

Participatory approaches are central to the MRMP-II strategy of ecosystem management and sustainable development. The project addresses the GEF focal areas of biological diversity, climate change and international waters, as well as land degradation. The project aims to strengthen relevant institutions and make investments based on the principles of integrated ecosystem management. The MRMP-II project accords with the Convention on Biological Diversity, the UN Framework Convention on Climate Change, and the UN Convention to Combat Desertification.

4) Regional context

The MRMP-II project is located in the western part of the Northwest Coastal Zone (NWCZ) of Egypt that extends from El-Saloum, on the border with Libya, about 320 km to the east towards Alexandria, and inland from the coast for about 44 km. To the north of the project area is the Mediterranean Sea, to the south is the Sahara Desert. The natural habitat is dry rangeland, with annual rainfall ranging from about 150mm in the NE to about 20mm in the SE. The area is inhabited by Bedouin, and the current population is estimated at about 230,000 (30,000 households). This area is different from most other parts of Egypt in that rainfed agriculture is practiced and the traditional tribal structure remains largely intact. The Bedouin have been settling in recent decades, and there has been a shift from the semi-nomadic, ecologically balanced pastoral system to potentially unsustainable systems of natural resource use that include significant sedentary agriculture. Some Bedouin move between Egypt and Libya, while others have migrated to Cairo and other urban areas. The location of the project area on the Mediterranean Sea has led to some coastal areas being developed as tourist centers. Enforcement of existing environmental regulations is very weak.

5) Replicability of the project

If the project is successful in its efforts there will be considerable scope to replicate the approach in similar areas of Egypt, the Middle East and North Africa. The MRMP-II is reportedly the first project of its kind in Egypt to attempt to develop a participatory, cross-sectoral planning and implementation mechanism that emphasizes both economic development and environmental sustainability. The project intends to develop a replication strategy that would include documentation and wide dissemination of information to, inter alia, government planners and decision makers, as well as other development projects. The MRMP-II will exchange experience and lessons learned with the GEF/UNDP MedWet coastal project and the results will be disseminated throughout the region. For the first time in Egypt, an effort will be made under this project to provide credit to marginalized communities, primarily to women, with the participation of the commercial sector. The (a) integrated resource management techniques, and (b) M&E methods to assess the anticipated increase in the store of carbon in plants and soil as a result of project activities, are expected to serve as models useful in similar areas of the country and region.

6) (Anticipated Effectiveness and) Sustainability of the project.

The designers of MRMP-II correctly recognize and emphasize that a community-driven development approach is necessary for the project to achieve its intertwined developmental and environmental goals on a sustainable basis. The biggest challenge facing the project will be to implement a successful CDD system in the project area. Thus, when examining sustainability it is first necessary to assess the likelihood of the project itself performing as planned.

The first MRMP project was designed to follow an innovative, participatory development approach focused on the identification and implementation of Community Action Plans (CAPs) by the local community groups. It was further expected that by the end of the project period the Project Coordination Unit (PCU) would no longer be needed. For a number of reasons, however, the activities of the first phase were essentially designed and implemented by the PCU using a top-down approach with only limited participation from local communities, especially when formulating CAPs. The PCU has operated in an enclave manner, independent of the parent ministry from which its staff were seconded. There has been very little contact with other government agencies and ministries. The PCU has had full administrative and financial autonomy, including the disbursement of project funds. Over the years, the PCU has acquired considerable experience with the implementation of an IDA-funded project and is considered well suited to continue managing the second phase of the project.

Those charged with designing the second phase of the MRMP are clearly aware of the difficulties and challenges involved in successfully promoting an effective CDD approach that primarily targets the poor. Criteria and procedures will be established to assist communities to target the poor and women for project resource allocation, with control systems put in place. Very considerable resources will be devoted to capacity building at various levels (see number 11 below). The CDD approach will need to be tailored to fit the traditional, male dominated Bedouin society and other existing socioeconomic conditions. The objective is that the project assist the communities so that they can take responsibility for the planning, implementation, monitoring and evaluation of development and environmental activities. It is intended that in MRMP-II the PCU will be initially responsible for activity implementation. As the capacity of local communities is strengthened, responsibility will be gradually but progressively transferred to communities. Some of the proposals presented in Annex Three of the MPMR Formulation Report, however, for what is expected to be accomplished in regard to CDD under the project seem too optimistic. The same might also be said of the project goal to so broadly implement a CDD approach within the five year implementation period of MRMP-II.

In regard to community-driven development, three key points should be kept in mind: (a) highly skilled, well trained individuals are needed at the interface with local communities, (b) efforts should be taken to identify early on communities with real (if latent) potential to successfully carry out community-based activities, (c) elite capture at all levels is a real possibility. The designers of MRMP-II seem aware of these points and have taken steps to address them.

The MRMP-II project is to take a number of steps appropriately aimed at promoting sustainability of services and activities. Efforts will be made to mainstream access (especially for women and girls) to education and health services currently provided by the project. Efforts will also be made to provide residents of the project area with access to micro-finance on a sustainable basis, and to find an institutional home for the Matruh Adaptive Research Center (MARC). The GEF will fund environmental staff in an effort to strengthen environmental work in the Governorate office during the project period, and the Governorate will take responsibility for the work at the end of the project. The Egyptian Environmental Affairs Agency (EEAA) is to take responsibility for the two protectorates (nature conservation areas) that will be established under the project.

To achieve sustainability it is very important that before the end of the project period: (a) effective actions be taken to fully integrate the work of the PCU into the Governorate and other concerned organizations, (b) an effective coordination mechanism between key actors (local government, Tourism Development Authority, Ministry of Planning, Northwest Coast development Agency, the Army) be established.

Secondary Issues

7) Linkages to other focal areas.

The MRMP-II project is multi-focal covering biodiversity conservation, climate change, international waters and land degradation.

8) Linkages to other programmes and action plans

The second Matruh Resource Management Project will have linkages with the GEF/UNDP *Conservation of Wetlands and Coastal Ecosystems in the Mediterranean Region (MedWet)* biodiversity conservation project currently in about its second year of operation. MRMP-II is also anticipated to have linkages with: (a) the GEF/UNDP *Conservation and Sustainable Use of Medicinal Plants in Arid and Semi-Arid Areas of Egypt* biodiversity conservation project, (b) the Italian Cooperation *Sustainable Development of the Siwa Region* project located on the edge of the Sahara Desert to the south of the MRMP-II project area, (d) the multi-donor *Mediterranean Basin Regional Drylands Management Project*, (e) The GEF-UNDP *Small Grants Medicinal Plants Project* that has been approved and aims to conserve medicinal plants in the NWCZ, (f) a Swiss Fund project intended to conserve biodiversity in the NWCZ. There are also several Bank financed projects in Egypt dealing with agriculture, irrigation and drainage. MRMP-II intends to collaborate with these projects to enhance the sharing of information regarding M&E systems.

9) Other beneficial or damaging environmental effects

The rationale for GEF financial support to the MRMP-II is that it will significantly promote local, national, regional and global environmental benefits. Various environmental benefits are clearly presented in the project documents. No damaging environmental effects have been identified.

10) Stakeholder involvement

The MRMP-II will affect and/or be influenced by a large number of stakeholders. The first MRMP is already known in the project area, the Governorate and Egypt. The stakeholders of the second MRMP will include the Project Coordination Unit (PCU), the Ministry of Agriculture and Land Reclamation, the Egyptian Environmental Affairs Agency (EEAA), the Governorate, the National Coordination Committee (NCC) and its members, and the Project Coordination Committee (PCC) at the Governorate level and its members. (The Army is a key actor affecting the environment in the project area and is therefore an important potential stakeholder.) It is intended that the NCC take a more active role in project affairs in phase two. The MRMP-II plans to update the mandate and membership of the PCC to ensure full representation of various actors in the region: governmental, non-governmental, donors, research institutions. It is envisaged that local community representatives be included on the PCC. As noted above, to date the project has had very little contact with other government bodies.

GEF funding will partially finance the secondment of three staff from the Nature Conservation Sector of the EEAA to support the Project Coordination Unit (PCU) and make up the project management unit for biodiversity activities. This unit will be responsible for the implementation of activities concerning protected areas management, species conservation and training in protected area management, flora and fauna conservation, and community participation in conservation. The GEF contribution will also finance two part-time experts in the Governorate EMU.

The changed focus of the second phase of MRMP will lead to organizational changes within MRMP-II. The main project objective will become the further improvement of the welfare of the stakeholders, especially the more disadvantaged rural residents, and contribute to poverty alleviation. Project documents often use the term "stakeholders" as if the term were synonymous with residents of the project area, yet to date this category of stakeholders has had very little organizational or institutional clout in regard to project management and affairs. The inclusion of community representatives on the PCC, noted above as a possibility, would be an important step to increase such community involvement. Because of the significantly increased emphasis on community participation and capacity building in MRMP-II, a Community Planning Facilitation Unit (CPFU) will be set up. In the first year of the second phase of MRMP, there are plans to carry out a participatory evaluation of the implementation of the existing CAPs. On the basis of this evaluation, it is anticipated that an initial participatory planning exercise will establish the development framework for each community and a CAP for the first year. In addition: (a) the broader focus on NRM and conservation will result in a Natural Resource Management Department, and (b) a separate Gender Unit will be established with its own budget and greater operational autonomy. These organizational changes are necessary efforts to promote the interests of the specific categories of stakeholders involved.

11) Capacity building

The project proposal correctly emphasizes the need for capacity building at various levels to sustainably achieve MRMP-II's objectives. Under component A (Community Development) there will be extensive capacity building of communities. This will include training for local community representatives and other community members on a wide range of appropriate subjects, including basic training in environmental protection and environmental assessment. The objective is to strengthen the local communities' capacities to enable them to plan, implement and monitor their own development. Women will be provided with training to ensure that they have the same access to information as men. The project will also support literacy classes for women and education for girls.

There will be increased emphasis on extension, with more farmer involvement and a new community based extension outreach effort through the training of Community Facilitators. Promotion of off-farm income generating activities will mainly target women through the provision of training, access to credit and market linkages. In regard to marketing and agro-processing, emphasis will be placed on improving marketing awareness and the business skills of both the beneficiaries and project staff.

GEF funding will support a wide range of capacity building. The goal will be to develop community, project and Governorate capacity to manage environmental resources in a sustainable manner. The funds will promote formal and informal environmental education in schools and in each of the 38 community centers. Environmental curricula will be developed for both children and adults. Local knowledge and oral history will be recorded. There will be a project sub-component to strengthen women's development capacity that will include socioeconomic surveys and specialized training. Under component B (Integrated Natural Resources Management) GEF funding would strengthen the field level environmental capacity of the project, Governorate and Nature Conservation Sector of the EEAA (including the secondment of three staff referred to above). National and international experts will also be contracted to provide training in a number of fields.

12) Innovativeness of the project

The second Matruh Resource Management Project is an innovative effort to fully blend GEF financing into a project also financially supported by IFAD, the World Bank, local stakeholders and the Government of Egypt. Significant efforts will be made under the project to promote community-based development in an attempt to achieve genuine, sustainable poverty reduction and environmental objectives. This comprehensive and multi-sectoral project well reflects the spirit and intent of the GEF's Operational Program # 12.

Response to STAP Review:

It is encouraging to note that the STAP review is, in general, very positive. The project team is in agreement with the guidance provided by the STAP reviewer regarding participation and sustainability aspects. The team is fully aware of the difficulties of implementing a full-fledge Community-Driven Development (CDD) approach, and is indeed proposing to limit the Project ambition to furthering the participatory approach, transferring more responsibilities to the communities in the decision making and resource allocation process and emphasizing capacity-building, so that, by the end of the project, the communities will be capable to negotiate with other government and non government agencies for the delivery of services and investments. To this end, community development professionals will be recruited to strengthen project staff, and an NGO (from outside the region, if it exists) or international consultants, specialized in community development will provide training to project staff and support to local communities for Community Action Plans development. In addition, local communities will be represented at regional levels and project headquarter level (in the Project Coordination Committee). Finally the project will support local communities to register under the Association Law, so that they be recognized as legal entities by other government and non government agencies.

Elite capture is indeed a concern for the World Bank team. As a safeguard against this, the planning process will be lowered to the *aila* (clan) level, instead of the higher level (sub-tribe) which was considered under the first project. In addition the result of the planning process will be presented and discussed with all the heads of households so as to optimize the spread of information. Ensuring a widespread information process is indeed one of the best tool to prevent elite capture.

To achieve sustainability, the Project intends to collaborate not only with EEAA, but also with the education and health services of the Governorate, either involving them in project activities or implementing these activities through them. The Project Coordination Committee will be headed by the General Secretary of the Matrouh Governorate, who provides the umbrella and the coordination mechanism for all Government services in the Governorate.

ANNEX 4. BIO-DIVERSITY CONSERVATION, CARBON SEQUESTRATION AND ENVIRONMENTAL PROTECTION

CARBON (C) SEQUESTRATION

C sequestration potential in drylands

Given the arid warm environment found in the NWCZ, the potential for C sequestration is modest. Carbon can be sequestered as organic C in vegetation, litter, and soil organic matter. Carbon can also be sequestered as inorganic carbonates. Izaurralde et al. (2001) estimated that carbonates sequestered C at a rate of 0 to 1 kg ha⁻¹ y⁻¹ in arid regions.

In this region, productivity is low and decomposition rates are high. In addition, sparse vegetative cover combined with periods of high wind speeds and high intensity but low duration rainfall events create conditions conducive to wind and water erosion. The soil fraction preferentially removed by wind and water erosion tends to be of higher C content than the bulk soil. Lal (1976) reported C concentrations in eroded sediment that were as much as 5 times higher than that of the original soil and Zobeck and Fryrear (1986) reported C enrichment of wind-blown sediments. Soil C lost by erosion is lost not only from the site but in large part is less protected from microbial activity. It has been estimated that 20% of C lost to erosion is emitted to the atmosphere as CO₂ (Lal et al. 1998). The greatest potential for increasing C sequestration in the NWCZ is by increasing biomass in perennial vegetation and reducing soil erosion losses.

Soils: Soils in the NWCZ range from sandy to sandy loam in texture. In general, heavier textured soils have higher C content than lighter textured soils. Sandy soils have the potential to store up to 1% organic C (Stevenson and Cole 1999) while soils on the north coast are reported to have C concentrations of 0.1% or less. Targeting management practices that sequester C to sites with heavier textured soils will maximize C sequestration in MRMP-II.

Land uses: Land use within MRMP can be grouped into rangeland, orchard, fallow, and annual cropland. Within each land use there is potential to increase or decrease soil C status through management. From this point forward, it would be also be appropriate to add protected areas as one of the land classifications to be monitored on the north coast.

Grazing of rangeland vegetation removes biomass, which is used by the grazing animal as an energy source. Rangeland vegetation varies in its ability to tolerate grazing but under well managed grazing most species remain vigorous and productive. Overgrazing and degradation of rangeland will reduce the C status of these systems. Proper management of productive sites and rehabilitation of degraded sites offers opportunities to improve C sequestration.

Conversion of rangeland vegetation to orchards, mainly in developed wadis, maintains perennial vegetation. Orchards in developed wadis have a more favorable soil moisture status and are often fertilized. Hence, orchards are productive and have the potential to increase C sequestration. A system of mulching under the trees would be an improvement over the clean tilled conditions that are currently practiced.

Conversion of rangeland to barley production replaces perennial vegetation with an annual crop. Perennials partition a larger percentage of biomass into roots than annual plants. Hence, C additions to the soil are reduced by conversion of perennial vegetation to annual crops. Establishment of annual crops in degraded areas has potential for improving productivity and increasing C sequestration. Establishment and maintenance of vegetation on degraded sites also reduces the susceptibility of these sites to wind and water erosion.

In years of below normal precipitation, sites used for annual crops are left fallow. Under fallow conditions there are very little organic C inputs and decomposition results in a loss of soil organic C.

Tillage and water management: Management practices affect crop productivity and potential C sequestration. Tillage is used to control weeds and to prepare a seedbed. Tillage increases decomposition by increasing residue-soil contact, disrupting aggregates, exposing protected organic matter, and improving aeration. Tillage also reduces residue cover and exposes the soil surface to wind and water erosion. Non-inversion tillage (chisel) causes less

organic matter oxidation compared to inversion tillage (disk or plough). Minimizing the number of tillage operations also has a very large impact. Unless the increase in crop productivity resulting from tillage is greater than the increase in decomposition rate resulting from tillage there will be a reduction in C status of the system.

