



**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 IV of V

BANKABLE INVESTMENT PROJECT PROFILE

**Improving Range–Livestock Productivity
in the North–Western Desert of Egypt**

December 2005

EGYPT: Support to NEPAD–CAADP Implementation

Volume I: National Medium–Term Investment Programme (NMTIP)

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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 Farfra Oasis

NEPAD–CAADP BANKABLE INVESTMENT PROJECT PROFILE

Country: Egypt

Sector of Activities: Livestock

Proposed Project Name: **Improving Range–Livestock Productivity in the North–Western Desert of Egypt**

Project Area: North–Western Desert of Egypt

Duration of Project: 6 years

Estimated Cost: Foreign Exchange US\$9.02 million
Local Cost..... US\$2.2 million
Total US\$11.2 million

Suggested Financing:

<i>Source</i>	<i>US\$ million</i>	<i>% of total</i>
<i>Government</i>	2.20	20
<i>Financing institution(s)</i>	9.02	80
<i>Beneficiaries</i>	–	–
<i>Private sector</i>	–	–
<i>Total</i>	11.22	100

EGYPT:

NEPAD–CAADP Bankable Investment Project Profile

“Improving Range–Livestock Productivity in the North–Western Desert of Egypt”

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I. PROJECT BACKGROUND

A. Project Origin

I.1. This project idea was prepared by livestock production and range management specialists and formulated on the basis of experience of more than 30 years with many national and international agencies in the North Western Coast (NWC) of Egypt. Raising sheep in NWC considered to be the main economic activity of Bedouins inhabiting the area and constitutes the majority of their incomes. Rangeland is the main feedstuff for livestock population in NWC. However, rangeland has been deteriorated rapidly as a result of mismanagement and overgrazing. Consequently, low productivity of Barki sheep as well as other indigenous breeds of livestock, is often blamed on low genetic merit. Moreover, poor management and inadequate nutrition are the major constraints preventing the animals from exhibiting their genetic potential. Thus, sheep productivity has been deteriorated as a result of lack of genetic and poor feeding. Therefore, there is desperate need to start an integrated program to improve rangelands and sheep production in the NWC of Egypt. Efforts devoted to improve sheep production are crucially important and would enhance the export of sheep abroad at relatively higher prices which would contribute to the prosperity of the region.

B. General Information

I.2. In recent years, the Egyptian Government has put more emphasis and investments on agriculture sector to provide feed security for the increasing population (the present estimate of population is about 66 million). There is evidence that during the Roman era the region flourished with fruits and cereals produced through rain–water harvesting and storage to enhance the efficiency of the limited rainfall. Dryland farming seems to have gradually declined during the reign of the following empires until the VIIth century when Mediterranean coastal belt were dominated by nomadic Arab and Berber tribes following the Islamic conquest of North Africa. At present, the NWC considered to be a promising area for development. The total area of agricultural land in the NWC was estimated as about 2.5 million ha. of which about 93% is rangeland and 7% is potentially arable and partially used for producing dry land cereal and horticultural crops. Rangeland is the main feedstuff for livestock in NWC. The range vegetation consists of sparse stands of shrubs and sub–shrubs and herbaceous perennials with a winter– spring covers of ephemerals of variable density depending upon soil depth and surface topography. Increased animal numbers are mainly responsible for deteriorating the rangelands and decreasing their contribution to animal feed. As a result, livestock production has become increasingly dependent on heavy use of concentrates, cereal grain, straw and farming by–products. Range degradation is exacerbated by increased uprooting of shrubs for fuel wood and increased ploughing of rangelands for cropping leading to over utilization of the remaining areas especially near the coast.

I.3. The climate is of semi–desert type characterized by a short mild winter with an erratic rainfall of 100–160 mm/year and a long dry hot summer.

I.4. The region is the traditional home of Bedouin tribes who presently comprise about 75% of the 25,000 population while the rest are migrants from the Nile Valley. The rural population comprises about 44% total population.

