



**New Partnership for
Africa's Development (NEPAD)
Comprehensive Africa Agriculture
Development Programme (CAADP)**



**Food and Agriculture Organization
of the United Nations
Investment Centre Division**

GOVERNMENT OF THE ARAB REPUBLIC OF EGYPT

SUPPORT TO NEPAD–CAADP IMPLEMENTATION

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Volume V of V

BANKABLE INVESTMENT PROJECT PROFILE

**Integrated Water Management for Community Settlement
in Farafra Oasis**

December 2005

EGYPT: Support to NEPAD–CAADP Implementation

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Volume IV: Improving Range–Livestock Productivity in the North–Western Desert of Egypt

Volume V: Integrated Water Management for Community Settlement in Farafra Oasis

NEPAD–CAADP BANKABLE INVESTMENT PROJECT PROFILE

Country: Egypt

Sector of Activities: Water Management

Proposed Project Name: **Integrated Water Management for Community Settlement in Farafra Oasis**

Project Area: Farafra Oasis

Duration of Project: 4 years

Estimated Cost: Foreign ExchangeUS\$4.37 million
Local Cost.....US\$4.35 million
Total US\$8.71 million

Suggested Financing:

<i>Source</i>	<i>LE million</i>	<i>% of total</i>
<i>Government</i>	25.4	50
<i>Financing institution(s)</i>	25.5	50
<i>Beneficiaries</i>	–	–
<i>Private sector</i>	–	–
<i>Total</i>	50.9	100

Note: US\$1 = LE5.84

ARAB REPUBLIC OF EGYPT:

NEPAD–CAADP Bankable Investment Project Profile

“Integrated Water Management for Community Settlement in Farafra Oasis”

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I. PROJECT BACKGROUND

A. Project Origin

I.1. This project idea was prepared by the Groundwater Sector, *Ministry of Water Resources and Irrigation* (MWRI). The project was formulated on the basis of detailed field survey and the society needs analysis in addition to the threats facing the management of the water resources in Farafra Oasis. The survey and analysis were conducted by a team comprising the groundwater, agronomy and social development professionals from the local groundwater directorate as well as from the head quarter. It focused on development of the water resources management for agriculture, tourism and small industries toward upgrading the socio-economic conditions. Full participation of the people’s assemblies as representative of the community, graduates, poor landless farmers, medium to large investors and the new valley governorate was anticipated.

B. General Information

I.2. Egypt’s population of 67 million (2001), which is increasing at a rate of approximately 2% annually, is concentrated along the banks of the Nile River and adjacent areas. This inhabited area represents about 9% of the total area of Egypt, while the remaining 91% of the area is desert and virtually empty, since it is inhabited by less than one million inhabitants. This high population density along the Nile Valley and in the Delta has caused tremendous pressure on the cultivated land, leading to declining productivity of crops and livestock. To this end, several measures have been implemented, especially in the area of vertical agricultural expansion. However, economically, there is a limited to the value of such vertical expansion. Therefore, venturing into the desert for the exploration and exploitation of its natural resources become an important objective and a matter of survival for the present and future generations. Accordingly, Egyptian agricultural policy has forced to do all it can to increase the cultivated land by 3.7 million feddan by year 2017 to secure the food production in order to decrease the need for imports.

I.3. In this context the western desert oases have quickly become important, since they straddle one of the most extensive aquifers in the world. The Nubian Sand Stone system forms a large fresh water-bearing body, covers about 65% of Egypt physical area and extends across boundaries into the territories of Libya, Sudan and Chad. Five main depressions are distinguished across the western desert. From south to north, these are Kharga, Dakhla, Farafra, Baharya and Siwa. The elevation of these depressions is less than 200 m above sea level.

I.4. Farafra as well as all the western desert oases is threatened by serious problems affected the integrated water resources management which, has a dangers adversely impact on the cropping lands contributing with the food deficit which exists and prove ever more difficult to reduce. Most of the deep groundwater wells are in urgent need of protection and rehabilitation. Within Farafra, beneficiaries and young graduates small-scale schemes which were initiated over the last 20 years failed to develop as planned. Groundwater sector analysis indicated that the main reasons are lack of experience, absence of production plans via marketing strategies and scarcity of fund.