In arid systems, water management is critical to crop production. Any water management activity that captures water within the project area and is used for vegetation production will increase C sequestration. In contrast, runoff from the project area represents water that is unavailable for plants and has the potential to erode soil and associated C from the project site.

Land management options: Increasing C sequestration on rangelands can only occur if range condition is high, a condition that also favours higher plant and animal biodiversity. This requires grazing at levels and times that the vegetation can support. For degraded range, improvement techniques can usually restore the site to its potential over time, depending on rest, rainfall and utilization. Inter-seeding native species that have been lost due to overgrazing can accelerate the rate of recovery of rangeland.

Soils in the MRMP are low in fertility and nutrient availability may limit establishment and growth of plants during rehabilitation. Phosphorus fertilization is an effective mechanism for stimulating legume production, especially on disturbed (ripped soils) sites. There are many papers from ICARDA in Aleppo, Syria that studied the effects of phosphate on communally owned land as well as for on-station controlled grazing trials. These results are of relevance to the work in the NWCZ of Egypt (Cocks and Osman, 1996; Ghassali et al. 1999; Osman and Cocks 1992; Osman et al. 1991, 1994). The applied P and the fixed N will serve as nutrient sources for other species growing on the site.

Rangeland sequestration potential Using an average production value of 60 kg/feddans and assuming (a) that livestock eat 100 % of the current year's growth, (b) perennial vegetation partitions 80% of its production to below ground biomass, (c) the same amount of below ground biomass dies each year, (d) below-ground biomass contains 50% C and (e) 10% of the C is sequestered an estimate of sequestered carbon on the 498,000 feddans of rangeland (sparse rangeland and bare soil and rock areas not included) is 1,494 tons C/ year.

The factor most limiting the establishment and productivity of the range vegetation is available water. At present, significant amounts of precipitation are lost to runoff from range areas. While some of this runoff is captured and used in cropped soils lower in the watershed, significant amounts are lost to the sea. Water distribution structures (rock dams and terraces) should be constructed in catchments that do not feed cropped areas to increase residence time and maximize infiltration. The increase in available water will increase native plant production and organic matter additions to the soil.

Orchards sequestration potential: Biomass of orchard crops can serve as a significant C sink. To optimise the amount of C sequestered in orchard crop biomass varieties adapted to the area should be developed and used. These varieties should be selected for disease resistance and water use efficiency as well as fruit production. Residue should be managed to reduce evaporative losses of soil water. In addition to plant residue, inorganic material (e.g. rock or plastic) can be utilized as evaporative barriers under orchard plants. Since orchard crops are of high cash value, nutrients should be managed to insure that deficiencies do not limit yields. Animal manure, sewage effluent and sludge, and compost may all serve as nutrient sources in orchards. Orchards are planted in deep soils behind water control structures in wadis. Fruit yield and vegetative growth are used to determine planting geometry and density to achieve optimum water use efficiency.

Carbon can be sequestered in two ways in orchards: soil organic matter and secondary aboveground growth. Using the same assumptions for below-ground biomass production and C sequestration as used for perennial range vegetation, 47,500 tons C/ year are sequestered in soil organic matter in orchards. Assuming that perennial shrubs (a) partition the same amount of biomass to secondary growth as to fruit production, (b) secondary growth is 50% C, and (c) 50% of the secondary growth is pruned and used for firewood each year, 47,500 tons C /year are sequestered in secondary growth.

Sequestration potential of annual crops: Optimising C sequestration in annual cropping systems requires that production be maximized and that losses of C due to decomposition, mineralization, and erosion be minimized. To optimise C sequestration, annual crops should replace perennial range vegetation only when: well-managed annual

crops can substantially out-produce the range vegetation and feeding of the grain produced will result in a chance for the range areas to be rested.

Use of varieties that are adapted to the area and that exhibit disease resistance and high water use efficiency are needed. Use of organic and inorganic fertilizers insures that nutrient deficiencies are not limiting yields. Crop residue serves as a barrier to diffusion of water from the soil surface. Tillage should be minimized in terms of the number of passes and degree of disturbance for the reasons discussed above. Annual crops are usually grown on wadi tips and other areas at higher elevations in the catchments having sufficient soil depth and that receive runoff during precipitation. When annual crops are grown in catchments that do not support orchards, water control structures should be placed to maximize water retention and allow as much infiltration as possible. Assuming that (a) 50% of biomass remains after harvest, (b) biomass is 40% C, and (c) 10% of this C is sequestered, 340 tons C/year are sequestered on 4000 feddan of watermelon and 870 tons C/year are sequestered on 145,200 feddan of barley.

Loss of carbon under fallow: The area in fallow each year within the MRMP is approximately the same as that in barley. Under fallow there are no additions of C to the soil and microbial activity mineralizes existing soil organic matter. Assuming that microbial activity mineralizes the same amount of organic C in a fallow year that is sequestered in a crop year; therefore there would be a loss of 870 tons C/year.

Erosion control: As mentioned above, erosion control is essential to optimising C sequestration in this arid environment. Two erosion processes operate within the NWCZ – wind and water. Erosion is a three-step process: detachment, transport, and deposition. Controlling wind and water erosion requires that the soil be protected from the forces present in the moving wind and water that cause detachment. Minimizing wind erosion requires that the soil surface be protected from the erosive force of the wind. Shelterbelts planted perpendicular to the prevailing wind direction are effective in reducing the wind speed at the soil surface. Shelterbelt species must be those that are either not palatable or they must be protected from grazing. Residue can also protect the soil surface from the erosive effects of the wind. Residues can be either organic (mulch or crop residue) or inorganic (plastic or rock). Soils are best protected from water erosion when the canopy cover and plant residue absorbs the initial raindrop impact. Since canopy closure is unlikely in an arid environment, residue is needed to protect the soil surface. Once the infiltration rate has been exceeded and overland flow begins, flow rates need to be minimized through the use of stone dikes, terraces, dams, etc.

Estimates of soil erosion losses from the study site are not available. Soil erosion is a serious problem within MRMP and C losses in sediment lost by wind and water erosion easily have the potential for offsetting any of the C gains estimated above. The organic fraction also includes seeds that are essential in natural revegetation.

STATUS OF BIODIVERSITY IN THE NWCZ

The western Mediterranean coastal region is one of Egypt's five primary "biodiversity hotspots", containing some of the most important regions for the diversity of wild terrestrial fauna and flora in the country. Almost 50% of the flora of Egypt is represented in the region with nearly 70% occurring within 10 km of the coast (Le Houaou 1998). The coastal dunes, salt marshes and sea cliffs support some of the highest floral diversity in the country (Baha El Din 1998). Besides the richest mammal and reptile communities in the country and a fairly rich local avifauna, the region is situated on internationally important flyways for birds migrating between Eurasia and Africa, with the largest populations and diversity of species occurring in the autumn when hundreds of millions of migrants pass through the region. In addition, this region has a rich invertebrate life with a high number of endemic insects and spiders.

The agricultural system also exhibits a great degree of diversity. There are still local varieties of some field and horticultural crops as well as wild species and relatives of some important crop plants such as *Hordium*, *Vicia*, *Trifolium*, *Medicago*, *Allium*, *Solanum*, *Phoenix*, *Vigna*, and *Brassica*. In the governorate of Marsa Matrouh, 52 of the globally threatened coastal species are present (de Grissac 1997).

Flora

Native plants: In 1998, the project contracted a biodiversity expert who helped review the fodder shrubs that could be developed from local and imported plant germplasm (Appendix 1). A summary of the information in the report

(Le Houérou 1998) indicates the project region has approximately 990 different species or about 47% of the total number of species represented in Egypt. About 71% of the families and 59% of the genera are also represented. Most species are herbaceous (84%) and annual (57%). Approximately 43% of the species have no known utilization while 36% of the species are used for grazing and 14% are used for herbal and medicinal purposes. Most of the plants are found in cultivated areas (45%) while 18% are located on wastelands, 16% on rangelands and 18% in wetlands.

The flora in the project area is similar to the rest of Egypt with regards to the proportion of species in the family and genera. However, there are 16 endemic species and subspecies recorded in the region. All are potentially globally threatened by various types and degrees of danger; however six are listed or will be listed as threatened (rare, vulnerable or endangered) according to the IUCN criteria (Baha El Din et al. 1996).

Boulos (1995) recognizes 61 endemic species in Egypt of which over half are from Sinai. The NWCZ is poorer in this respect because only 16 species and subspecies are mentioned:

<i>Allium blomfeldianum</i>	<i>Helianthemum sphaerocalyx</i>
<i>Allium desertorum</i>	<i>Lepidium aucheri</i>
<i>Allium mareoticum</i>	<i>Nigella arvensis</i> subsp. <i>tauberti</i>
<i>Allium myrianthum</i>	<i>Silene fruticosa</i>
<i>Carduncellus mareoticus</i>	<i>Teucrium brevifolium</i>
<i>Echinops taekholmianus</i>	<i>Verbascum letourneuxii</i>
<i>Ebenus armitagei</i>	<i>Viola scorpiuroides</i>
<i>Ferula marmarica</i>	<i>Zilla spinosa</i> subsp. <i>biparmata</i>

Based on published information and field observations, the species that merit the highest priority for conservation action are as follows:

- Ebenus armitagei* - A near endemic species to Egypt and Libya.
- Zilla baiparmata* - A near endemic species to Egypt, Libya and Tunisia.
- Allium mareoticum* - An endemic species to the eastern NWCZ.
- Helianthemum sphaerocalyx* - A near endemic species to Egypt and Libya.
- Echinops taekholmianus* - An endemic species to the NWCZ.

Crop diversity: Agro-biodiversity is decreasing rapidly as new varieties are adopted. This results in a shrinking gene pool from which to develop new varieties. Although the adoption of barley cultivar ‘Giza 126’ is increasing, some producers still plant many old varieties of some field and horticultural crops. The area also has wild relatives of some important crop plants such as *Hordium*, *Vicia*, *Trifolium*, *Medicago*, *Allium*, *Solanum*, *Phoenix*, *Vigna*, and *Brassica*.

Most of the flora is represented in cultivated lands where the main crop is barley. There have been some introductions of new horticultural crops such as figs, olives and grapes. Watermelon, onion and tomatoes are also frequently grown. Home gardens provide refuge for many heirloom culinary species such as eggplant, turnip and others. Native plants are often found growing in the cultivated areas and for the most part farmers consider them a source of animal feed.

Fauna

Reptiles and amphibians: The western Mediterranean coast region has one of Egypt’s richest herpetofaunas, holding some 35 species (see Appendix 2). The prominent components of the herpetofauna include: Loggerhead Turtle (*Carreta carreta*), the geckos (*Stenodactylus mauritanicus*, *Tarentola mauritanica*), the lizards (*Acanthodactylus scutellatus*, *A. boskianus*, *A. pardalis*), the agamid (*Trapelus mutabilis*), Desert Monitor (*Varanus griseus*), Common Chamaeleon (*Chamaeleo chamaeleon*), the snakes (*Spalerosophis diadema*, *Macroprotodon cucullatus*, *Malpolon monspessulana*) and Green Toad (*Bufo viridis*).

The Egyptian Tortoise (*Testudo kleinmanni*) has virtually vanished from the greater part of its former range in the western Mediterranean coast. Very small, highly fragmented and isolated populations (or even individual animals)

might still exist in marginal habitats in the transitional zone between the more mesic coastal habitat and the xeric interior.

Marine turtles are all internationally endangered. Loggerhead Turtle is generally the marine turtle species known to regularly breed along the western Mediterranean coast. The disappearance of undisturbed sandy beaches used by marine turtles for breeding as a consequence of tourist development, as well as, accidental (or intentional) capture in fishing nets, are the two main threats to the species in Egypt.

Birds: A total of 169 bird species have been recorded or are thought to occur in the Saloum region (see Appendix 3). Of these some 35 species breed locally, the rest are passage migrants or winter visitors.

Breeding species include Cream-coloured Courser (*Cursorius cursor*), Desert Wheatear (*Oenanthe deserti*) and Crested Lark (*Galerida cristata*). Thekla Lark (*Galerida theklae*) and Raven (*Corvus ruficollis*) are two species restricted in Egypt to the Saloum ridges and cliffs. Shag (*Phalacrocorax aristotelis*) probably also breeds on the sea cliffs of Saloum, the only locality in Egypt.

The region supports several avian species restricted to the Mediterranean Biome, some of which have very restricted distribution in the country: Thick-billed Lark (*Ramphocoris clotbey*), Dupont's Lark (*Chersophilus duponti*), Temminck's Horned Lark (*Eremophila bilopha*) and Red-rumped Wheatear (*Oenanthe moesta*). The last species has undergone a severe decline in the past decades and has almost disappeared from its Egyptian range due to habitat degradation. The region was also an important breeding habitat for the threatened Saharan Houbara Bustard (*Chlamydotis undulata undulata*), but Gulf Arab hunters have decimated the local population. The species still occurs but breeding is localized and rare.

Hundreds of millions of birds pass through the western Mediterranean region, on a broad front, every autumn and spring. Many land to rest and feed in coastal habitats. Water birds, in particular, make more intensive use of the few available wetland areas. Wintering birds include small numbers of Houbara Bustard, which apparently come into Egypt from Libya. Potentially large and internationally important numbers of Dotterel (*Charadrius morinellus*) winter in the region.

Mammals: At least 33 species of mammals are (or were) known from the western Mediterranean coast of Egypt, roughly representing a quarter of Egypt's terrestrial mammalian fauna. The region holds by far the richest rodent community in the whole of Egypt composed of 19 species, including two threatened species: the Four-toed Jerboa (*Allactaga tetradactyla*) and the Greater Jerboa (*Jaculus orientalis*). These species suffer largely from habitat destruction, but are also subjected to intensive collection pressure by wild animal traders.

Dorcas Gazelle (*Gazella dorcas*) is a threatened species that used to be very common in this region only three decades ago, but has since declined sharply, and probably largely disappeared, as a result of excessive hunting, disturbance and habitat destruction.

The highly endangered Mediterranean Monk Seal (*Monachus monachus*) is still being recorded on the neighboring Cyrenaican coast of Libya, just northwest of Egyptian waters. The species might find refuge in the sea cliffs of Saloum. The species certainly inhabited the marine waters and shores of the region in the past, before its great global decline. The maintenance of this animal should be part of the biodiversity conservation agenda of Egypt.

The cheetah (*Acinonyx jubatus*), was known from the Saloum region not too long ago, but has certainly vanished during the past few decades. Scimitar Horned Oryx (*Oryx damah*) and Addax (*Addax nasomaculatus*) both disappeared from the region somewhat earlier. Bringing back these large widely roaming animals into this region would be extremely difficult in today's modern circumstances and should not be considered.

Marine Life: No particularly unique marine habitats are known from the western Mediterranean coast; nevertheless, very little of the Mediterranean marine environment of Egypt is protected. The conservation of some representative segments of the Mediterranean is important and will probably also help in the better management of local fish stocks. Little is known about the marine biodiversity. There appears to be comprehensive species lists of the flora and fauna diversity available and so the presence and absence of species seems well documented; however, less baseline data are available regarding marine biodiversity.

Endangered species: A number of globally threatened species of plants and animals occur in the area. Endangered Loggerhead Turtles (*Caretta caretta*) use the shores of the north coast for nesting. Some intact desert habitats probably hold the sole remaining viable populations of the Egyptian Tortoise (*Testudo kleinmanni*). The marine cliffs north of Saloum could be suitable for the highly endangered Monk Seal (*Monachus monachus*). See Appendix 4 for a list of threatened vertebrates found in the region.

EXISTING LAND EXPLOITATION

Current situation

In the past 10 years there has been large-scale tourism development on the north coast of Egypt between Alexandria and Marsa Matrouh. An almost continuous stretch of tourist facilities occupies the coastline between Alexandria and Alamein and there are plans to develop the rest of the North Coast in a similar manner. This development results in immediate habitat destruction along the coast along with quarrying for building material and soil stripping for lawns and gardens (Baha El Din et al. 1996, de Grissac 1997). Most plant species occur along the coast and a few kilometres inland (Le Hourou 1998) and so this development can have a strong negative impact on biodiversity of the region. Many of these developments were built as a result of land speculation, with the expectations that real-estate prices will be higher in the future.