II. PROJECT AREA

II.1. In Egypt’s NWC, the climate is arid Mediterranean, the average rainfall is as low as 144 mm with a coefficient of variation of 45% while topography and soil conditions allows for dry farming system. The range–dependent small ruminant production systems are a common feature in the NWC of Egypt. Sheep and goat (estimated to be about 600,000 heads) are the main contributors to the livestock population in these areas, cattle, buffaloes and camels also exist but in limited numbers. Raising sheep is the main economic activity of Bedouins inhabiting the area and constitutes the major source of their income.

II.2. Natural grazing is the most valuable natural resource for wildlife as well as livestock feed along the NWC zone, since ruminants convert it into food and other products for human consumption. Bedouin flocks depend entirely on range forage communally grazed but tribally controlled. The ranges of the area have been subjected to heavy overstocking and periodic and prolonged droughts which led to the deterioration in the quantity and quality of the available forage. This has resulted in the reduction of rangelands in both size and per unit area production as well as acceleration of soil erosion and radical vegetation changes. The changes largely embody the thinning out of the vegetation, destruction of perennial grass and spreading of undesirable bush and woody species as well as toxic plants. Moreover, under heavy grazing for prolonged periods, highly palatable and productive genotypes have been lost and disappeared which would narrow the genetic resource. On the other hand, the livestock population in the area has been increased during the last decade. Consequently, the stocking rate has drastically increased which resulted in additional grazing pressure on the remaining rangelands. Furthermore, and because of the low productivity of rangelands, Bedouins plough extensive areas of rangeland for barley production for summer feed and to save on concentrates. Hence, the cultivated area allocated for orchards, barley and particularly wheat has significantly expanded at the expense of good rangeland. This phenomenon and the continuous decrease of the grazing capacity of the range would have a very detrimental effect on commercial stock farming. At present, livestock graze range areas for part of the year, but for the rest they are fed on the available concentrates and other crop by–products.

II.3. The number of sheep and goats in the NWC fluctuates from one year to another. It decreases as the intensity of drought increases in the region. Sheep and goats are usually found together in most flocks. The main breeding season is in June–July. Lambing and kidding coincide with the beginning of the natural grazing season which extends from November–March. This limited grazing season is usually followed by a long dry season during which breeding and pregnancy occurs. Sheep are usually shorn once a year during March–May.

II.4. The Barki fat–tailed, coarse wool breed is dominating the NWC region and is considered to be the most adapted breed of sheep under the harsh and arid prevailing conditions. Despite the great potential of that breed and its favourable performance when proper management is exercised, this breed appears to be of primitive type and low productivity since, to date, it has not been subjected to an organized selection program. The improvement of the productivity from the genetic point of view together with enhancing the nutritional and health standards is of crucial importance to achieve real increase in the economic value of Barki sheep. On the other hand, it would increase the export of sheep abroad at relatively higher prices which would contribute to the prosperity of the region.

II.5. The main problems facing animal production in the region could be attributed mainly to the absence of genetic improvement and feed shortage mainly during the long dry summer season. Selection of ram lambs has over many generations been chosen as replacements from within their relatively small flocks on a phenotypic basis without proper selection. Flock owners are also reluctant

to use any rams from outside their flocks. Most probably, selections practiced within Bedouins' flocks have reached a limit since continued selection would not be able to increase production any further.

II.6. There are indications that the large majority of the animals cannot produce under the extensive conditions, unless they are supported by supplementary feeding. There is also a strong tendency to increase livestock number beyond the level compatible with the productive capacity of the range. Therefore, large quantities of supplemental feeds are being used in increasing quantities at present. As a result of the higher input costs, many Bedouins cannot produce enough net income to survive. This will eventually lead to a further depopulation of Bedouins in the rural areas, resulting in major socio-economic problems.

II.7. Most feedlots in the region are running haphazardly. While some Bedouins occasionally fatten their lambs, the others sell them to private traders. Male lambs are usually confined in sheds after weaning for fattening for about 10–12 weeks before sale. The fattening system does not often involve use of rangeland resources, however, it is dependent on a significant quantity of cereal grains and/ or concentrates.