II. PROJECT AREA

II.1. The proposed project area is in Farafra oasis, which situated in the middle of the western desert of Egypt (26°40' to 27°40'N, 27°30' to 28°40'E). The oasis is 200 km southeast of Baharia Oasis and 300 km northeast of Dakhla Oasis. The total area of the Farafra depression extends over an area of 10 000 km², the second largest depression in the western desert of Egypt. It consists of three secondary administrations.

II.2. **Topography, climate and soils.** The project area (Farafra depression) is bounded from north, east and south by escarpment of the surrounding desert plateaus (270–300 m a.s.l. with residual hills as high as 350 m a.s.l.). The eastern edge of the Great Sand Sea encroaches on the southwestern margin of the greater Farafra depression. The floor of the depression altitude rises from north to south and is 76 m at Qasr Farafra, where the width of the depression is 90 km. Since there is no rain, the only available water resource in the region is the fossil groundwater from the Nubian Sand Stone Aquifer. Average temperatures ranges from 25 to 37°C; it rises up to about 45°C (absolute maximum) from time to time in summer. In winter the temperature ranges from 17 to 25°C, dropping to zero, specially late at night during January and February. Generally, temperature cools rapidly after sunset during both summer and winter. Rainfall is completely absent throughout the year in Farafra region. The heaviest shower recorded during the last two decades did not exceed 3.5 mm. Relative humidity ranges from 24 to 35%, and not exceeding 60% in winter. Evaporation ranges from 12 to 26 mm/day during summer and from 5 to 12 mm/day during winter. Wind speed ranges from 1.5 to 5 m/s and characterized by heavy dusting, specially during April till June as well as during September and October. The dominated soil type is sandy silt with heavier clay soils in some locations.

II.3. **Population.** The total population of Farafra Oasis was 1,010 persons in 1960, which increased to 2,500 (1996) and to 15,000 (2001). The average density is low and estimated at 1,5 person per km². The composition of population, in terms of gender, is quite balanced with males forming about 55% of the total population. The major portion of the population is literate. However, still 50% of the population (at the age of employment) is out of employment force. The majority of the employed population is engaged in farming being employed by others (70%); while those having their own farms represent only 15% of the population.

II.4. **Infrastructure.** Domestic water (5,200 m³/d) is obtained from 9 deep wells (depths vary from 800 to 1,200 m). The water at the well is generally of very good quality except for iron and manganese (natural). In the urban area, all houses are connected; while about 40% of the rural community is connected to the main line coming from the treatment plant. The oasis is still lacking a sanitary system. Health services are particularly poor in the area. Most of the rural clinics are operational with shortage of basic medical equipments. Schools, although evenly distributed in the secondary administration districts, are still very limited compared to other oases of the New Valley.

II.5. **Agriculture.** Within Farafra Oasis, agriculture is mainly dependent on the groundwater abstracted through deep wells from Nubian Sand Stone aquifer. The most prevailing crops in Farafra are maize, corn and alfalfa. Average crop yield are low. A considerable area is cultivated by water million during summer session depending on the soil moisture.

II.6. **Social setting.** Most of the people of the project area are immigrants from Nile Valley and Delta forming a rather heterogeneous ethnic and linguistic group partly as a result of different origins of the migrated people and young graduate settlers. Absences of active people's assemblies play rule in this context. The majority of the population is poor (average per capita annual income below US\$400) even those employed by the government. Investors at this early stage of development are offering new job opportunities but not high-income jobs.

III. PROJECT RATIONALE

III.1. The main problem facing the new communities in Farafra and may result in reverse immigration is the threat on livelihood due to the following:

- The source of water is not ensured either due to poor management or poor conditions of groundwater wells;
- Lack of capacity of new settlers on water management under prevailing conditions;
- Lack of market requirements and marketing strategies;
- Limited knowledge on suitable developmental prospective based on comparative advantages;
- Limited knowledge on agricultural practices in desert regions.