Egypt does not have a comprehensive land use planning system, particularly at the local level, yet governmental entities, ministries and local government authorities lay claim to great stretches of land. For example the Tourist Development Authority (TDA) has control over long stretches of the Egyptian coastline, while the Ministry of Agriculture controls agricultural areas, and municipalities are responsible for urban areas. Desert areas are generally considered “state owned” and traditional land claims are not legally recognized. The authority of various government organs over land use is exclusive and organized in a jigsaw pattern, with little spatial overlap and coordination.

In 1998 the GOE produced an “Investment Map”, which broadly outlined the land uses in Egypt. In 2001 a Presidential Decree was issued with an amended land use map for Egypt. Existing and proposed protected areas are acknowledged on both land use maps; however, because of its large scale and lack of detail, the maps are of little use at the site level. They do provide a clear governmental support for proposed protected areas, and indicate areas dedicated to tourism development.

There is certainly a great need to institutionalise land use planning in Egypt, and make it an important planning tool of the GOE. MRMPII would provide a very good demonstration for institutionalising land use planning and integrated resource management, which can then serve as a tool and model for the rest of the country.

Development regulations in Matruh Governorate

It is required for all developers to submit an economic feasibility study and an environmental impact assessment (EIA). Regulations provided in the Governorate investment manual require that developments must be in accordance with Law 4 for 1994 (Law of the Environment), indicating the need to preserve wildlife, habitats, coasts and other landscapes having natural aesthetic and economic values. Maintaining legal distances from the shoreline when building prohibits the release of effluents into the sea and helps prevent coastal alterations. The manual provides for methods to maintain open space and other building codes such as colour regimes, etc.

Despite the presence of these regulations and their availability to investors etc., there is little evidence that guidelines in the manuals are respected. For example, almost none of the new developments in Matruh Governorate maintain the white and blue building colour-code stipulated in the manual. More significantly, the EIA process is usually misunderstood. EIAs are often seen as a requirement that can be performed at any stage of a project development process, in some cases even after a project is nearly complete. EIA documents are seen as fulfilling a requirement in themselves, and are often (usually) not evaluated. This is usually the case with small projects. Moreover, some projects (such as agricultural development and road building projects) do not submit an EIA because it is assumed that they would not or could not pose environmental risks.

Private landownership

Traditional land claims have no legal standing in Egypt; however, the GOE tends to acknowledge local claims in most cases. Private land ownership issues are a sensitive matter, which surfaces occasionally, including some unresolved ownership claims related to existing protected areas in Egypt. The current project should seek to reconcile land ownership rights with protected area management principles, through inducing public participation and establishment of participatory processes. This process will benefit from the participatory approach of MRMP. Additionally, the model developed here can be adopted in other protected areas in Egypt where local inhabitants have significant traditional rights.

CURRENT CONSERVATION SITUATION

Protected areas

Legal framework: Law 102/1983 established the legal framework for the creation of protected areas in Egypt (see Appendix 5). Nature Conservation Sector as the responsible body within the EEAA has the legal mandate to declare and manage protected areas in Egypt according to Law 102 for 1983. A Prime Ministerial Decree declares protected areas after the submission of a proposal by the EEAA, which includes justification and a delineation of the proposed protected area. All development and other human activities are strictly controlled in protected areas, for example, hunting is forbidden and development only allowed after a through EIA process.

Law 4/1994 gives the EEAA the legal mandate over biodiversity management and conservation issues, coordination of hunting management and overseeing compliance to the provisions of international conventions.

Management set up of existing protected areas: Existing protected areas have a typical management team composed of a manager, rangers, community guards and accountant. The size and composition of the team varies from one location to the other. Scientific advisors are assigned to certain protected areas when the need arises. Protected area personnel are responsible for monitoring their reserves, enforcing the law (they have police power) and implementing management plans. The manager of a protected area reports directly to the Director of the Nature Conservation Sector.

Most existing protected areas have established on site facilities, such as visitor centers, tracks, hiking trails, research labs and staff housing. In several reserves eco-lodges and cafeterias have been established that are rented on a concession basis. Protected areas that are frequently visited charge a visitor's fee to recover costs.

Existing protected areas in Egypt and the NWCZ: There are currently 21 declared protected areas in Egypt, almost all of which lie to the east of the Nile River. At present, representation of the western Mediterranean coast in the National Protected Area Network is very limited in terms of habitats, species and area. The Egyptian National Biodiversity Conservation Strategy and Action Plan has as one of its main objectives the expansion of the National Protected Area Network to become more fully representative of the nation's biodiversity and ecosystems. To fulfil these objectives, 19 additional protected areas were proposed in a study by the Nature Conservation Sector of EEAA.

To date, only one protected area has been declared along the western Mediterranean coast; El Omayed Protected Area, which is situated on the coast 80 km west of Alexandria. Prime Ministerial Decree 671 established the Protected Area in 1986 and Decree 90/1996 expanded the boundaries. El Omayed occupies an area of 700 km², with 31 km of coastline along the Mediterranean Sea and a depth of 26 km inland. El Omayed Protected Area is a Specially Protected Area under the Barcelona Convention, as well as a UNESCO Man and Biosphere Reserve. An administrative building with a research station and facilities to accommodate visitors are established. Tourist developments, agricultural reclamation and hunting are among the illegal activities taking place inside the reserve. The most intact habitats remaining are the inland plateau where development and population pressures are not as intense; however, much of the littoral habitats are under pressure.

EEAAs currently proposed protected areas

Criteria: Four protected areas have been identified in the western Mediterranean coast region (Saloum, El Qasr, El Showela and Ras El Hekma). The following selection criteria were used:

- Representation as a primary habitat in the protected area network,
- Importance for biodiversity,
- Intactness of site,
- Possibility of effective management,
- Presence of other important non-biological resources (e.g. landscape value, geological features),
- Potential benefit to local communities and national economy (e.g. through eco-tourism).

Saloum: The protection of the natural resources of the Saloum region has been identified one of Egypt's highest biodiversity conservation priority areas. The Saloum plateau is one of Egypt's richest regions in biodiversity, particularly in botanical terms. The Saloum region contains unique habitats and many floral and faunal elements only known in Egypt from this small region. The Crested Porcupine (*Hystrix criistata*) and Thekla Lark (*Galerida theklae*) are examples of species only known in the country from the Saloum cliffs.

The region contains the largest remaining tract of relatively intact and undisturbed coastal habitats in the whole Egyptian Mediterranean coast, and is one of the least populated. The proposed protected area encompasses a great diversity of habitats in a fairly compact area, these include, off shore waters and reefs, steep sea cliffs (which are of rare occurrence along Egypt's Mediterranean coast), coastal dunes, coastal oolitic ridges, coastal lagoons, extensive intact coastal salt marshes and other saline habitats, Mediterranean steppe habitats, inland cliffs, ridges and wadis, and the Saloum Plateau. These diverse habitats and landforms, support an equally diverse fauna and flora, and render the landscape of the region of spectacular quality and unique beauty.

The region is facing an increasing development and degradation pressure, as is the case along the rest of the Egyptian Mediterranean coast. The protection of this area is of prime importance for the conservation of biological diversity in Egypt.

El Qasr: This proposed Protected Area represents a fairly undisturbed example of a unique and restricted habitat in Egypt – the Mediterranean coastal steppe – a habitat that is being lost and degraded very rapidly in Egypt. The area extends from south of the coastal plain to some 50 km inland, and encompasses all the transitional zones from the Mediterranean vegetation belt in the north to near pure desert in the south. The area has a high conservation and scientific value. It includes a variety of landscape features and a diversity of habitat types and biological components that are marginally represented within Egypt's current network of protected areas.

The area is part of El Diffa Miocene Plateau. A vast flat sand and gravel plain with scattered clay pans. Several low limestone ridges run east - west across the plain, and gradually raising the flat landscape to an elevation of 200 m. Fairly dense desert scrub dominated in the northern part by *Thymelaea hirsuta* and in the south by *Anabasis articulata-Hammada scoparia*, with scattered *Lycium* sp. bushes. Rainfall and density of vegetation decreases rapidly southwards, and severe desert conditions prevail beyond 70 km. from the coastline.

In the context of conserving wildlife adapted to life in steppe and arid environments it is essential to protect fairly large blocks of habitats, since the concerned taxa often occur in very small densities and require large territories to satisfy their survival needs. This is particularly true for the larger mammals, but also applies to even fairly small birds, such as the various species of larks. The Qasr area represents a fairly intact large tract of habitat (in comparison with other parts visited in the region), which is easily accessible for monitoring and visitors.

As the area falls on the boundary between the Mediterranean and Saharo-Sindian Biomes, it supports assemblages of fauna and flora, characteristic of both biomes. The maintenance of representative examples of these characteristic assemblages is of prime importance, equal to that of conserving threatened taxa.

El Showela: The proposed protected area largely includes marine and littoral habitats, and off shore islands. The shoreline is sandy with scattered rocky outcrops, followed inland by a band of dense salt marsh vegetation. The marine environment encompassed in the protected area holds representative Mediterranean marine ecosystems, fauna and flora. The off shore islets hold numbers of breeding seabirds such as Yellow-legged Gulls (*Larus cachinnans*)

and Shag (*Phalacrocorax aristotelis*). This is probably the only remaining breeding locality for both species in Egypt. Botanically the littoral habitats and inland cliffs and wadis hold a large diversity of floral elements. The sandy shores of the area are also used on a regular basis by nesting marine turtles.

The proposed protected area encompasses a diversity of habitats and landscape features that are characteristic of the western Mediterranean coastline of Egypt. These habitats are being very rapidly consumed by coastal construction and development. If current rates of habitat loss continue these coastal habitats will be completely lost or heavily degraded within the next decade. Thus the establishment of a protected area along this section of the shoreline will guarantee at least a minimal maintenance of some examples of important sites.

Ras El Hekma: Numerous scientists and organizations have nominated Ras El Hekma for protection. It is one of Egypt's best-known natural heritage sites. The area is perhaps most important for the floristic elements it supports, some of which are rare or endemic (e.g. *Ebenus armitagei*, which is only known from Ras El Hekma in Egypt). The marine environment represented in the proposed protected area also possesses characteristic elements of the Mediterranean marine fauna and flora. Endangered marine turtles also nest in the region. However, in recent years several coastal tourist developments have started to encroach on the area, including numerous summerhouses, native homes, and fig and olive orchards. The natural character, habitats and important biodiversity are retained in small patches. Because development pressures have degraded natural habitats and created a complicated situation, the management of Ras El Hekma as a protected area would be extremely difficult and probably fruitless. Resources should be directed to other proposed localities where conditions would allow for greater success.

Existing projects of relevance

GEF-UNDP-EEAA-MedWet Coast Project: This is a Mediterranean-wide regional GEF funded project in its second year, with focal activity areas in Egypt at three protected areas along the Mediterranean coast: Zaranik in North Sinai, Burullus in the Delta and Omayed west of Alexandria. The project in Egypt mainly aims at developing and strengthening the management of these three protected areas. Geographically the project has no overlap with the project proposed herein. However, some of the biodiversity resources of global significance being addressed, particularly in Omayed Protected Area, are partly represented in the currently proposed project area.

Natural habitats in and around Omayed are severely degraded and only represent a small fragment, which cannot sustain viable populations of many of the target species.

The development of a protected area at Saloum was proposed initially to be included as part of this project, but was later dropped during implementation. A feasibility study was undertaken for the declaration of this area.

GEF-UNDP-EEAA Medicinal Plants Project: This is a GEF funded project about to be launched. Although the project activities are centered in the St Katherine Protected Area in South Sinai, it should have outputs with implications for medicinal plant conservation and utilization throughout Egypt. The project will also include nationwide surveys of "hot spots" for medicinal plants, including the NWCZ. The project aims at formulating a national medicinal plant strategy. Tools developed and experiences gained should be applicable in the NWCZ.

GEF-UNDP Small Grants Medicinal Plants Project: This is a GEF small grant funded project for medicinal plants conservation in NWCZ, which has recently been approved. The project focuses largely on collection of local knowledge and *ex-situ* conservation measures in the area near El Hamam.

Siwa Environmental Amelioration Project: The Siwa project aims at improving environmental management in the oasis through several approaches, one of which is the establishment of a large protected area in the regions surrounding Siwa Oasis. Other components include: development of sustainable agriculture, development of eco-tourism and handicrafts, municipal waste management and strengthening the Matruh Governorate Environmental Office. This project funded by Italian Cooperation, is now entering its second phase. Much can be learned from this project as it is active in Matruh Governorate and has generally similar objectives to MRMP-II and the approach used to develop the Siwa protected area can be emulated to a large extent. Regional aspects of the project, particularly the development of an eco-tourism strategy for Matruh Governorate will require coordination.

Emerging policy issues related to biodiversity, protected areas and MRMP-II

An emerging issue for EEAA is the desire and necessity to reconcile the various competing, uncoordinated strategies for the development of the NWCZ. Ideally, government decision-makers should overlay the various strategies from agriculture, environment, tourism, defence and infrastructure development, which could be collated and redistributed to the contributing ministries and agencies for their comment and reconciliation when competing desires for development are identified. EEAA does not have the capacity or authority to do this but would benefit from a policy debate for the reconciliation of land uses.

The NWCZ may not be able to compete with the marine biodiversity and mountains of southern Sinai; but equally interesting historical sites, beautiful beaches and deserts could provide an attractive menu for tourism provided well-planned transportation infrastructure would allow visitors to see the western parts of the country as a circular route, rather than retracing their path to Cairo from Matruh before heading to tours of the Delta, Nile Valley and the White Desert. Although outside of the context of MRMP-II, the existing Siwa to Bahariya road will one day be improved and it will open up the western part of Egypt for expanded tourism. Will there be ecotourism to see in the Matruh area or will tourists drive directly to Siwa? Can protected areas the size of those in Sinai be established in the western part of Egypt as well? These are major policy questions.

Locally: The shift in project focus towards conservation requires that the project undertake a stakeholder analysis to identify beneficiaries and target groups, elaborate the means of participation, and utilize the MRMP Coordination Committee to establish structures of communication among EEAA, local authorities and local communities for the conservation and use of biodiversity, appointing new Coordination Committee members if necessary. Capacity building and public awareness on the need for protection of biodiversity are required at the policy, decision-maker, farmer and landowner levels, targeted at stakeholders specifically concerned with biodiversity conservation and management.

Nationally: The GOE must use MRMP-II as a pilot project, demonstrating how to establish and sustain community conservation of biodiversity “hotspots” and points of natural beauty in combination with the protected areas planned by EEAA for the NWCZ. The new protected areas should be established based on sound scientific principles, integrating these areas as soon as practicable into an overall conservation strategy for in-situ and ex-situ work in Egypt. MRMP-II has an advantage in being able to integrate ex-situ project objectives from its core funding and in-situ project objectives under GEF. An essential national goal, albeit outside the context of the current core or GEF funding, is to consolidate germplasm under the authority of a National Germplasm System and Gene bank. Standardized methods for biodiversity documentation should be developed to harmonize the information storage and retrieval systems with all biodiversity related projects in Egypt, and these functions should be coordinated with approaches used in MRMP-II.

Remote sensing, geographical information systems, and air and ground surveys are indispensable tools that are now used for biological, biophysical and spatial characterizations – all essential in the context of the proposed project. MRMP-I has accomplished the first steps in establishing the degree of plant biodiversity available in the NWCZ, where it is concentrated and how it can be exploited. The project should now take on the necessary elements of a conservation strategy, that includes environmental impact assessments to control uncontrolled development, control over illegal hunting to protect fauna and to set up a package of interventions that will be useful for replication in other parts of the country.

Internationally: Egypt needs assistance in establishing and strengthening coordination mechanisms among MRMP-II, biodiversity projects in Egypt, and other countries with similar interests inside and outside the region.