II.8. Wool as protective integument of the animal is of crucial importance to the adaptability of the animals under such harsh conditions. Wool production considered to be one of the main sources of income for the inhabitants in the NWC. The manufacturers are reluctant to buy such wool due to its high content of non-wool substances since it results in lower clean scoured yield. Therefore, they offer reduced prices for such wool and hence, the producers do not get a reasonable price since they are not able to present their wool from the industry point of view. On the other hand, small wool industries in the area are traditional and practiced by Bedouin women mainly for household use and as a source of additional income. They usually make carpets, rugs, blankets and tents but they claim these to be exhausting and time consuming to make and that their economic return is low compared to the effort they require. The entire process of wool spinning and weaving is done by hand using primitive and labour intensive instruments.

II.9. No diseases were mentioned to be common in the area. This was probably due mainly to the mineral rich soils of the region and to the transhumance system practiced in the area. However, health sanitation is lacking and therefore parasites are insufficiently controlled. The deficiencies of vitamin A during the dry season contribute to major problems concerning the health and productivity of the animals.

III. PROJECT RATIONALE

III.1. Valuable animal genetic resources in African countries as well as in Egypt appeared to be in real threat from various factors acting to endanger the indigenous breeds and causing the erosion of the available natural resources particularly, natural vegetation. Hence, there is desperate need for integrated program to rehabilitate the available rangelands and conserve the animal genetic resources for the prosperity of the country.

III.2. Range-livestock production in the NWC affected heavily by the very low and erratic rainfall as well as frequent and prolonged droughts. Accordingly, rangeland appeared to have deteriorated drastically and the consequences would have negative impacts on the socio-economic situation of local communities.

III.3. In the NWC and for many generations selection of rams, if there is any, has been practiced on a phenotypic basis from within Bedouin’s flocks which resulted in increasing the risk of spreading undesirable traits and poor productivity in these flocks, thus improved animals are lacking. Hence, the immediate importance of the initiation of an organized breeding program to enhance the production efficiency of various animal products as a long term strategy to meet with the increasing demand of the coming generations and the requirements of the export commitments.

III.4. Poverty is widespread in the area as a result of deteriorating range–livestock productivity, the main source of income. Furthermore, local inhabitants are lacking experience and extension. A practical program for training and extension would be needed to increase the capacity of the local inhabitants and generate additional income to alleviate poverty.

IV. PROJECT OBJECTIVES

IV.1. Stimulate an integrated system and techniques for proper utilization and maintenance of a communally grazed area to rehabilitate the deteriorated rangelands and propagate strategies to soften the impact of periodic and prolonged droughts. This would improve natural vegetation, secure feeding requirements for the livestock, fill the gap of feed shortage during the critical dry period and decrease some pressure on natural vegetation to ensure the ecosystem sustainability as well as for rural development in general.

IV.2. Develop the hardiness and highly adapted Barki sheep to enhance their production efficiency to be capable of survive, producing and reproducing under prevailing conditions for the financial survival of stock owners. This could be approached through breeding animals under extensive system of natural grazing and carrying out selection under the most stringent conditions.

IV.3. Providing and distributing improved rams would be the main objective of this project to disseminate superior genetic materials responsible for higher productivity into the Bedouin’s flocks throughout the NWC. This would ensure permanent and cumulative annual genetic improvement in animal productivity.

IV.4. The returns from genetic improvement in this project while it would be variable in the early years, it accumulates over a long period of time. Hence, this project not only would be able to cover its costs after 10 years, the annual genetic gains attained at that time would be sustained at an increasing rate as long as the selection is going on. Moreover, this project would generate another source of income in addition to its impact on the socio–economic status of the inhabitants.

IV.5. Alleviating poverty and assisting the inhabitants to coop with such fragile uncertain conditions prevailed by helping them to enhance livestock productivity, the main source of income, and develop promising technologies to generate additional incomes through some income generating activities.