III.2. The target group consists of various categories of land and water users. Based on the prevailing conditions, the following groups can be identified:

- The very few natives and locals who are very much involved in tourism, in small industries of local products and in small-scale agriculture (mainly date palm orchards). This category is generally government-supported;
- Poor landless farmers who have settled and are facing problems;
- Graduates who are occupied with small-scale, government-supported agricultural development;
- Medium to large investors (transfer of technology).

III.3. The target group covers all categories with various levels of support. The aim of selecting all the groups is to insure control on water wastage and possible support of large investors to other groups through exchange of experience in water management and influence on cropping pattern and marketing.

III.4. Indicators are important tools in process of water resources managements. As soon as the project becomes operational, one of the issues of critical importance is the analysis of its performance; aiming at determining the extent to which the objectives are being met. Such analysis may reflect the water use efficiency, response of stakeholders, impact of the project on the poorest categories, etc. Such analysis is indispensable for assessing the effectiveness of the project initiatives and it may also help in correcting mistakes in time. Indicators include:

- Water wells distribution systems (as well as agriculture drainage systems) operational and users satisfied in two villages;
- Water wells and related infrastructure in the three other villages properly maintained and users satisfied;
- Eight to ten well field *Water User Associations* (WUAs) operational under a legal umbrella;
- One *District Water Board* for the whole oasis;

- All categories of beneficiaries cooperating with minimum conflict;
- Gradually increase of the efficiency of water usage;
- A diversity of activities are introduced and gradually adopted by users;
- A diversity of crops are introduced and sold without accumulation in the field during the harvesting period.

IV. PROJECT OBJECTIVES

IV.1. The *main objective* is to improve sustainable livelihood of communities in Farafra oasis.

IV.2. *Specific objectives* include:

- Rehabilitate / initiate water supply infrastructure;
- Strengthen capacity of local communities to manage water and introduce participatory water management;
- Develop marketing capacity and market oriented products;
- Increase agricultural production (per unit of supplied/consumed water) through improved / appropriate desert agriculture;
- Increase water use efficiency and encourage transfer of development towards non-conventional ones (less water and lower water quality, including reuse) to ensure sustainability of communities;
- Diversify economic activities, making use of the comparative advantage of the region;
- Improve project management.

V. PROJECT DESCRIPTION

V.1. In the following paragraphs, a summary of the various activities is presented.

A. Inception Phase

V.2. During the inception phase various preparatory activities will take place before finalizing the operational plan of the project. First, a baseline survey will be carried out to update the situation and determine the needs (infrastructure). Moreover, the land and water plan will be reviewed to ensure openness to the project, including sectoral water needs (e.g. irrigation, drinking, fisheries, industry, tourism, etc.). This step is crucial for the estimation of proper economic activities for the various sub-region (well fields and groups), participation at well fields level and future allocation of available water resources to water user sectors. A prediction of effluent from the various uses including its quality is important in the process of planning to ensure high water use efficiency without affecting the initial resource. This step needs a review of land use plans with the local and central government.

V.3. A final identification of the boundaries of the oasis will be made with support of the local government. A preliminary base line survey will follow to ensure a proper understanding of behaviours of present setups and perceptions of existing and future stakeholder. Analysis of the initial state will be discussed with the local government and stakeholder to demonstrate the major issues and need for changes (if any) and also to ensure their support to the project.

V.4. This will be followed by the preparation of initial land use map. It should be mentioned here that land use maps are important tools, not only for water allocation, but also for the selection of suitable disposal means of liquid and solid wastes.

B. Detailed Field Investigations

V.5. Undertaking detailed field investigations is the first step in the implementation phase. It is necessary for the final analysis of the present state and development of measures. Detailed field investigations will cover, among others, the following:

- An inventory of existing water points, including natural springs and natives wells;
- Land use and prevailing types of soils;
- Water use practice, water requirements and drainage;
- Cultural and socio–economic conditions;
- Disposal means and quality of effluent;
- Stakeholder perceptions.