THREATS

Threats to animal and plant biodiversity in the NWCZ of Egypt are based on five main factors: (1) widespread ploughing by the local population and military is one of the greatest threats to biodiversity in the NWCZ, owing to its concentration in the areas of best rainfall and soils, which is where biodiversity is also concentrated; (2) the local population is unsustainably exploiting the limited natural resource base through grazing, plant collecting for fuel, food or medicine and unregulated hunting; (3) uncontrolled and unsustainable development of beach resorts are

eliminating natural coastal habitat at an alarming speed; (4) lack of carefully planned zoning prohibits a concentration of development in areas that could co-exist with points of interest and beauty and (5) solid waste mismanagement and concomitant pollution are dampening the desirability for NWCZ development. The result of these factors is habitat destruction and degradation. The root causes are lack of opportunities for income generation beyond traditional agriculture; inability to sustainably utilize all resources and the need for a well-implemented plan that rationalizes the competing and often conflicting uses of resources by the existing actors. Specific threats are addressed in more detail below.

Habitat destruction, degradation and unsustainable use of limited natural resources

Agriculture: Most of the western Mediterranean coastal land areas cannot support intensive agriculture, which is leading to the degradation of soil, water and rangeland resources. Perhaps the most serious threat to the western Mediterranean coast is the complete (and possibly irreversible) destruction of habitats caused by cultivation. The areas most intensively cultivated were prime habitats for biodiversity. In the past camels, donkeys and simple tools were used for ploughing, which did not completely eliminate perennial vegetation, leaving behind a network of islands of natural vegetation. Modern machinery, however, indiscriminately and completely removes perennial shrubs, which provide landscape complexity and shelter to wildlife. After the crop is harvested in late spring/early summer, animals graze the stubble and then land remains devoid of vegetation throughout the remainder of the year. This in turn means that grazing pressure is concentrated on remaining pockets of natural vegetation.

As the local population increases and becomes more sedentary, the need for agricultural land also increases. As each additional feddan is cultivated for marginal cereal cultivation, the habitat for biodiversity is also destroyed. At this point in time almost all the best rangeland has been converted to marginal cropland.

To complicate matters, a large proportion of the current ploughing activities are carried out by the military as part of an ambitious plan to be self-sufficient in grain production. It is widely accepted that this fragile desert ecosystem is unable to sustain intensive mono cropping because of depletion of soil nutrients and erosion, yet huge areas of natural habitat/rangeland were destroyed along with their plant and animal life.

Overgrazing: This threat has been identified many times as a contributing factor to habitat degradation (Le Hou[▲]rou 1998, Baha El Din 1998, de Grissac 1997, Baha El Din et al. 1996). Generally, the rangelands in the project area are extremely degraded with many palatable plants reduced to near extinction ((Le Hou[▲]rou 1998) Currently, the number of animals is about 2 to 3 times the carrying capacity of the resource. The increase in grazing pressure results in further degradation of the range resource and more intensive grazing on the few relatively palatable species remaining, as well as an increase in the more grazing resistant plants, which further depletes diversity.

Traditional pastoralism in the past was more limited than today. The human population was much smaller, and summer grazing opportunities too distant or extra feed supplies expensive to purchase (thus limiting the possibility of maintaining excessively large herds). In modern times; however, the use of trucks has enabled local Bedouins to rapidly transport their herds from one grazing site, quickly depleting grazing grounds over large areas. Supplementary food and water transportation by trucks made it possible to take herds further, to graze marginal habitats in distant localities. These areas were not normally grazed in the past. They were difficult to reach and could only support grazing during very short periods of the year. All these techniques (made possible by modern transport), plus government subsidies on grain, have allowed locals to maintain larger herds, far exceeding the carrying capacity of their environment.

Firewood collection: There is an increasing demand by local Bedouin populations on fuel woods, which targets larger woody perennials. This demand is leading to notable degradation of habitats, particularly in localities distant from other sources of energy.

Unregulated medicinal plants collection: The collection of wild native medicinal plants for commercial trade has no formal or informal regulation. The most serious aspect of this practice is that it usually targets rare and localized flora, damaging them further.

Introduction of alien species: The introduction of non-indigenous alien species of plants has taken place on more than a million hectares throughout North Africa and West Asia. The introduction of non-indigenous species is well known as one of the primary factors for the erosion of biodiversity throughout the world; however, it should be kept in mind that some species have good potential for productivity. Exotic species have adapted from origins in west Australia, South Africa, North America, and South America. Some have become naturalized in the Mediterranean Basin and, therefore, may volunteer outside planted sites, such as some of the cacti (*Opuntia* spp.), *Kochia* spp., and *Agave americana*. Some are mildly invasive under particular circumstances of micro-climate and management, such as *Atriplex nummularia*, *Acacia cyanophylla*, *Opuntia stricta* subsp. *dillenii*, *Opuntia vulgaris*, *Parkinsonia aculeata*, *Prosopis glandulosa*, but none of them has become a pest, nor even a threat to the environment. In many cases it is quite the opposite; although some may have become pests in other Mediterranean environments, such as *Prosopis* spp. in the northwestern part of the Cape Province of South Africa, *Acacia cyanophylla* and *Acacia cyclops* in the eastern Cape Province of South Africa.

Uncontrolled off-road vehicular use: With the growing development pressures, increase in human population and the increased availability of cars the volume of traffic in (both on and off road) has reached levels never witnessed before. The growing accessibility and lack of regulation is in place to control off-road traffic, tracks have sprung up in all directions in many areas severely eroding large areas of desert habitat. The phenomenon of multiple braided tracks is especially notable. The area of habitat affected by this is probably very large. Movements and training activities of the military also cause considerable damage to habitats and need some regulation.

Hunting: Hunting and falconry, mostly by Gulf Arabs, has had a profound impact on all wildlife in the region. Gazelles and Houbara Bustard have been impacted worst, as they are the main quarries for these hunters. Off-road vehicular use by hunters, but also the military and Bedouins, contributes to the degradation of natural habitats.

Bird hunting is widespread along the North Coast in the autumn and is pursued by local residents as a traditional activity. Quail, songbirds and falcons are caught using a variety of techniques, including traps, nets and air rifles. It is estimated that several million birds are caught annually, including small numbers of Corncrakes; most for local consumption, but some birds (particularly quail) are sold for supplementary income. The numbers of falcons caught and sold for falconry is unknown. There is no management of hunting or enforcement of wildlife protection legislation.

Commercial wildlife collectors and traders usually depend on a network of local middlemen, who collect various species of reptiles and mammals. Middlemen buy any wildlife brought to them by other locals. Herders are the most likely to encounter and collect wildlife. Indeed, herders are responsible for collecting the great majority of Egyptian Tortoises (*Testudo kleinmanni*) (Baha El Din 1994). Herders are very familiar with wildlife behavior, habitats and most importantly tracks. The economic importance of wildlife collection is small, but herders (who are usually very poor) welcome the opportunity of making some extra money.

Quarrying: Throughout the North Coast, especially in the east there is intensive quarrying and stone collection for building materials to be used in the construction of tourist resorts and roads. The calcareous ridge running parallel to the coast at Alamein and Burg El Arab has been completely destroyed for brick production. Quarrying is transforming the natural landscapes and destroying habitats for fauna and flora. The stone collection negatively impacts natural habitats, particularly where bulldozers have been used to rip the land to allow more stone collection.

Pollution and solid waste disposal: Solid waste, particularly plastic bags are one of the main sources of environmental pollution and could become more severe as development and population increases in the area. In addition to being unsightly, local farmers indicate that sheep regularly die after ingesting plastic bags. The Egyptian coastline is also badly polluted with crude oil and plastic rubbish that is washed ashore, and waste materials from quarrying and construction are dumped in an *ad hoc* fashion in the desert.

MITIGATION MEASURES

Protected areas are effective in achieving measurable and specific biodiversity objectives at specific localities. However, many of the biodiversity issues are of a crosscutting nature and are widespread throughout the landscape.

Many issues can be addressed by embedding biodiversity interventions within core MRMP-II activities, including a vigorous environmental awareness and public education strategy.

Objectives of proposed mitigation measures

- Establish protected areas as an effective land use planning and management tool in NWCZ,
- Stop then reverse biodiversity erosion in the NWCZ using integrated biodiversity conservation and community participation within development activities of MRMP-II, including improved land management practices to improve carbon sequestration,
- Provide formal and informal environmental education in schools and protected area centers and Sub-Regional Support Centers;
- Optimise economic return to local communities from native biodiversity resources through sustainable use options.
- Empower a coordination mechanism for integrated ecosystem management that includes all stakeholder to execute rigorous environmental impact assessment to weed out environmentally destructive activities and reject or amend them for the benefit of the environment.

Appendix 1: The rangeland program in MRMP will continue its rangeland fodder shrub work on developing species from the following list.

Plants proposed for continued development in the NWCZ of Egypt	Use (1)	Soil (2)	Zone (3)
• <i>Periploca angustifolia</i> (= <i>P. laevigata</i>) found locally.	G	sil/sha	I-III
• <i>Atriplex nummularia</i> , cultivar 'Von Holdt' from South Africa.	CC/G	sil/sal	I-II
• <i>Atriplex lentiformis</i> held at ARC, El Qasr Station.	CC/G	sil/sal	I-II
• <i>Atriplex halimus</i> subsp. <i>halimus</i> , cultivar 'INRF 70 100', Tunisia, from Spain.	CC/G	sil/sal	I-II
• <i>Atriplex halimus</i> subsp. <i>schweinfurthii</i> -- local sources of highly palatable individuals.	G	sil/sal	I-III
• <i>Colutea istria</i> from Sinai, Jordan and Syria.	CC/G	sil	I-II
• <i>Opuntia ficus-indica</i> f. <i>inermis</i> from Wadis Abu Lahou and Bahariya.	CC	san	I (II)
• <i>Atriplex canescens</i> cultivar 'Marana' from the USA.	G	sil/sal	I-II
• <i>Cassia sturtii</i> found on ARC, El Qasr Station from Australia.	CC	sil/san	I-II
• <i>Atriplex canescens linearis</i>	G	san/sal	I-III
• <i>Acacia salicina</i>	CC	sil/sha	I-III
• <i>Acacia cyanophylla</i>	CC	san	I-II
• <i>Moricandia nitens</i> (reseeding) Locally found in Wadi Saloufa (km 50 from Marsa Matrouh on the Alexandria road)	G	sil/sal	I-III
• <i>Atriplex glauca</i> Locally found in Wadi Medouar (reseeding)	G	sil/sal	I-III
• <i>Atriplex leucoclada</i> (reseeding)	G	sil/sal/sha	I-III
• <i>Salsola vermiculata</i> (Syria); (reseeding)	G	sil/sal/sha	I-III
• <i>Artemisia herba alba</i> Locally found at 12 km east of Sidi Barrani, (or km 111 west of Marsa Matrouh), north side of the highway in front of Sidi Othman El Fitouri's tomb, Lat. 31° 02' 25" N., Long. 26° 47'32"E, Alt. 20 m; area ca. 50 feddans; (reseeding).		sil/sha	I-III
Subject to experimental confirmation:			
• <i>Rhamnus oleoides</i> 'Saloufa'; Locally available in major wadis and on cliffs, e.g. Wadi Saloufa at km 50 on the Marsa Matrouh - Alexandria road. Excellent browse, extremely drought-tolerant in the whole of North Africa to the very edge of the desert, similar to <i>Periploca angustifolia</i> ('Hallaba').	G	sil/sha	I-III
• <i>Chamaecytisus mollis</i> (Morocco)	CC	sil/sha/san	I
• <i>Myoporum serratum</i> Local (New Zealand)	CC	sil/san/sal	I-II
• <i>Agave americana</i> (Mexico)	CC	sil/sha/san	I-II
• <i>Portulacaria afra</i> (South Africa)	G	sil/sal	I
(1) Use: Grazing (G); Cut and Carry (CC).			
(2) Soils: Saline (sal); Silty (sil); Sandy (san); Shallow (sha).			
(3) Zone: Coastal plain (I); S. coastal plain, cliffs and plateau depressions (II); depressions in the S. plateau (III).			

Appendix 2. Reptiles and amphibian of the NWCZ.

English name	Latin name	Local status
Green Toad	<i>Bufo viridis</i>	Present
Tripoli Gecko	<i>Tropicolotes tripolitanus</i>	Probable
Gecko	<i>Stenodactylus mauritanicus</i>	Present
Moorish Gecko	<i>Tarentola mauritanica</i>	Common
Turkish Gecko	<i>Hemidactylus turcicus</i>	Common
Changeable Agama	<i>Trapelus mutabilis</i>	Present
Bosc's Lizard	<i>Acanthodactylus boskianus</i>	Common
Nedua Lizard	<i>Acanthodactylus scutellatus</i>	Common
Egyptian Leopard Lizard	<i>Acanthodactylus pardalis</i>	Rare
Small-spotted Lizard	<i>Mesalina guttulata</i>	Common
Oliver's Lizard	<i>Mesalina olivieri</i>	Common
Red-spotted Lizard	<i>Mesalina rubropunctata</i>	Present
Snake-eyed Lizard	<i>Ophisops elegans</i>	Uncommon
Desert Monitor	<i>Varanus griseus</i>	Present
Common Chamaeleon	<i>Chamaeleo chamaeleon</i>	Common
Ocellated Skink	<i>Chalcides ocellatus</i>	Common
Audouin's Skink	<i>Sphenops sepsoides</i>	Common
Gold Skink	<i>Eumeces schneiderii</i>	Present
Common Skink	<i>Scincus scincus</i>	Probable
Snake	<i>Leptotyphlops macrorhynchus</i>	Probable
Snake	<i>Coluber rogersi</i>	Present
Algerian Whip Snake	<i>Coluber algirus</i>	Present
Diademed Sand Snake	<i>Lytorhynchus diadema</i>	Common
Snake	<i>Macroprotodon cucullatus</i>	Present
Hooded Snake	<i>Malpolon moilensis</i>	Present
Montpelier's Snake	<i>Malpolon monspessulanus</i>	Present
Sand Snake	<i>Psammophis schokari</i>	Common
Sand Boa	<i>Eryx jaculus</i>	Rare
Egyptian Cobra	<i>Naja haja</i>	Present
Clliford's Snake	<i>Spalerosophis diadema</i>	Present
Cat Snake	<i>Telescopus dhara</i>	Probable
Horned Viper	<i>Cerastes cerastes</i>	Common
Sand Viper	<i>Cerastes vipera</i>	Common
Egyptian Tortoise	<i>Testudo kleinmanni</i>	Extinct?
Loggerhead Turtle	<i>Caretta caretta</i>	Present

Appendix 3. Birds of the NWCZ

Status codes are as follows: PV= passage visitor, WV= winter visitor, RB= resident breeder, MB= migrant breeder, CB= casual breeder, AV= accidental visitor; “?” denotes some uncertainty about status.