IV.6. The main objective of this project is to enhance human resources through building the capacity of local inhabitants with specialized training and extension program to ensure the sustainability of various activities supported by the project.

V. PROJECT DESCRIPTION

V.1. The project was planned to rehabilitate the deteriorated rangelands and improve animal productivity through establishing an integrated range–livestock model. This project proposed an organized grazing system based on establishing number of communal grazing units in various areas along the NWC. That is to provide the flexibility to the Bedouins to move from one area to another. Moreover, within each area a practical rotational grazing system would be implemented to ensure rehabilitation, maintaining as well as the productivity of rangelands. Furthermore, an efficient and practical breeding program would be practiced in each unit in order to enhance the genetic merit and develop the hardiness of the indigenous sheep breed under the prevailing conditions. The project would also act to provide and distribute improved rams to disseminate superior genetic materials to enhance the productivity of Bedouins flocks along the NWC. Some other activities would be accessed to this project to stimulate some income generating activities to the local inhabitants.

V.2. This project would start by rehabilitating 10,000 feddans of rangelands and 1,000 breeding Barki ewes to establish two communal grazing units (each of 5,000 feddans and 500 breeding Barki ewes). These grazing units would be located along the NWC in Fuka and Sidi Barrani. This project is planned for six years and could be extended. It comprises four main components as follows:

Component 1: Range Management

V.3. The project would deal with an area of about 10,000 feddans in the NWC, to set up two communal grazing units probably in Fuka and Sidi Barrani (each of 5,000 feddans) to implement various project activities. The range management component would include:

- Preparatory stage to review the indigenous knowledge of resources users and local communities to be incorporated in conservation and rehabilitation of rangelands as well as management of range and sheep flocks.
- An agreement will be reached with the leading Bedouins in the region to incorporate some of them to the project and clarify the importance of this project to them as well as to the whole region.
- Methodology and techniques of rehabilitation of desert rangelands would be implemented through direct seeding and use of specialized equipments and locally adapted species. Criteria of sites, and selection of the species and seed application such as seed preparation, seeding time and methods of using the seeding equipment will be practiced.
- The selected range plant species would be multiplied, promoted and distributed to the Bedouins in the region to be planted in later stages.
- Rotational grazing would be designed and implemented to feed the animals of both nucleus and control flocks.
- Set up an integrated model for the use and maintenance of an area communally grazed but controlled by proper range use system and develop strategies for improved land use.
- Throughout the project would act to introduce new feed resources and mixed cropping to increase their nutritive values.
- Conservation, improvement and management of soil and water resources may include: rain water harvesting and spreading (contour furrows, contoured earthen embankments,

stone and earthen bunds in helical structures, run–off management in wades and waterways, improving physical and chemical properties of soil etc.).

- The project would contribute to improve the socio–economic status of the local communities and their environment through providing seedlings of multi–purposes shrubs and seeds of key range grasses and legumes to promote afforestation, agro–pastoral and improve water supply for human use.

Component 2: Genetic Improvement of Sheep

V.4. The project would act to formulate two nucleus flocks within each communal grazing unit in Fuka and Sidi Barrani (each of 500 breeding Barki ewes) to produce improved rams to be multiplied in the leading Bedouins’ flocks and then distributed to the Bedouin’s flocks along the NWC. While selection would be continued and tested in the nucleus flock, these improved rams would be multiplied in the leading Bedouins flocks and then distributed to other Bedouins flocks. Consequently, this project would be an applied improvement project by producing larger numbers of sheep and incorporating larger numbers of Bedouin’s flocks along the NWC. That could be implemented through the following three stages:

Stage 1: Establishing a nucleus flock and producing improved rams

V.5. This stage will include:

- Establishing infrastructure facilities such as animals, pens, offices, green houses (for range plants), etc. All these constructions have to be environmentally oriented and compatible with project objectives.
- Superior Barki sheep would be collected from the best available genetic materials from various flocks along the NWC. Approximately 1,000 breeding Barki ewes would be maintained to develop two genetically superior nucleus stock (each of 50 breeding ewes in Fuka and Sidi Barrani).
- The nucleus flock would be maintained on natural grazing conditions with the minimum supplementary feeds. Moreover, selection would be carried out under the most stringent conditions to increase sheep productivity under the prevailing system. That would help to develop more robust and highly adapted animals with higher production efficiency under less favourable conditions. Furthermore, this would ensure that the distributed rams are well adapted to the prevailing environmental conditions and being capable of providing effective genetic progress in Bedouins’ flocks.
- Selection objectives as well as selection criteria would be clearly defined in the nucleus flock. Efficient and intensive selection will be carried out to maximize the selection objectives in the nucleus flock. Thus, recording for the basic information of productive and reproductive traits under the prevailing conditions would be sustained throughout the project.
- Supreme ram lambs produced from the nucleus flock would be selected for multiplication in leading Bedouins’ flocks while the others would be retained in this flock for replacement. The remainders of these weaned ram lambs would be sent to the fattening centre.

- Fifty ewes would be chosen at random from each foundation flock to form two control flocks in Fuka and Sidi Barrani. The culling and mating among individuals in these flocks would be at random. The same methods of management and husbandry would be applied in both nucleus and control flocks.
- Genetic improvement achieved in different traits in the nucleus flock would be assessed in each generation as compared with the control flock.

Stage 2: Multiplication of improved rams in leading Bedouins’ flocks

V.6. This stage will include:

- An agreement would be reached with some of the leading Bedouins’ flocks which are quite large (sometimes exceeding 1,000 heads) and are above average in phenotypic merit. Some incentives would be available to these flocks (e.g. veterinary care, supplement of vitamin A or else).
- Leading Bedouins flocks could be very valuable for testing and multiplication of improved rams produced in the nucleus flock. The best of their ram lamb progeny would be distributing to a suitable number of Bedouins’ flocks along the NWC.
- Considerable actions would be taken to follow up the efficiency of improved rams to raise the productivity of the leading Bedouin’s flocks through simple and practical methods of recording. That is to ensure the transmission of genetic improvement wrought in the nucleus flock in the productive traits under various environmental conditions.

Stage 3: Distributing multiplied improved rams in Bedouin’s flocks.

V.7. This stage of the project plan would be done basically in the Bedouin’s flocks throughout the NWC region. This stage will include:

- Distributing improved rams wrought in the nucleus flock would disseminate superior genetic materials responsible for higher productivity in Bedouins’ flocks and ensure proper planning and permanent genetic improvement in meat, wool and lamb production along the NWC.
- An extension program would be implemented for the distribution of the multiplied improved rams produced in the previous stages to Bedouins’ flocks taking into consideration the social and economic situation prevailing in the region.
- Simple and practical methods of recording would be followed to test the efficiency of multiplied improved rams to disseminate the genetic improvement in Bedouins’ flocks.
- The implementation of the previous stages would sustain in parallel throughout the project. Selection in the nucleus flock would continue during the testing of improved rams each generation. Hence, more improved rams and their offspring would be produced and after multiplication, their progeny are consequently distributed to Bedouin’s flocks. Hence, this project can be transformed into an applied improvement project, through producing and distributing larger numbers of sheep as well as incorporating larger numbers of Bedouin’s flocks along the NWC.

Component 3: Income Generating Activities

Stage 1: Establishing fattening centres

- Animals culled from the nucleus flock would be sent to the fattening centre to increase mutton production and provide some return to the project.
- The centre would act to demonstrate some appropriate techniques of husbandry and feeding for Bedouins. Fattening would be based mainly on locally available feeds to increase the efficiency of fattening procedures and produce high quality carcasses.
- Stimulating fattening centres would encourage Bedouins to run such enterprises along the NWC. This would increase mutton production in the region to satisfy local consumption and to meet the requirements of the export commitments. Furthermore, it would stimulate the culling of surplus ram lambs from Bedouins’ flocks and hence, decreasing the number of animals on the range and relieve the pressure on grazing lands.