C. Analysis of Present Status and Development of Measures

V.6. Development of measures that satisfy the requirements of sustainable development is generally based on comparable characteristics of the region and people perceptions. Discussions of measures with stakeholder are a very important step to seek their support and cooperation during and after the execution (implementation and operation). A clear and transparent presentation of measures is important prior to implementation.

V.7. Design and Implementation: Design and implementation of measures (or full project) needs a proper interaction between involved institutions on the one hand and active participation of stakeholder with the implementing agencies. Participation should be positive, meaning that it should not only be in kind but extends to a full sharing of responsibilities (including cost). At this point, the formation of water boards is crucial.

V.8. Various components are included in the design and implementation phase (to be detailed later).

D. Final Assessment of Suitable Schemes

V.9. Monitoring will be considered an integral part of the project cycle. Various components will be subjected to monitoring and evaluation, including the hardware (infrastructure) and the software (socio–economy, health, behaviours and legislation). Results of monitoring and evaluation activities will be discussed with the stakeholder community in large, better on the spot. Their feed back is an important factor for the final assessment of suitable schemes and recommendation for other projects.

E. Time Schedule

V.10. The time schedule of activities covers a period of four years.

V.11. The first four months are devoted to the inception phase. The main project should be completed in the next 44 months. The first period of four months will be devoted to carry out detailed investigations, followed by four months for the formation of water boards at the field level. Market studies and finalization of detailed designs of the main infrastructure would be the next steps. The next 36 months are foreseen to be required for the discussion of designs with stakeholders and implementation, at least in two locations. Before finalizing the work in the rest of the oasis (or parallel to it), monitoring and evaluation is carried out to evaluate the situation in the two areas (well fields). This will include demonstration to stakeholders and finalization of the rest of the oasis.

VI. INDICATIVE COSTS & PROPOSED SOURCES OF FINANCING

VI.1. The total cost of the project is estimated at approximately LE50.9 million (of which LE25.4m will be covered by the Egyptian Government).

Table 1: Summary Project Costs by Component and by Year											
Main Activities (amounts in LE'000)	Inputs	Year 1		Year 2		Year 3		Year 4		Total	
		Donor	GOE	Donor	GOE	Donor	GOE	Donor	GOE	Donor	GOE
Inception Phase											
Baseline survey		150	100							150	100
Assessment of water needs	Transport and accommodation	20	10							20	10
Assessment of effluent	Computers and software	40	30							40	30
Initials land use map		40	10							40	10
Detailed Field Investigations											
Detailed inventory of water points and water use practices	Accommodation, measurement devices	30	120							30	120
Inventory of disposal means and quality of effluent	Operation and maintenance of equipment, laboratory	120	10							120	10
Analysis of Present Status and Development of Measures											
Analysis of poor and good practices and reasons	Team discussions		15							0	15
Assessment of groundwater potential, water use efficiency, impact of poor disposal of effluent	Data processing, presentations, map, other communication materials		5							0	5
Recommended land and water use plan and discussion with people	Maps and communication means	40	20							40	20

Table 1: Summary Project Costs by Component and by Year

Main Activities (amounts in LE'000)	Inputs	Year 1		Year 2		Year 3		Year 4		Total	
		Donor	GOE	Donor	GOE	Donor	GOE	Donor	GOE	Donor	GOE
Design, Implementation and Evaluation											
Design of hardware and software and discussion with people	Staff and material	60	80							60	80
Implementation in phases	Subcontracts			10,000	10,000	7,000	7,000	7,000	7,000	24,000	24,000
Evaluation/ revised designs	Monitoring systems			1,000	1,000					1,000	1,000
Total		500	400	11,000	11,000	7,000	7,000	7,000	7,000	25,500	25,400
			900		22,000		14,000		14,000		50,900

VII. PROJECT BENEFITS

VII.1. The project benefits might be summarized as follow:

- Water source infrastructures replaced in 2 villages (Abu Minqar and El Sheikh Marzouq) and in 2 villages (Farafra, Abul Noss) situation is improved;
- A *District Water Board* for Farafra and 8–10 WUAs at well field levels are operational;
- Exploitation of groundwater is regulated in a way that ensures long–term availability (elongated time);
- Market strategy developed;
- Market–oriented products introduced;
- A diversity of economic activities introduced;
- A project management unit established.