English name	Latin name	Local status
Ostrich	<i>Struthio camelus</i>	Extinct
Mediterranean Sheerwater	<i>Puffinus yelkouan</i>	PV
Cory's Sheerwater	<i>Calonectris diomedea</i>	PV
Cormorant	<i>Phalacrocorax carbo</i>	PV WV
Shag	<i>Phalacrocorax aristotelis</i>	RB?
Great-crested Grebe	<i>Podiceps cristatus</i>	WV
Black-necked Grebe	<i>Podiceps nigricollis</i>	WV
Eurasian Wigeon	<i>Anas penelope</i>	PV
Green-winged Teal	<i>Anas crecca</i>	PV
Mallard	<i>Anas platyrhynchos</i>	PV
Northern Pintail	<i>Anas acuta</i>	PV
Garganey	<i>Anas querquedula</i>	PV
Northern Shoveler	<i>Anas clypeata</i>	PV
Greater Flamingo	<i>Phoenicopterus ruber</i>	PV
Little Egret	<i>Egretta garzetta</i>	PV
Grey Heron	<i>Ardea cinerea</i>	PV
Purple Heron	<i>Ardea purpurea</i>	PV
Cattle Egret	<i>Bubulcus ibis</i>	PV
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	PV
Little Bittern	<i>Ixobrychus minutus</i>	PV ?
Glossy Ibis	<i>Plegadis falcinellus</i>	PV?
White Stork	<i>Ciconia ciconia</i>	PV?
Osprey	<i>Pandion haliaetus</i>	PV
European Honey-buzzard	<i>Pernis apivorus</i>	PV
Black Kite	<i>Milvus migrans</i>	PV
Western Marsh-Harrier	<i>Circus aeruginosus</i>	PV
Eurasian Sparrowhawk	<i>Accipiter nisus</i>	PV
Common Buzzard	<i>Buteo buteo</i>	PV
Long-legged Buzzard	<i>Buteo rufinus</i>	WV?
Eurasian Kestrel	<i>Falco tinnunculus</i>	RB PV WV
Red-footed Falcon	<i>Falco vespertinus</i>	PV
Merlin	<i>Falco columbarius</i>	WV
Eurasian Hobby	<i>Falco subbuteo</i>	PV
Lanner Falcon	<i>Falco biarmicus</i>	RB?
Peregrine Falcon	<i>Falco peregrinus</i>	PV
Barbary Partridge	<i>Alectoris barbara</i>	Extinct
Common Quail	<i>Coturnix coturnix</i>	PV
Water Rail	<i>Rallus aquaticus</i>	PV
Corn Crane	<i>Crex crex</i>	PV
Spotted Crane	<i>Porzana porzana</i>	PV
Common Moorhen	<i>Gallinula chloropus</i>	PV
Eurasian Coot	<i>Fulica atra</i>	PV
Common Crane	<i>Grus grus</i>	PV
Houbara Bustard	<i>Chlamydotis undulata</i>	Extinct?
Common Snipe	<i>Gallinago gallinago</i>	PV
Eurasian Curlew	<i>Numenius arquata</i>	WV
Spotted Redshank	<i>Tringa erythropus</i>	PV
Common Redshank	<i>Tringa totanus</i>	WV
Marsh Sandpiper	<i>Tringa stagnatilis</i>	PV
Common Greenshank	<i>Tringa nebularia</i>	PV
Green Sandpiper	<i>Tringa ochropus</i>	PV
Wood Sandpiper	<i>Tringa glareola</i>	PV

Common Sandpiper	<i>Actitis hypoleucos</i>	PV
Little Stint	<i>Calidris minuta</i>	PV WV
Dunlin	<i>Calidris alpina</i>	PV WV?
Curlew Sandpiper	<i>Calidris ferruginea</i>	PV
Ruff	<i>Philomachus pugnax</i>	PV
Eurasian Thick-knee	<i>Burhinus oediconemus</i>	RB
Black-winged Stilt	<i>Himantopus himantopus</i>	PV
Pied Avocet	<i>Recurvirostra avosetta</i>	PV
Cream-colored Courser	<i>Cursorius cursor</i>	PV RB
Collared Pratincole	<i>Glareola pratincola</i>	PV
Black-bellied Plover	<i>Pluvialis squatarola</i>	PV WV?
Common Ringed Plover	<i>Charadrius hiaticula</i>	PV
Little Ringed Plover	<i>Charadrius dubius</i>	PV
Kentish Plover	<i>Charadrius alexandrinus</i>	RB PV WV
Eurasian Dotterel	<i>Charadrius morinellus</i>	WV
Northern Lapwing	<i>Vanellus vanellus</i>	PV
Lesser Black-backed Gull	<i>Larus fuscus</i>	PV WV
Black-headed Gull	<i>Larus ridibundus</i>	PV
Audouin's Gull	<i>Larus audouinii</i>	WV RB?
Yellow-legged Gull	<i>Larus cachinnans</i>	WV RB?
Slender-billed Gull	<i>Larus genei</i>	PV WV
Whiskered Tern	<i>Chlidonias hybridus</i>	PV
White-winged Tern	<i>Chlidonias leucopterus</i>	PV
Black Tern	<i>Chlidonias niger</i>	PV
Little Tern	<i>Sterna albifrons</i>	RB?
Crowned Sandgrouse	<i>Pterocles coronatus</i>	RB?
Rock Dove	<i>Columba livia</i>	RB
European Turtle-Dove	<i>Streptopelia turtur</i>	PV
Laughing Dove	<i>Streptopelia senegalensis</i>	RB
Common Cuckoo	<i>Cuculus canorus</i>	PV
Pharaoh Eagle-Owl	<i>Bubo ascalaphus</i>	RB?
Little Owl	<i>Athene noctua</i>	RB
Short-eared Owl	<i>Asio flammeus</i>	PV
Eurasian Nightjar	<i>Caprimulgus europaeus</i>	PV
Common Swift	<i>Apus apus</i>	PV
Pallid Swift	<i>Apus pallidus</i>	PV RB?
Common Kingfisher	<i>Alcedo atthis</i>	PV
Blue-cheeked Bee-eater	<i>Merops persicus</i>	PV
European Bee-eater	<i>Merops apiaster</i>	PV
European Roller	<i>Coracias garrulus</i>	PV
Eurasian Hoopoe	<i>Upupa epops</i>	PV RB
Eurasian Wryneck	<i>Jynx torquilla</i>	PV
Brown-necked Raven	<i>Corvus ruficollis</i>	RB
Eurasian Golden-Oriole	<i>Oriolus oriolus</i>	PV
Red-backed Shrike	<i>Lanius collurio</i>	PV
Lesser Grey Shrike	<i>Lanius minor</i>	PV
Southern Grey Shrike	<i>Lanius meridionalis</i>	RB
Woodchat Shrike	<i>Lanius senator</i>	PV
Rock-Thrush	<i>Monticola saxatilis</i>	PV
Blue Rock Thrush	<i>Monticola solitarius</i>	WV
Eurasian Blackbird	<i>Turdus merula</i>	PV WV
Song Thrush	<i>Turdus philomelos</i>	PV WV
Fielfare	<i>Turdus</i>	WV
Spotted Flycatcher	<i>Muscicapa striata</i>	PV
European Pied Flycatcher	<i>Ficedula hypoleuca</i>	PV
Collared Flycatcher	<i>Ficedula albicollis</i>	PV
European Robin	<i>Erithacus rubecula</i>	WV
Common Nightingale	<i>Luscinia megarhynchos</i>	PV
Bluethroat	<i>Luscinia svecica</i>	PV WV?

Rufous Bush-Robin	<i>Cercotrichas galactotes</i>	PV RB
Black Redstart	<i>Phoenicurus ochruros</i>	WV
Common Redstart	<i>Phoenicurus phoenicurus</i>	PV
Whinchat	<i>Saxicola rubetra</i>	PV
Stonechat	<i>Saxicola torquata</i>	WV
White-tailed Wheatear	<i>Oenanthe leucopyga</i>	RB
Northern Wheatear	<i>Oenanthe oenanthe</i>	PV
Mourning Wheatear	<i>Oenanthe lugens</i>	RB?
Black-eared Wheatear	<i>Oenanthe hispanica</i>	PV
Desert Wheatear	<i>Oenanthe deserti</i>	WV RB
Isabelline Wheatear	<i>Oenanthe isabellina</i>	WV
Red-rumped Wheatear	<i>Oenanthe moesta</i>	FB?
Sand Martin	<i>Riparia riparia</i>	PV
Eurasian Crag-Martin	<i>Hirundo rupestris</i>	PV
Barn Swallow	<i>Hirundo rustica</i>	PV
Red-rumped Swallow	<i>Hirundo daurica</i>	PV
Common House-Martin	<i>Delichon urbica</i>	PV
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>	PV WV?
Eurasian Reed-Warbler	<i>Acrocephalus scirpaceus</i>	PV
Marsh Warbler	<i>Acrocephalus palustris</i>	PV
Great Reed-Warbler	<i>Acrocephalus arundinaceus</i>	PV
Olivaceous Warbler	<i>Hippolais pallida</i>	PV
Willow Warbler	<i>Phylloscopus trochilus</i>	PV
Common Chiffchaff	<i>Phylloscopus collybita</i>	WV
Bonelli's Warbler	<i>Phylloscopus bonelli</i>	PV
Wood Warbler	<i>Phylloscopus sibilatrix</i>	PV
Blackcap	<i>Sylvia atricapilla</i>	PV
Greater Whitethroat	<i>Sylvia communis</i>	PV
Lesser Whitethroat	<i>Sylvia curruca</i>	PV
Rueppell's Warbler	<i>Sylvia rueppelli</i>	PV
Sardinian Warbler	<i>Sylvia mela nocephala</i>	WV
Subalpine Warbler	<i>Sylvia cantillans</i>	PV
Spectacled Warbler	<i>Sylvia conspicillata</i>	WV
Marmora's Warbler	<i>Sylvia marmara</i>	AV
Bar-tailed Lark	<i>Ammomanes cincturus</i>	RB
Greater Hoopoe-Lark	<i>Alaemon alaudipes</i>	RB
Thick-billed Lark	<i>Ramphocoris clotbey</i>	RB?
Bimaculated Lark	<i>Melanocorypha bimaculata</i>	PV?
Greater Short-toed Lark	<i>Calandrella brachydactyla</i>	PV
Lesser Short-toed Lark	<i>Calandrella rufescens</i>	RB
Dupont's Lark	<i>Chersophilus duponti</i>	RB
Crested Lark	<i>Galerida cristata</i>	RB
Thekla Lark	<i>Galerida theklae</i>	RB
Sky Lark	<i>Alauda arvensis</i>	WV
Temminck's Lark	<i>Eremophila bilopha</i>	RB
House Sparrow	<i>Passer domesticus</i>	RB
Spanish Sparrow	<i>Passer hispaniolensis</i>	PV WV
White Wagtail	<i>Motacilla alba</i>	PV WV
Yellow Wagtail	<i>Motacilla flava</i>	PV
Gray Wagtail	<i>Motacilla cinerea</i>	PV
Tawny Pipit	<i>Anthus campestris</i>	PV
Tree Pipit	<i>Anthus trivialis</i>	PV
Meadow Pipit	<i>Anthus pratensis</i>	WV
Red-throated Pipit	<i>Anthus cervinus</i>	PV WV
Water Pipit	<i>Anthus spinoletta</i>	WV
Eurasian Linnet	<i>Carduelis cannabina</i>	WV
Ortolan Bunting	<i>Emberiza hortulana</i>	PV?
Corn Bunting	<i>Emberiza calandra</i>	WV

Appendix 3. Mammals of the NWCZ

English name	Latin name	Local status
Arabian Horseshoe Bat	<i>Rhinolophus clivosus</i>	Present
Kuhl's Pipistrelle	<i>Pipistrellus kuhlii</i>	Present
Long-eared Hedgehog	<i>Hemiechinus auritus</i>	Common
Desert Hedgehog	<i>Paraechinus aethiopicus</i>	Uncommon
Lesser White-toothed Shrew	<i>Crocidura suaveolens</i>	Present
Cape Hare	<i>Lepus capensis</i>	Common
Anderson's Gerbil	<i>Gerbillus andersoni</i>	Common
Lesser Gerbil	<i>Gerbillus gerbillus</i>	Common
North African Gerbil	<i>Gerbillus campestris</i>	Common
Simon's Gerbil	<i>Gerbillus simoni</i>	Present
Charming Gerbil	<i>Gerbillus amoenus</i>	Present
Henley's Gerbil	<i>Gerbillus henleyi</i>	Common
Libyan Jird	<i>Meriones libycus</i>	Common
Shaw's Jird	<i>Meriones shawi</i>	Common
Fat-tailed Jird	<i>Pachyuromys duprasi</i>	Uncommon
Fat Sand Rat	<i>Psammomys obesus</i>	Common
Mole Rat	<i>Spalax(ehrenbergi)</i>	Rare
Black Rat	<i>Rattus rattus</i>	Common
House Mouse	<i>Mus musculus</i>	Common
Garden Dormouse	<i>Eliomys quercinus</i>	Uncommon
Lesser Jerboa	<i>Jaculus jaculus</i>	Common
Greater Jerboa	<i>Jaculus orientalis</i>	Uncommon
Four-toed Jerboa	<i>Allactaga tetradactyla</i>	Rare
Crested Porcupine	<i>Hystrix cristata</i>	Extinct
Jackal	<i>Canis aureus</i>	Uncommon
Red Fox	<i>Vulpes vulpes</i>	Common
Striped Weasel	<i>Poecilictis libyca</i>	Rare
Striped Hyaena	<i>Hyaena hyaena</i>	Extinct?
Wild Cat	<i>Felis sylvestrus</i>	Present?
Cheetah	<i>Acinonyx jubatus</i>	Extinct
Mediterranean Monk Seal	<i>Monachus monachus</i>	Extinct?
Dorcas Gazelle	<i>Gazella dorcas</i>	Rare
Scimitar Horned Oryx	<i>Oryx damah</i>	Extinct
Addax	<i>Addax nasomaculatus</i>	Extinct

Appendix 4. Globally and nationally threatened vertebrate fauna

SPECIES	GLOBAL STATUS (IUCN 2000)	NATIONAL STATUS
Fish		
<i>Aphanius fasciatus</i>	DD	uncommon
Reptiles		
<i>Acanthodactylus pardalis</i>	not listed	VU
<i>Varanus griseus</i>	not listed	LR
<i>Eryx jaculus</i>	not listed	VU
<i>Testudo kleinmanni</i>	EN	CR
<i>Chelonia mydas</i>	EN	EN
<i>Caretta caretta</i>	VU	EN
Birds		
<i>Falco naumanni</i>	VU	VU
<i>Chlamydotis undulata</i>	VU	EN
<i>Crex crex</i>	VU	VU
<i>Oenanthe moesta</i>	not listed	EN
Mammals		
<i>Eliomys melarnurus</i>	LR	LR
<i>Jaculus orientalis</i>	LR	VU
<i>Aleactaga tetradactyla</i>	EN	CR
<i>Hystrix cristata</i>	LR/nt	EX ?
<i>Acinonyx jubatus</i>	EN	EX
<i>Monachus monachus</i>	CR	EX ?
<i>Gazella dorcas</i>	LR	EX
<i>Oryx dammah</i>	CR	EX
<i>Addax nasomaculatus</i>	EN	EX

Threat status based on IUCN criteria according to IUCN (2000) Red Data Book: EX= Extinct, CR= Critically Endangered, EN= Endangered, VU= Vulnerable, LR= Lower Risk, DD= Data Deficient, NE= Not Evaluated. ? = occurrence not certain in NWCZ.

Appendix 5: Egyptian Law

Law 102/1983 Concerning Natural Protected Areas

In the name of the People

The President of the Republic

The People's Assembly decreed the law whose text follows, and we have issued it:

(First article)

In implementing the provisions of this law, a Natural Protected Area is defined as any area of land, coastal or inland waters distinguished by what it contains of living organisms, plants, animals, fishes, or natural features of cultural, scientific, touristic or aesthetic value; which is delineated by a Prime Ministerial Decree issued upon a proposal from the Egyptian Environmental Affairs Agency of the Cabinet of Ministers.

(Second article)

It is forbidden to undertake actions, activities or procedures; which would lead to the destruction, damage or degrade the natural environment; or harm terrestrial, marine or plant life; or detract from its aesthetic quality in a Protected Area.

It is specifically prohibited to undertake the following:

- Hunting, transporting, killing or disturbing living terrestrial and marine organisms, or carrying out activities, which lead to their extermination.
- Hunting, removing or transporting any living organisms or organic material such as shells, corals, rocks or soil for any purpose.
- Damaging or transporting plants found in a Protected Area.
- Damaging or destroying geographic or geologic formations, or areas considered as habitats for animals and plants, or for their reproduction.
- Introducing foreign species into Protected Areas.
- Polluting the soil, water or air of a Protected Areas in any manner.

It is also prohibited to erect buildings or structures, or to construct roads, or operate vehicles, or practice any agricultural, industrial or commercial activities in a Protected Area; without the permission of the concerned administrative body, according to conditions, rules and procedures to be specified by a Prime Ministerial Decree.

(Third article)

It is forbidden to practice any activities or under take actions or experiments in areas surrounding a Protected Area, which are delineated in a decree by the concerned Minister, upon a proposal from the Egyptian Environmental Affairs Agency of the Cabinet of Ministers, which would affect the environment of a Protected Area or the natural processes in it, without the permission of the concerned administrative body.

(Fourth article)

The administrative body, to be specified by a Prime Ministerial Decree, is mandated to implement the provisions of this law and its executive decrees, with the objective of conserving Protected Areas and protecting them. The mentioned body is empowered to establish branches in Governorates where Protected Areas are located. These would be concerned with the following:

- Preparing programs and studies necessary for the development of the Natural Protected Area.
- Monitoring environmental phenomena, surveying the terrestrial and marine organisms in the Protected Area and establishing an archive for each Protected Area.
- Managing and coordinating activities related to the Protected Area.
- Informing and educating the public about the objectives and purposes of establishing Protected Areas.
- Exchanging information and experiences with countries and international organizations in this field.
- Managing the moneys of the fund referred to in the sixth article.