Stage 2: Establishing wool collecting and processing store

- Wool produced in the region would be collected in this store for grading before marketing to ensure higher return for Bedouins than is presently possible.
- Small wool industries would be supported and practiced by Bedouin women as an income generating activity to generate primary or complementary incomes for Bedouins to enhance rural development.
- Introducing modern techniques such as spinning wheels and better weaving looms which are considered to be practical, less tiring and time saving and being economically feasible. That would assist Bedouins to improve their skills to produce hand made carpets of marketable quality.

Component 4: Capacity Building and Institutional Support

- Training and extension would be conducted through field days, on–job training and workshops and directed towards livestock breeders, pastoralists and beneficiaries to build their capacity and ensure sustainability of various project activities.
- The project would support training extension staff and Bedouins to develop and propagate some technical factors of importance to the range–livestock production system and for rural development in general such as rangeland resources, biodiversity, mutual habitats conservation, range management, animal breeding, carpet making, wool grading, lamb fattening, caring for sheep and goat skin, veterinary care, etc.
- All new technologies and practices would be thoroughly evaluated prior to widespread implementation. Extension staff would work with interested beneficiaries to test and demonstrate the best available technologies and practices together with their economic feasibility and acceptability by Bedouins.

VI. INDICATIVE COSTS

VI.1. Cost items included:

- Approximately 10,000 feddans in Fuka and Sidi Barrani along the North Western Coast of Egypt;
- Pure Barki sheep for nucleus (1000 breeding ewes + 100 Barki rams) and control flocks (100 breeding ewes);
- Fixed constructions (sheep pens, two dips, feed storage, green houses, offices, fattening centres, etc.);
- Permanent and temporary personnel and labours;
- Sheep breeding and management facilities and equipments;
- Range management facilities and equipments;
- Computers and sheep recording facilities;
- Transportation facilities;
- Running expenditure;
- Maintenance and repair;
- Training & extension;
- Miscellaneous.

Table 1: Summary Cost Breakdown by Component

Component (amounts in US\$'000)	Local	Foreign	Total	% Foreign Exchange	% Total Base Costs
1. Range Management	1,050	3,950	5,000	79.0	49.0
2. Genetic Improvement of Sheep	600	2,900	3,500	82.9	34.3
3. Income Generating Activities	250	750	1,000	75.0	9.8
4. Capacity Building and Institutional Support	100	600	700	85.7	6.9
Total Baseline Costs	2,000	8,200	10,200		100.0
Physical & Price Contingencies	200	820	1,020	80.4	10.0
Total Project Costs	2,200	9,020	11,220		110.0

Table 2: Summary Cost Breakdown by Year

Component (amounts in US\$'000)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
1. Range Management	2,800	450	450	450	450	400	5,000
2. Genetic Improvement of Sheep	1,500	400	400	400	400	400	3,500
3. Income Generating Activities	250	150	150	150	150	150	1,000
4. Capacity Building and Institutional Support	200	100	100	100	100	100	700
Total Baseline Costs	4,750	1,100	1,100	1,100	1,100	1,050	10,200
Physical & Price Contingencies	475	110	110	110	110	105	1,020
Total Project Costs	5,225	1,210	1,210	1,210	1,210	1,155	11,220

VII. PROPOSED SOURCES OF FINANCING

VII.1. This project could be financed by financing agencies interested in implementing an improved model for livestock production and range management as well as income generating activities. That is to help alleviating poverty and improve livelihood of the local inhabitants in the north–western desert of Egypt. The contribution of the Egyptian Government could involve prices of lands and buildings.