VIII. IMPLEMENTATION ARRANGEMENTS

VIII.1. Groundwater Sector, MWRI, would have the overall responsibility for the implementation of the project. This responsibility would be developed to the regional level for day to day planning and work execution. Beneficiaries including young graduate, landless farmers and local agricultural assemblies will be the main participants.

IX. TECHNICAL ASSISTANCE REQUIREMENTS

IX.1. The integrated approach to water management has been the key issue in the national water resources management policy. The cooperation between the Groundwater Sector and the stakeholders in the field of water management dates back to the day one of Groundwater Sector establishment. Lessons learned will be applied through cooperation with the *Water Board Project* (project developed through Egyptian–Dutch development cooperation) staff. *National Water Research Center* will play

an important role supporting the applied research related issues. With the help of the Planning Sector, Horizontal Expansion Sector, Irrigation Sector and the *Egyptian Agriculture Drainage Authority*, integrated water management approach could be anticipated. Investors will support the project by technical/marketing experience exchange with the beneficiaries including the small-scale land owners and young graduates.

IX.2. The project will require both long and short term technical assistance (TA) inputs. The long term TA could be in the fields of: (a) integrated water resources management; (b) deep wells engineering and design; and (c) irrigation agronomy.

IX.3. Short term TA inputs include: (a) desert agriculture production, handling, storage and marketing; (b) water distribution training specialist; (c) an environmental specialist carrying out the environmental impact assessments.

X. ISSUES AND PROPOSED ACTIONS

X.1. **Technical.** There are several areas which would need to be examined in detail as part of further processing of this project:

- Integrated water management and conservations: Although Groundwater Sector has considerable experience in integrated water resources management and water conservation techniques, the concepts and understanding are recent and less widespread.
- Participation: Participation of the beneficiaries is clearly crucial to successful implementation of such project. The means of ensuring the full and willing participation of local communities in planning, implementation and monitoring of the project programmed must be elaborated.
- Project scale: From being a very large project horizon, the Groundwater Sector has proposed the first phase which might to be the start point to develop the Egyptian desert oases. It is possible to expand the scale of the project by introducing more oases in the western desert region.

X.2. **Financial.** The main financial issue is the attractiveness to beneficiaries for participating in the programme. The willing and voluntary acceptance of the programme by them is essential. Under these circumstances, there is often found in conservation activities a considerable gap between the economic value to the nation of the conservation work carried out, and the financial attractiveness of it to the individual farmer. Many conservation activities do not yield immediate and obvious benefits. Consequently, a way has to be found to encourage farmers to undertake conservation works which are in the national and their own long term interests

X.3. **Institutional.** There is one important institutional issue which need to be resolved before this project can be further prepared, i.e. the responsibility transfer for rehabilitated groundwater infra structure. Up till now, the Groundwater Sector is responsible administratively for all groundwater management and water distribution. In the future part from the responsibilities should be transferred to the users.

X.4. **Environment.** The project is aimed specially at improving the environmental status of rural areas in Farafra Oasis. However, planners must be alert to possible adverse environmental consequences of some of the proposed project activities.

X.5. **Policy.** Government is clear in the priority which it places on conservation of natural resources. However, there is one issue which needs to be examined, i.e. **Regional priority**. Under decentralized administration, the Regional Governments are free to determine their own priorities for development. It needs to be made explicit that, when there so much development activity required, this project is in accordance with said priorities.

XI. POSSIBLE RISKS

XI.1. In the case of delaying project implementation or cancellation, the following risks will be anticipated such as:

- Reverse immigration;
- Environment deterioration;
- Dilapidation of natural resources (fertile lands & flowing groundwater).