(Fifth article)

Legally declared societies concerned with environmental protection are permitted to seek the concerned administrative and judicial bodies for the implementation of the provisions of the laws and decrees concerning to the protection of Protected Areas.

(Sixth article)

A special fund is to be established to receive moneys, grants, donations to the Protected Areas and entrance fees, if any; as well as, the revenue from any fines collected as a result of the implementation of the provisions of this law. All these funds will be assigned for the following purposes.

- *Subsidizing the budget of the bodies implementing the provisions of this law.*
- Contributing to the improvement of the environment in Protected Areas.
- Conducting the studies and surveys necessary in this field.
- Monetary rewards for those informing about and apprehending violators of the provisions of the law.

(Seventh article)

Unless, otherwise a stronger penalty is specified by another law, any person violating the provisions of the second and third articles of this law and its executive decrees, is subject to a fine of no less than LE 500 and not more than LE 5,000, and or imprisonment for a duration of not more than one year. Recurrent offenders will be fined no less than LE 3,000 and not more than LE 10,000, and or a prison term of not less than one year. In addition, offenders will bear any cost incurred for the removal or reparations determined by the concerned administrative body or its branches in the Governorates, and equipment or tools used in the violation will be confiscated.

(Eighth article)

Fines and removal costs are collected through administrative means and instantly.

(Ninth article)

The employees of the concerned administrative body responsible for the implementation of the provisions of this law and its executive decrees, which are designated by a decree from the Minister of Justice, in agreement with the concerned Minister, will have law enforcement powers concerning crimes listed in this law.

(Tenth article)

All legislation contradicting the provisions of this law are hereby cancelled.

(Eleventh article)

This law is to be published in the official journal, and will be enacted three month after its publication date.

To be stamped by the state stamp, and implemented as one of its laws.

Issued at the Presidency on 21 Shawal 1403 (31 July 1983).

(Hosney Mubarak)

Appendix 6: Potential hotspots for community conservation of biodiversity and eco-tours

Site 1 - Wadi Saloufa

Wadi Saloufa is located 50 km E of Matrouh on the Alexandria road, about 2-3 km S of the highway: 31°07'44.2" N x 27°40'38. 0" E at 2-3 km E of the MRMP Ras El Hekma Section headquarters. The cliff of the escarpment between Wadi Saloufa and Wadi Abu Ghrouf (comprising Wadi Hashem) is rich in rare and useful species comprising more than 100 species. Among those are *Periploca angustifolia* (Hallaba), a fodder shrub to be included in the MRMP plantation program since 1999. *Rhamnus oleoides* (Saloufa), which gives its name to this wadi because of its unusual abundance in this site, is another rare fodder shrub heavily browsed and often reduced to a mat-shaped dwarf shrub. This species is present all along the northern edge of the Sahara from NW Egypt to S Morocco, either in cliffs or wadis. When undisturbed it is a small tree strongly resembling a wild olive. Among the other species in the site are:

<i>Oryzopsis miliacea</i> (Hamri)	<i>Anabasis oropediorum</i> (Ajrem)
<i>Moricandia nitens</i> (H'mim)	<i>Globularia arabica</i> (Z'rega)
<i>Convolvulus oleifolius</i>	<i>Phagnalon rupestre</i>
<i>Asparagus aphyllus</i>	<i>Artemisia herba alba</i> (Sheih)
<i>Atriplex glauca</i> (Qteifa)	<i>Salsola oppositifolia</i>
<i>Stipa parviflora</i> (Safsoof)	<i>Dactylis hispanica</i>
<i>Lotus creticus</i>	<i>Salvia verbenaca</i>
<i>Prasium majus</i>	<i>Micromeria nervosa</i>
<i>Ephedra aphylla</i>	<i>Varthemia candicans</i>

All these 18 species are indicative of high biodiversity; most constitute excellent grazing. Biodiversity at Wadi Saloufa is rated 4 on a 6-grade scale, in number of species present over a standard sampling area of 2,500 m² (0.6 feddan):

✓	0 = 0-10 species = Depleted/ Desertified
✓	1 = 10-20 species = Poor/Low
✓	2 = 20-40 species = Fair
✓	3 = 40-60 species = Medium
✓	4 = 60-80 species = Good/High
✓	5 = > 80 species = Outstanding

It is hereby suggested the area between the west bank of Wad Abu Ghrouf and the east bank of Wadi Saloufa be fenced. The fence could be placed 100-200 m south of the cliff, on the plateau, and 200-300 m north of the cliff in the foothill plain. The distance between Wadi Saloufa and Wadi Abu Ghrouf is approximately 5 km. The fence would have 3 horizontal barbed wires and 2 cross wires, of the type at present in use in the rangeland units of MRMP, which is quite adequate. The fence would thus have a length of 12 km and the area fenced would have 5 x 0.5 km = 2.5 km² or 250 ha.

Site 2 - Ras el Hekma

Ras El Hekma is a famed place in Egyptian ecology and range science since the 1950's when many range experiments and phytosociological surveys were carried out in this peninsula. Most of the land (white, deep coarse sand from the weathering of the oolitic Tyrrhenian calcareous sandstone outcrops) has now been planted to fig groves. Natural vegetation sites are now restricted to a few outcrops of the Tyrrhenian oolitic calcareous sandstone of no more than 1-5 hectares each (including one utilized by the army as a communication relay, which, being protected from grazing and trespassing, is interesting as a refuge for relict species, but of very difficult access to civilians). The flora of these hills includes some good range species such as *Echiochilon fruticosum*, (Kahla), *Lotus creticus*, *Helianthemum sessiliflorum*, *Stipa lagascae* and other psammophytes. The biodiversity score rates "Medium" (40-60 spp. per 2500 m²). I suggest that some 3 sandstone outcrop hills of about one hectare each be fenced, *i.e.* 1,200 m of fence for 3 ha.

Appendix 6 continued: Potential hotspots for community conservation

Site 3 - Wadi Ramla

The Wadi Ramla site is located some 10 km S-SW of Marsa Matrouh 31°14'12.6" N X 27°09'78.7" E, near a stone grinding mill about 300 m N of the highway by-pass road. Part of the site has been protected for a few years by the landowner so that a few tall "Hallaba" (*Periploca angustifolia*) (1-2 m high) are present on the site. The biodiversity score of the site rates 3 to 4 (Medium to Good). Because of its protection status some Hallaba seeds can already be collected there around the 1st and 2nd weeks of June, for multiplication purposes in nursery. An area of 1 km x 0.5 km along the cliff, on both sides of it should be fenced, as in Wadi Saloufa, *i.e.* 3 km of fence for an area of 50 ha.

Site 4 – Cleopatra - Omayed shoreline

It is recommended an area of littoral sand-dune with oolithic sandstone outcrops be fenced and protected between Cleopatra beach and the town of Omayed to the western outskirts of Marsa Matrouh, west of the oil refinery plant, perhaps near El Qasr between the ARC station and Cleopatra. The precise selection of the site will need careful investigation, before the area is totally 'developed' for the construction of summer sea resort houses or commercial undertakings. In terms of biodiversity the area scores 3 to 4. The selection of the site is urgent: before long all the area will be developed. It is furthermore recommended the area should stretch about 1km along the seaside and about 500-m in depth inland, in order to preserve the natural conditions of this special environment. This type of habitat is now almost completely urbanized - and spoiled - by the recent building of treeless summer resorts between Alexandria and El Alamein.

Site 5 - Wadi Magid

Wadi Magid is located about 20-25 km W-SW of Marsa Matrouh, between Wadi Medouar and Wadi Oum El Sheitan: 31° 18' 53.0" N x 27° 04' 57.7" E. It is recommended that an area of 50 ha (1 km x 0.5 km) be fenced along the cliff of the main wadi head. This case is otherwise similar to Wadi Ramla. The biodiversity rating scores 3.

Site 6 - Wadi Halj ed Dabba

This wadi is located 41 km W of Marsa Matrouh along the coastal road: 31° 26' 37.1" N x 26° 43' 24.4" E, along a feeder road to El Methany, on both sides of the cliff. This wadi is still very rich, rating 4 (Good) on the biodiversity scale; with 80 species including *Periploca angustifolia*, *Rhamnus oleoides* and *Hyparrhenia hirta*. It is recommended the two banks of the wadi be fenced from the wadi head to the foothill, *i.e.* approximately a 4 km fence.

Site 7 - Wadi Hallaba

This site is located at km 40 along the Siwa road on the second escarpment, about 5km west of the highway. This area, with a mean annual rainfall estimated slightly below 80 mm and a shallow soil, is rich in *Periploca angustifolia* shrubs, extremely browsed, and *Ephedra aphylla* (Alenda), also very grazed. In spite of the very arid conditions, the biodiversity factor rates 3 (Medium) on the evaluation scale. The area to be fenced should have 1 km x 0.5 km on the upper plateau along the cliff and foothill of the escarpment, in the zone of maximum Hallaba density, calling for a length of fencing of 3 km.

Appendix 6 continued: Potential hotspots for community conservation

Site 8 - *Artemisia herba alba* (Sheih) steppe

An area of some 20 ha of Sheih steppe is located about 12 km E of Sidi Barrani along the highway, on the northern side, in front of the tomb of Sidi Othman el Fitouri. The site rates 2-3 on the biodiversity scale (Fair to Medium). The Sheih site is protected from cultivation and intrusion by the landowner. This piece of Sheih steppe is the only remnant we found of the previous steppe, which in the late 1960s, still occupied some 12,500 ha S and E of Sidi Barrani and some 22,500 ha SW of Negeila, according to the FAO vegetation reconnaissance map (1970). All the rest has been cleared for barley cultivation. It is therefore important this relict be saved; it is also important for foundation of a seed production scheme for future range development/reseeding activities within the MRMP long-term program.

There may be other remnants left of the pristine Sheih steppe, but only the systematic mapping of the vegetation of the project area will determine where and how much is available so as to prepare a development plan.

Site 9 – Saloum

Along the highway, 10-15 km E of Saloum there are scattered populations of Hallaba, some *Ziziphus lotus* (Sidra) and probably some *Rhus tripartita* (Jdari). *Periploca* is sometimes protected from grazing inside large “Nebkas” or “Rhebadas” (Hillocks) by the very spiny Sidra and then may reach over 3 m in height and produce seeds, this phenomenon is known in ecology under the term of “nursing”. There are also in this area along the highway some heavily browsed individual shrubs of *Atriplex halimus* subsp. *schweinfurthii* within little browsed populations. These should be selected and cuttings taken for vegetative propagation, then multiplied in a nursery with the view of creating a seed orchard of highly palatable strains of “Qettaf”. Such a project would be of immense value for the MRMP range development program, as the local populations are well adapted, easy to establish (they actually “volunteer”), but, in general, of poor grazing value because of genetic drift and “counter-selection” towards more unpalatable types.

Appendix 7: NWCZ Medicinal Plants (Le Houérou 1998). In the table that follows each species recorded is qualified by a number of attributes distributed in 12 groups with codes for characterization.

- 1 & 2. Scientific name (Genus, species).
3. Botanical family.
1. Local vernacular names are, to a large part, taken from Vivi Täckholm, 1974; Le Floc'h, 1983; Boulos, 1983 and from Boulos and El Hadidi, 1984
5. Frequency status (common or rare).
6. Life span (annual, biannual, pauciennial or perennial).
7. Biological type (herb or forb, climber, shrub, tree).
8. Area of distribution in 5 parallel belts from the Mediterranean shore to some 150km inland, *i.e.* from a MAR belt of ca 150 mm to less than 25 mm.
9. Habitat (rangeland, cultivated fields, fallows, wasteland, wadis, runnels, cliffs).
10. Utilization (none, grazing, ornamental, handicraft, medicinal, fuel).
11. Grazing value on an evaluation scale: toxic, zero, and 1-5.
12. Biological, Ecological and other miscellaneous remarks:

Col (C) No.	Item	Code	Explanation of Code
5	Frequency status	CC	Very common
		C	Common
		FC	Fairly common
		FR	Fairly rare
		R	Rare
		RR	Very rare
		?	Dubious
		Rating results from Täckholm (1974)	
6 -	Zonal distribution	I	0 - 1 km from Mediterranean Shoreline
		II	1 - 10 km inland Steppe
		III	10 - 25 km inland Steppe
		IV	25 - 50 km inland Desert
		V	50 - 150 km inland Eremian zone
7	Biological type	C	Crassulescent (= Fleshy Halophyte)
		CH	Crassulescent (= Fleshy) herb
		Cl	Climber
		F	Fern
		Fr	Frutescent (= Herbaceous with a woody base)
		H	Herbaceous (Forb & Grass)
		Par	Parasite & Semi parasite
		S	Shrub
		CS	Crassulescent Shrub (= Fleshy Halophyte)
		DS	Dwarf shrub (h < 50 cm)
		HS	Tall shrub (h > 50 cm)
		TS	Trailing shrub
		Su	Succulent (= Fleshy glycophyte)
		T	Tree (h > 3 m)
8	Life span	A	Annual (= Therophyte)
		B	Biannual
		P	Perennial
		Sh	Short-lived perennial (= Pauciennial)
9	Habitat	Bra	Brackish water
		Can	Canals
		Cli	Cliffs
		Coa	Coastal (= Littoral)
		Con	Continental
		Cul	Cultigen, rainfed crops and fallows
		Des	Desert (MAR < 100 mm)
		Dne	Dunes
		Frw	Fresh (sweet) water

	Irr	Irrigated land
	Rge	Rangeland
	Roc	Rocks
	Run	Runnels
	Sea	Open sea water
	Sha	Shallow soils
	Snd	Sandy soils
	Slt	Salt marshes
	Ste	Steppe
	Wad	Wadis & Topographic Depression
	Wel	Wells
	Wet	Wetland
	Wld	Wasteland
10	Utilization	
	Cro	Crop
	Fen	Fencing (live)
	Fsh	Fodder shrub
	Fue	Fuel wood
	Gra	Grazing
	Han	Handicraft
	Med	Medicinal & Herbal
	Non	None
	Orn	Ornamental
	Sbi	Sand binding
	Unk	Unknown
	Veg	Vegetable, salad, fruit, human food
	Wbr	Windbreak
11	Grazing Value	
	0	No value
	1	Poor
	2	Mediocre
	3	Fair
	4	Good
	5	Excellent (Fodder crops, incl. Shrubs)
12	Remarks	
	Cha	Chasmophyte (cracks, crevices, diaclases)
	End	Endemic (Restricted to Marmarica)
	Ere	Eremophyte (= desert plant)
	Fod	Fodder (actual or potential)
	Gly	Glycophyte (= non tolerant to salinity in halophytic groups)
	Hal	Halophyte (salt - tolerant)
	Hyd	Hydrophyte (living in free water)
	Hyg	Hygrophyte (living in wet soils)
	Nat	Naturalized xenophyte
	Nit	Nitratophyte (on Nitrates -rich soils)
	Pel	Pelophyte (on clay soils)
	Phr	Phreatophyte (on water table)
	Psa	Psammophyte (on sandy soils)
	Sil	Limonophyte (on silty/loamy soils)
	SO4	Gypsophyte (on gypsic soils)
	Sum	Summer growing
	Tac	Tachytherophyte very short-lived annual (= Aacheb = Ghizzu)
	Wee	Weed (in range or crop)

C1 Genus	C2 Species	C3 Family	C4 Vern.name	C5 Freq.	C6 Distr.	C7 Biotype	C8 Life	C9 Habitat	C10 Utiliz.	C11 Graz.	C12 Remarks
Ephedra	Alata	Ephedraceae	Ald, Alenda	R	III-IV	HS	P	Des Snd	Gra Med	1/2	Ere
Ephedra	Aphylla	Ephedraceae	Algam, Nada	FC	I-II	HS	P	Cli Run Wad	Gra Med	3	Cha
Urtica	Urens	Urticaceae	Qorreis, Hurreq	FC	I-II	H	A	Wld	Med	0	Nit
Urtica	Pilulifera	Urticaceae	Qorreis	FC	I-II	H	A	Wld	Med	0	Nit
Parietaria	Judaica	Urticaceae	Widein	FC	I-II	H	A	Wld	Med	0	Nit
Rumex	Vesicarius	Polygonaceae	Hambeit, Hummad	FC	I-III	H	A	Rge Ste	Gra Veg Med	0	Nit
Portulaca	Oleracea	Portulacaceae	Rigla, Rashad	CC	I-II	CH	A	Wld	Veg Med	2	Nit
Vaccaria	Pyramidata	Caryophyllaceae	Fool el Arab	C	I-II	H	A	Cul	Med	0	Wee
Stellaria	Media	Caryophyllaceae	Qizzaza, Bughlan	R	I-II	CH	A	Wld Cul	Med	0	Nit
Spergularia	Maritima	Caryophyllaceae	Meshit	R	I-III	CH	P	Slt	Gra Med	3/4	Nit Wee
Spergularia	Rubra	Caryophyllaceae	Esbba Hamra	R	I-II	H	A	Cul	Non Med	0	Hal Wee
Herniaria	Hirsute	Caryophyllaceae	Mouker, Makir	FC	I-III	H	A	Cul	Med	2	Wee
Herniaria	Cinerea	Caryophyllaceae	-	FC	I-II	H	A	Rge Sha	Med	0	Wee
Paronychia	Arabica	Caryophyllaceae	Ramram	C	I-III	H	A B	Snd Ste Ste	Gra Med	1/2	Psa
Paronychia	Capitata	Caryophyllaceae	-	R	I-III	H	P	Snd Ste Ste	Gra Med	1/2	Psa
Chenopodium	Ambrosoides	Chenopodiaceae	Nitna, Natna	CC	I-II	H	A	Wld	Med	0	Nit Wee
Atriplex	halimus schweinfurthii	Chenopodiaceae	Qattaf	CC	I-IV	CS	P	Rge Slt	Gra Med Fsh	3	Hal
Haloxylon	Scoparium	Chenopodiaceae	Remeth	CC	I-IV	DS	P	Rge Ste	Gra Fue Med	1	Gly Sil
Cornulaca	Monacantha	Amaranthaceae	Haad	FC	III-IV	CS	P	Snd Des	Gra Med	3	Psa Gly
Adonis	Dentata	Ranunculaceae	Naab el Gemel	CC	I-III	H	A	Cul Wld Rge	Gra Med	1	Psa Tac
Nymphaea	Lotus	Nymphaeaceae	Bashneen abiod	C	I-II	H	P	Frw	Orn Med	0	Hyd
Papaver	Rhoeas	Papaveraceae	Ben Na'am	CC	I-II	H	A	Cul	Med	0	Wee
Papaver	Dubium	Papaveraceae	-	R	I-II	H	A	Cul	Med	0	Wee
Fumaria	Parviflora	Fumariaceae	Shahatrag, H. al Sabyan	CC	I-II	H	A	Cul	Med	0	Wee
Fumaria	Officinalis	Fumariaceae	-	RR	I-II	H	A	Cul	Med	0	Wee
Fumaria	Judaica	Fumariaceae	-	R	I-II	H	A	Cul	Med	0	Wee
Capparis	spinosa aegyptia	Capparidaceae	Kabbar	C	III-V	TS	P	Cli Roc Wad	Orn Med Veg	0	Ere
Capparis	Rupestris	Capparidaceae	Kabbar	CC	I-III	TS	P	Cli Roc Wad	Orn Med	0	Cha
Cleome	Amblyocarpa	Cleomaceae	Zeita, Magnuna	CC	I-III	H	A	Cul Wld Ste	Med	Tox	Psa Wee
Nasturtiopsis	Coronopifolia	Cruciferae	-	R	I-III	H	A	Rge Wld	Med	0	S04 Sil
Nasturtium	Officinale	Cruciferae	Qurrat el Ayn	C	I-II	H	P	Frw Can	Veg Med	2/3	Hyd
Anastatica	Hierochuntica	Cruciferae	Keff Maryam, Hidd M.	CC	III-V	H	A	Des Ste	Med	0	Tac Ere Pel

Lobularia	Marítima	Cruciferae	Aguerma	FR	I	H	A	Coa Dne	Med	0	Psa
Brassica	Nigra	Cruciferae	Libsaan, Khardal Abiad	CC	I-II	H	A	Irr	Med	0	Wee
Sinapis	Alba	Cruciferae	Khardal	R	I-II	H	A	Irr	Med	0	Wee
Sinapis	Arvensis	Cruciferae	Khardal	CC	I-II	H	A	Irr	Med	0	Wee
Eruca	Sativa	Cruciferae	Gergeer, Gargir	R	I-III	H	A	Cul Wld Ste	Gra Med	2/3	Wee
Zilla	spinosa biparmata	Cruciferae	Zilla, Shebrom, Shebroq	C	III-V	F	P	Des Wad	Gra Med	3	Ere End
Capsella	bursa-pastoris	Cruciferae	Kes el Raï	CC	I-II	H	A	Wld	Med	0	Nit
Reseda	Lutea	Resedaceae	Weyba	RR	I-III	H	A	Rge Cul	Gra Med	1	Wee
Anagyris	Foetida	Leguminosae	Garood, Karroub el Khinzir	RR	I-II	HS	P	Rge Cul	Med	Tox	Sil
Retama	Raetam	Leguminosae	R'tam	FR	I-V	HS	P	Rge Wad	Gra Fue Med Sbi	1/2	Psa
Melilotus	Indicus	Leguminosae	Handekoeq	CC	I-II	H	A	Rge Cul	Med	0	Wee Hal
Anthyllis	Vulneraria	Leguminosae	-	RR	I-II	H	A P	Cul Rge Ste	Gra Med	2/3	Wee
Alhagi	Graecorum	Leguminosae	Agool, Aqul	FC	III-V	Fr	P	Wld Slt	Gra Med	1	Hal Phr
Vicia	Sativa	Leguminosae	Hedéis	CC	I-II	H	A B	Cul	Cro Med	5	Fod
Acacia	Raddiana	Leguminosae	Talh	R	III-V	T HS	P	Des Wad	Gra Med	3	Phr Ere
Acacia	Ehrenbergiana	Leguminosae	Seyal	RR	III-V	T HS	P	Des Wad	Gra Med	1	Phr Ere
Erodium	Cicutarium	Geraniaceae	Dahmyea abu Ghazal	FC	I-II	H	A	Rge Cul	Gra Med	2	Wee
Ricinus	Communis	Euphorbiaceae	Kreroua, Kherwa	FR	I-II	TS	P	Wad Snd Wld	Med	Tox	Psa Nat
Mercurialis	Annuua	Euphorbiaceae	Halboob	R	I-II	H	A B	Wld Cli Run	Med	Tox	Nit
Euphorbia	Helioscopia	Euphorbiaceae	Libbein, Saada	C	I-II	H	A	Wld Cul	Med	Tox	Nit Wee
Euphorbia	Peplus	Euphorbiaceae	Widenia	CC	I-II	H	A	Wld Cul	Med	Tox	Wee
Haplophyllum	Tuberculatum	Euphorbiaceae	Shag. el Kelb, Füel	CC	I-III	Dr	P	Wld Cul	Med	Tox	Sum
Rhus	Tripartita	Anacardiaceae	Areen, Gdari, Ern	RR	I-III	HS	P	Cli Wad Run	Gra Fen Med	2	Cha
Pistacia	Lentiscus	Anacardiaceae	Za'roor, Batoum Derw	RR	I-II	HS	P	Cli Wad	Gra Fue Med	2	Cha
Pistacia	Atlántica	Anacardiaceae	Batoum	RR	I-III	T	P	Des Wad	Gra Fue Med	2	Phr
Ziziphus	spina-christi	Rhamnaceae	Nabq, Zegzeg	RR	I-IV	T	P	Des Wad	Fue Veg Med	2	Phr
Ziziphus	Lotus	Rhamnaceae	Sidra	RR	I-II	HS	P	Wad Cli	Fue Fen Med	2	Phr
Malva	Parviflora	Malvaceae	Khobbiza	CC	I-II	H	A	Rge Wld	Veg Gra Med	1/2	Nit
Malva	Sylvestris	Malvaceae	Khobbiza	FC	I-II	H	A	Cul Wld	Veg Gra Med	1/2	Nit
Thymelaea	Hirsute	Thymelaeaceae	Mitnan	CC	I-III	HS	P	Rge Wld	Fue Med Han	Tox	Psa
Bryonia	Cretica	Cucurbitaceae	Tafwa, Fashira	R	I-II	Cl	P	Cul Snd	Med	0	Psa
Citrullus	Colocynthis	Cucurbitaceae	Handal	CC	I-IV	Cl	P	Rge Snd Ste	Med	0	Psa

C1 Genus	C2 Species	C3 Family	C4 Vern.name	C5 Freq.	C6 Distr.	C7 Biotype	C8 Life	C9 Habitat	C10 Utiliz.	C11 Graz.	C12 Remarks
Cynomorium	Coccineum	Cynomoriaceae	Zab et Ard	FC	I-III	Par	P	Slt	Med	0	Hal
Eryngium	Campestre	Umbelliferae	Foqq'aa	C	I-II	H	P	Rge Cul Ste	Med	0	Sil Pel
Deverra	Tortuosa	Umbelliferae	Qezzah	CC	I-IV	Fr	P	Rge Cul	Gra Med	2/3	Psa
Ammi	Visnaga	Umbelliferae	Khilla sheitani	R	I-II	H	A	Wld Wet	Med	Tox	Pel Hyg
Ammi	Majus	Umbelliferae	Khilla Baladi	C	I-II	H	A	Cul	Med	0	Wee Sil Pel
Crithmum	Maritimum	Umbelliferae	-	RR	I	C Fr	P	Roc	Med	0	Cha
Torilis	Nodosa	Umbelliferae	Shamarel Gemel	CC	I-II	H	A	Cul Wld	Med	Tox	Sil Wee
Anagallis	Arvensis	Primulaceae	Ebeila, Ayn al Gamal	CC	I-III	H	A	Cul Wld	Med	Tox	Wee
Centaurium	Spicatum	Gentianaceae	Menash el Diván	C	I-II	H	A	Slt	Med	0	Hyg Hal
Centaurium	Pulchellum	Gentianaceae	Kantarion	CC	I-III	H	A	Slt	Med	0	Hyg Hal
Nerium	Oleander	Apocynaceae	Defla	R	I-II	HS	P	Wad Run	Orn Med	Tox	Phr Nat
Convolvulus	Althaeoides	Convolvulaceae	Maddah, Luwwaya	CC	I-II	Cl H	P	Cul	Med	0	Psa Wee
Cuscuta	Planiflora	Convolvulaceae	Hariret al Zatar	CC	I-II	Par	P	Cul Rge	Med	0	Wee
Heliotropium	Digynum	Boraginaceae	Roghl, S'gaa	CC	III-V	Fr	P	Des Rge Ste	Gra Med	2	Ere
Alkanna	Lehmannii	Boraginaceae	Hinna el Ghoul	CC	I-II	H	P	Rge Cul	Gra Med	1	Psa
Moltkiopsis	Ciliata	Boraginaceae	Halama	FR	III-V	Fr	P	Des Rge Ste	Gra Med	3	Psa
Echium	Plantagineum	Boraginaceae	Lisaan el Thour	RR	I-II	H	A	Cul Wld	Gra Med	1	Wee
Verbena	Officinalis	Verbenaceae	Rigl al Hammam	FR	I-II	H	P	Cul	Veg Med	0	Hyg
Thymus	Capitatus	Labiaceae	Zaater	R	I-II	DS	P	Cli Roc Ste	Veg Med	1	Cha
Marrubium	Vulgare	Labiaceae	Robeia	C	I-II	H	P	Wld	Med	0	Nit
Teucrium	Polium	Labiaceae	Ga'da	CC	I-III	Fr	P	Sha Rge Ste	Med	0	Cha
Ajuga	Iva	Labiaceae	Shandagoara	R	I-II	H	P	Cli Run	Med	0	Cha End
Lycium	Shawii	Solanaceae	Awsaj.	CC	I-III	HS	P	Rge Wad	Fue Gra Med	1	S04
Datura	Stramonium	Solanaceae	Semmel Fahr	R	I-II	H	A	Wld	Med	Tox	Nit
Datura	Metel	Solanaceae	-	R	I-II	H	A	Wld	Med	Tox	Nit
Nicotiana	Glauca	Solanaceae	Massasa	CC	I-II	HS	P	Wld	Med	Tox	Nit Nat
Hyosциamus	Muticus	Solanaceae	Sakaraan	FC	I-V	H	P	Wld Wad	Med	Tox	Pel Ere
Hyosциamus	Albus	Solanaceae	Bing	FC	I-II	H	P	Wld	Med	Tox	Nit
Globularia	Arabica	Globulariaceae	Zrega	FC	I-II	H	P	Cli Roc Ste	Gra Med	2	Cha
Globularia	Alypum	Globulariaceae	Zrega	FR	I-II	H	P	Cli Roc Ste	Gra Med	2	Cha
Cistanche	Phelypaea	Orobanchaceae	Halook, Danum	CC	I-II	Par	P	Cul	Med	0	Wee Hal
Plantago	Afra	Plantaginaceae	Qotoona, Aslouj	R	I-II	H	A	Cul Wld	Med	0	Psa Tac

C1 Genus	C2 Species	C3 Family	C4 Vern.name	C5 Freq.	C6 Distr.	C7 Biotype	C8 Life	C9 Habitat	C10 Utiliz.	C11 Graz.	C12 Remarks
Plantago	Coronopus	Plantaginaceae	Wideina	CC	I-III	H	A	Wld	Gra Med	1	Hal
Plantago	Major	Plantaginaceae	Waraaq, Lisaan al Hamal	R	I-II	H	A	Irr	Med	0	Sil Nit Hyg
Echinops	Spinosus	Compositae	Kasheer, Shük el Gamel	CC	I-III	H	P	Rge Sha	Med	0	Wee
Echinops	Spinossimus	Compositae	Kaddad	CC	I-III	H	P	Rge Cul	Med	0	Wee
Carlina	Involucrata	Compositae	Moraar	CC	I-III	H	P	Rge Wld Ste	Non	0	Wee
Cynara	Cornigera	Compositae	Karshoof, Khorshef	FC	I-II	H	P	Rge Cul Wld	Veg Med	0	Pel Wee
Silybum	Marianum	Compositae	Shook Sinnari, S. el Gamel	FR	I-II	H	P	Cul Wld	Med	0	Nit
Centaurea	Glomerata	Compositae	Yamraar, Ardjaqñü	C	I-II	H	A	Cul Wld	Med	0	Wee
Centaurea	Alexandrina	Compositae	Moraar	CC	I-III	H	A	Cul Wld	Med	0	Wee
Centaurea	Aegialophila	Compositae	Akash	CC	I	H	P	Coa Snd	Med	0	Psa Hal
Conyza	Bonariensis	Compositae	Hashishat el Gabal	C	I-II	H	A	Wld Cul	Med	0	Wee
Inula	Viscosa	Compositae	Magramam	R	I-II	H	P	Wet Wld	Med	0	Nit Pel
Varthemia	Candicans	Compositae	-	FC	I-II	H	P	Cli Roc Ste	Med	0	Cha Pel
Pulicaria	Crispa	Compositae	Ghobbeira, Aarfeg	FR	III-V	H	P	Des Wad	Med	0	Ere
Ambrosia	Maritima	Compositae	Damaseisa	R	I	H	B	Coa Snd	Med	0	Psa
Eclipta	Alba	Compositae	Sada, Suwwed	R	I	H	A	Wet Wld	Med	0	Hyg Wee
Anthemis	pseudo-cotula	Compositae	Basoon, Iribayan	CC	I-II	H	A	Cul Wld	Med	0	Wee
Achillea	Fragrantissima	Compositae	Ge Soom	RR	III-V	H	P	Des Wld	Gra Med	1	Ere
Achillea	Santolina	Compositae	Bishreen, Chaihata	R	I-II	H	P	Cul Wld	Med	0	Sil
Otanthus	Maritimus	Compositae	Shiba	R	I	H	P	Coa Snd	Med	0	Hal
Matricaria	Recutita	Compositae	Baboonig	R	I-II	H	A	Wet	Med Veg	0	Hyg Nat
Chrysanthemum	Coronarum	Compositae	Oqhowan, Rezaima	CC	I-II	H	A	Cul Wld	Med	0	Wee
Cotula	Anthemoides	Compositae	Ribyaan	C	I-II	H	A	Cul Wet	Med	0	Hyg
Cotula	Cinerea	Compositae	Sakaraan, Roboua,	CC	III-IV	H	P	Des Rge	Gra Med	1	Ere
Artemisia	Judaica	Compositae	Sheeb	FC	III-V	H	P	Wad	Gra Med	1	Ere
Artemisia	herba-alba	Compositae	Sheeh	C	I-III	H	P	Rge Ste	Gra Med Fsh	3	Sil
Cichorium	endivia/pumilum	Compositae	Shikorria, Sires	FC	I-II	H	A B	Cul Wld	Gra Med	2/3	Sil Pel
Lactuca	Saligna	Compositae	Hawa, Khass el Baqar	R	I-II	H	A B	Cul	Med	0	Wee
Narcissus	Tazetta	Amaryllidaceae	Nargis	R	I-II	H	P	Wet Wld	Orn Med	Tox	Hyg
Juncus	Acutus	Juncaceae	Samaar/Mor	CC	I-III	H	P	Wet Slt	Med Han	0	Hyg Hal
Lolium	Temulentum	Gramineae	Zawaan	R	I-II	H	A B Sh	Cul Irr	Gra Med	4	Wee Fod
Lolium	Perenne	Gramineae	Gazoon, Hashish al Faras	R	I-II	H	P Sh	Cul Irr	Gra Med	5	Wee

C1 Genus	C2 Species	C3 Family	C4 Vern.name	C5 Freq.	C6 Distr.	C7 Biotype	C8 Life	C9 Habitat	C10 Utiliz.	C11 Graz.	C12 Remarks
Phragmites	Australis	Gramineae	Qasab Hagana, Ghab	CC	I-III	H	P	Slt	Han Med Wbr	1	Hal Hyg
Stipagrostis	Scoparia	Gramineae	Sabat	FR	II-IV	H	P	Rge Dne	Gra Med Sbi	1	Psa
Cynodon	Dactylon	Gramineae	Nigel, Negem	CC	I-III	H	P	Cul	Gra Med	5	Psa Wee Fod
Panicum	Turgidum	Gramineae	Abu Rokba	C	III-V	HS	P	Des Wad Ste	Gra Med Sbi	2	Ere
Imperata	Cilíndrica	Gramineae	Halfa, Del al Qutt	CC	I-II	H	P	Wet Cul	Med Gra	1	Hyg Wee
Phoenix	Dactylifera	Palmae	Naghla	CC	I-V	H	P	Cul Wad Run	Veg Med Han	0	Phr
Arisarum	Vulgare	Araceae	Neirish, Mirish	C	I-II	H	P	Rge Wld	Med	Tox	Wee
Cyperus	Esculentus	Cyperaceae	Habb el Azeez	R	I-II	H	P	Wet Irr	Veg Med	0	Hyg
Cyperus	Rotundus	Cyperaceae	S'ed el Omar	CC	I-II	H	P	Wet Irr	Med	0	Hyg

Appendix 8: Medicinal And Herbal Plants Farm Survey, 2000-2001

Matruh Resource Management Project

Project Coordination Unit, M&E, SRSCs with Technical Assistance from ICARDA

Executive Summary

1. A farm survey was conducted 2000-2001 to assess current importance and the potential for enhancing and improving the collection and production of medicinal and herbal plants (HMP) in the project area of MRMP. Major findings of the survey were as below summarized.
2. Over 85% of total sample farmers were familiar with HMP, and about 60% collected wild plants. However HMP were collected mainly for domestic use, as less than 5% of total collectors marketed the materials.
3. Major reasons for not collecting HMP were “unavailability of plants in nearby areas” reported by over 40% of the non-collectors, “plants are left for grazing” and “no interest or no need” (16%, each). Other reasons of fewer frequent reports were “no experience in collection and/ or marketing”, and “family labor shortage”.
4. About 30% of farmers claimed availability of many HMP on their lands and nearby areas, 50% reported little availability of a few species, and 20% do not have any.
5. Availability of Sheih (*Artemisia judaica* and *Artemisia herba-alba*) was reported by about 80% of the sample; Thyme (*Thymus capitatus*), Mint (*Mentha spicata*), and Harmel *Peganum harmala* were reported by about 46% of the sample. Other species with fewer occurrences were Hallaba (*Periploca angustifolia*), Chamomile (*Chamomilla recutita*), Rosemary (*Rosmarinus officinalis*), Rayhan (*Ocimum basilicum*), Anise (*Pimpinella anisum*) and others.
6. Currently, less than 5% of the total sample farmers collect HMP for marketing. However, about 60% of farmers might enhance HMP collection for marketing had they received technical and marketing support from the project. The main reason for the other 40% of not willing to enhance collection was because unavailability of HMP in nearby areas.
7. Relatively small quantities of HMP were collected for marketing. In a year of normal rainfall, the average quantity per one collector was 180 kg for Sheih (*Artemisia*), 150 kg for Harmel (*Peganum*), 90 kg for mint, 50 kg for Thyme, and much smaller quantities of Chamomile and Hallaba (*Periploca*).
8. Contribution of HMP to family income, at present, is minimal as only 5% of farmers harvest them, mostly small quantities for marketing. Of this 5% collecting for the market, over 40% reported very little contribution, 30% had a contribution of less than 25% of total family income, and 30% had contributions of 25% or more.
9. Mint is a cash crop grown by about 47% of total farmers, on an average area of 1.4 fed (0.6 ha). The variability of mint area was very high (CV > 100%). Only half of this proportion of mint producers grew it every year. It is not grown every year by the other half (and not grown at all by 53% of the sample) due mainly to water deficiency. Mint quantity produced by the average farm was 38, 18, and 71 kg in normal, dry, and wet year, respectively (CV > 200% for the three averages). About 55% of mint producers reported very little contribution of mint to total family income, most likely due to small areas grown and low yield. But, 40% of producers had a contribution of 25% or a bit less, and about 5% had 25-50% contribution to total family income.

10. It could be concluded that the project should not encourage enhancement of wild HMP collection, but on very specific locations of good biodiversity and vegetative cover, protection should take place. Habitat for these plants has already been seriously degraded. However, good potential was revealed by this research to diversify and increase farmer income, which would be enhanced through adaptive research to cultivate these plants as crops, much like mint. About 70% of farmers expressed willingness to do so.

Appendix 9: Example of an educational agro-eco-tour through the farming systems of wadis nearby Marsa Matrouh. Note: This scientific traveling workshop actually took place on 2-3 December 1998 in association with MRMP, GTZ, ICARDA and the Regional Initiative for Dryland Management. It could easily include biodiversity hotspots and be simplified or intensified depending on the audience.

Stop 1: Wadi Kharouba

Reclamation scheme

(a) Adaptation of technical solutions to local conditions and farmer's expectations; (b) procedure of implementation with seasonal considerations; (c) case study for the site; (d) application of farmer; (e) inspection of site with applicant; (f) cost estimation for implementation; (g) negotiation of different technical solutions and related costs with farmer; (h) order for implementation; (i) construction; (j) leveling; (k) quality control during construction; (l) measurement of performed volumes of work (m³ of dam volume); (m) payment of project's contribution; (n) agricultural land use recommendation provided by the project; (o) planting and watering; (p) inspection of engineering works after run-off events (includes repairs and design corrections in the event of damage (1st year), catastrophic events and guarantees of workmanship and coping strategies).

Cost of the reclamation scheme

(a) Farmer's contribution; (b) MRMP's performance in rainwater harvesting activities; (c) implementation of rainwater harvesting systems for potential wadi area; (d) breakdown by wadi to show the progression (scattered at first, coalescence into a coherent development plan and priority safeguards to avoid problems).

Situation before reclamation

(a) Endangered natural resources (gullying, soil loss); (b) the vision of wadi development in a fixed period of time (5-6 years); (c) security from flash floods; (d) ratio of catchment area to cultivated area; (e) significance to NWC strategic planning for regional wadi development

Stop 2: Wadi Ramla

Habitat rehabilitation

(a) Problems of ripped area and its history; (b) chances for development; (c) classification by type and suitability; (d) farmer's response; (e) area available; (f) match to available seedlings of adapted species; (g) choice of shrubs; (h) potential for direct sowing

Stop 3: Wadi Ramla

Wadi tips

(a) Every wadi and its watershed extend over hundreds or thousands of hectares; (b) wadi beginnings, the so-called wadi 'tips', are physically connected to the privately owned fruit plantations further down the wadi stream; (c) these areas have sufficient soil and water for shrubs but not enough for fruit trees; (d) additional land that also has potential inside the wadis: i.e. slopes, terraces between wadi branches, 'ripped' areas; (e) an accurate assessment of the interest and the willingness of the owners must be made

Fruit tree extension program

(a) Extension messages (there is a message for every species); (b) fruit trees are new in the area so extension messages are willingly accepted (don't overload the farmer with too many messages all at the same time); (c) recommendation for land use and potential for diversification; (d) choice of fruit tree species; (e) farmer's rationale for choice of species (labor requirement, yield response to water restriction: figs fail in dry years while olives still give some yield); (f) location affects choice (soil type and chemical composition, exposure to wind, rockiness); (g) examples: figs – most predominant; olives; almonds better in wind protected areas (in deep cut wadis); pomegranates; grapes – flexible; others (carob, peaches, etc.); (h) seedling density; (i) rationale for seedling spacing; (j) seedling production in nurseries; (k) propagation by cuttings; (l) cultivation practices (fertilization, pest control and pruning); (m) harvesting techniques; (n) marketing; (o) cost factors in the marketing chain; (p) quality considerations

Stop 4: Top of Wadi Senab

Cistern construction

(a) Geological feasibility of cistern construction; (b) most common shapes and sizes; (c) cost; (d) procedure of construction; (e) purpose of stored water; (f) size considerations; (g) probability of filling each year; (h) threshold run-off inducing rainfall event (example for a 3-mm/hr rainstorm)

Selected Range Management Areas (SRMAs)

(a) Layout of the SRMA (250 feddan with 25 feddan shrubs, etc.); (b) contributions of each party; (c) choice of beneficiary; (d) range management; (e) cut and carry vs. direct grazing; (f) costs; (g) potential to reduce costs of

fencing; (h) potential to improve feed unit availability by over-sowing

Stop 5: Wadi Senab

Reclamation scheme

(a) Threshold run-off inducing rainfall event; (b) probability of water supply; (c) main factors that define the productivity potential; (d) location; (e) water supply; (f) soil depth, texture and inherent fertility; (g) why do trees drop their leaves? (Figs as indicators of drought stress)

Remains of Roman dams

(a) Trial and error principle (observed over a period of centuries); (b) historic textbook upon which future improvements were built; (c) historic sites were developed according to potential land development; (d) modern sites must take farmer boundaries and interest into account; (e) current methods do not use dry stone dams in areas with high run-off occurrence; (f) Romans made many small dams; (g) minimum size for production units (~0.5 feddan)

Ancient kilns

(a) Jars were used for packing; (b) indications that materials were exported; (c) requirements for fuel-wood; dimensions and density of kilns in the area – where did the fuel come from?

Stop 6: Aguiba Beach Viewpoint

Stop 7: Orchards at Abu Lahu Bahri

Fully mature fig trees

(a) Fresh fig yields under unrestricted water supply up to 1 ton per tree; (b) average achievable yield for fresh figs: ca. 200 kg/tree/year; (c) spatial variation in fig tree growth and yield; (d) yield vs. age; (e) 1st yields in years 4,5,6; (f) if water is restricted then vegetative capacity and yield are limited; (g) under unlimited soil/water conditions, max yields are reached in 10-15 years.

Stop 8: Abu Lahu Bahri

Slope terraces

(a) Earth dams with masonry spillways; (b) economic comparison of different elements of rainwater harvesting (earth dams vs. dry stone dams vs. masonry dams); (c) the farmer, engineer and economic criteria determine the design of the rainwater harvesting reclamation system, to include dimensions of the wadi, dam spacing and terrace sizes; (d) farmer opinion: access by tractor, large continuous areas; (e) engineer's opinion: drop depth of floods to about 1-m; (f) correct location and dimensioning of spillway; (g) choose type of dam according to expected flood volumes; (h) economic considerations: the bigger the area the higher the cost

Stop 9: Dar Douma

Agriculture in southern 'hataya' depressions

(a) The southern fringe of fruit tree plantations; (b) drought resistance and survival in consecutive dry years; (c) economy of orchards: low investment costs; (d) where is the limit to fruit tree production? (e) Discussion: Land use priority: fruit trees>barley>fallow>rangeland

Stop 10: 'Raqaba Barakeesh'

Historic rainwater harvesting structures

(a) Historic vs. modern rainwater harvesting; (b) Raqaba Barakeesh is a twin raqaba with one modern and one historic branch; (c) the historic is distinguished by terraces plus diversion channels (managed by one individual). Traces of this system are found throughout the NWC, suggesting a set of rigid rules for implementation of rainwater harvesting systems. The modern version is distinguished by presence of terraces (multiple ownership).

Appendix 10: Proposed Environmental Training Topics

Training will be an important component of biodiversity conservation in the NWCZ. Training will be needed at all levels, from managers to community members.

Protected area management staff

Natural resources management principles and techniques
Multi-disciplinary planning for development
Field survey techniques
Monitoring
Accounting
Communications: Public address, report writing, documentation, photography, etc.
Environmental education
Community participatory techniques
Law enforcement
Navigation, cartography and GPS use
Training for trainers: various topics

Community guards

Basic biodiversity conservation principles
Community participatory techniques
Law enforcement
Monitoring
Communication

Environment Office staff

EIA process, particularly evaluation
Multi-disciplinary planning for development
Basic biodiversity conservation principles
Community participatory techniques
Monitoring
Communication

Local community leaders

Basic biodiversity conservation principles
Community participatory techniques
Monitoring
Training in marketing

Governorate Planning department

EIA process
Multi-disciplinary planning for development
Basic biodiversity conservation principles

Tourism related personnel

EIA process
Basic biodiversity conservation principles
Training in marketing

MRMP-II staff

EIA process
Basic biodiversity conservation principles
Monitoring
Training for trainers: Various topics
Training in marketing

Law enforcement agencies

Hunting legislation
Protected area legislation
EIAs

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- **Financing Plan:** Section C and Annex 6 (Investment and Running Costs) provide detailed information on project costs and financing plan by component and financing source.
- **Cost-effectiveness:** Annex 2 provides a detailed description of the Incremental Cost analysis of the project, while Annex 7 provides an overall Financial and Economic Analysis of the project.
- **Core Commitments and Linkages:** Section B.1 and B.3 describe the linkages of the project within the Bank, the CAS and related sector strategies.
- **Consultation, Coordination and Collaboration between IAs:** Sections B.1.2, C.2 describe how the project design is linked with other projects through lessons learned and indicates how the project will coordinate with other activities carried out by other donors (GEF/UNDP MedWet Coastal Project, GEF/UNDP Medicinal Plants Project and EEAA/Italian Cooperation Siwa Ammelioration Project)
- **Response to Reviews:** Annex 3 includes the STAP review comments and response. There were no separate comments from GEFSEC at pipeline entry, and recommendations at PDF-B grant approval were to include in the technical and institutional design comments received by other IAs. Comments were received from one IA (UNDP) which have been thoroughly addressed during project preparation and are reflected in the design as follows: Section E.4.2 details the global environmental benefits and significance, while Annex 4 provides a detailed technical description of approaches to biodiversity conservation and carbon sequestration in the project. A coherent Logical Framework for the project is included in Annex 1. Coordination with other activities carried out by UNDP and other donors is mentioned under Section B.1.2 and in the detailed description of project activities under Section C.2, while institutional implementation and coordination mechanisms with key stakeholders are described in Section C.5 . Section B.3.2 gives a summary of the Government achievements under MRMPI, and Section D.3 describes lessons learned and incorporated in the project design. The detailed socio-economic characteristics of the target group has been included under Annex 8.

3. Please let me know if you require any additional information to complete your review prior to inclusion in the work program. Many thanks.

Attachment

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ISC, Relevant Regional Files

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