VIII. PROJECT BENEFITS

VIII.1. Since the main source of income for the inhabitants of the NWC comes from range–livestock production, hence the major benefits of this project would be directed towards those inhabitants as well as animal breeders, pastoralists and other local community groups through:

- Rehabilitate the degraded rangelands and increase its productivity, reduce the cost of livestock feeding and increase the returns from raising animals.
- Enhance the production efficiency of various animal products for local consumption and export commitments.
- Introducing appropriate income generating activities to generate additional incomes for the inhabitants and ensure better returns for Bedouins reflected on their social and economical status.
- Building the capacity of the local inhabitants through efficient extension and training program for various project activities and creating jobs. Community participation and Bedouin extension is an essential component of any awareness raising and environmental education program.
- Efficient utilization and conservation of the available natural resources in the region.

IX. IMPLEMENTATION ARRANGEMENTS

IX.1. The *Desert Research Centre* would have the overall responsibilities for the implementation of the project. They would be responsible for planning and executing of the project.

IX.2. Bedouins beneficiaries would play an important role in the project implementations since they are part of the project. Leading Bedouins would act multiply the rams wrought in the nucleus flock. These multiplied rams would be distributed to transfer the genetic progress to Bedouins flocks along the NWC. Bedouins would also be involved in promoting and multiplication of the selected range plants to be planted in the project area. Moreover, they would be the core for implementing the income generating activities in order to improve their livelihood.

X. TECHNICAL ASSISTANCE REQUIREMENTS

X.1. The project team members would include high calibre expertise in different areas. These experts have long experience in their fields in the NWC as well as in similar environment through

some international organizations. Therefore, no technical assistance has been identified at this stage. Probably as the project proceed, short–term expertise would be required for training, extension, etc.

XI. ISSUES AND PROPOSED ACTIONS

XI.1. **Conservation technology.** Rehabilitation and ranges control must become an integral part in this project and has to be given more attention. Selection of plant species, use of agronomic and biological methods of erosion control as well as other techniques have to be tested and implemented to ensure that Bedouins attained it as a useful activity to effectively participate in such activity.

XI.2. The *Desert Research Centre* has considerable experience in the application of conservation techniques in the project area. They also attained their experience from many national and international organizations.

XI.3. **Participatory approach.** The participatory approach is crucially important for successful implementation of the project. That is to ensure the participation of local community in the implementation and monitoring of various project activities. The project would rely on some leading Bedouins to multiply the improved rams wrought in the nucleus flock. Furthermore, the progeny of these improved rams would be distributing to some Bedouins’ flocks along the NWC. Recording of some basic information would be taken to test the effectiveness of these improved rams to disseminate superior genetic materials to Bedouins’ flocks along the NWC. Therefore, promising Bedouins would have the priority to be employed as extortionists and at all levels wherever possible. Moreover, training would be given to those Bedouins to increase their capacity as well as their communication skills.

XI.4. **Other project activities.** It is essential for the financial survival of stock owners to deal with a number of different agricultural activities to be able to survive and cope with these fragile and uncertain conditions. These activities aiming at earning primary or complementary incomes which would help to alleviate poverty as well as providing rational use for the natural resources available in the region. That would be reflected on the social and economical status of the inhabitants of the region. The project would deal with some of these activities such as fattening centre, wool collecting and processing store. The project could provide credit loans to Bedouins destined to finance these productive activities. An efficient marketing policy for these products would ensure higher and more encouraging economic return for Bedouins. On the other hand, such activities would act as demonstrations for Bedouins and might encourage them to run similar enterprises along the NWC.

XI.5. **Financial.** Bedouins might need some incentives to be fully cooperated with the project particularly for the components of range management and livestock improvements which would be of long term interest. Incentives could be in forms of seedlings, veterinary care, vitamin A supplementation, feed rations or else.

XI.6. **Environmental.** Attention would be given to improve the environmental status of rural areas and assuring that all project practices, constructions and activities should be compatible with the prevailing environmental conditions and appropriate to the Bedouins.

XI.7. **Regional policy priority.** This project lies within the interest of Ministry of Agriculture and Land Reclamation as well as Mersa Matruh governorate. However, an agreement would be reached with the governorate to be familiar with such project and its activities.

XII. POSSIBLE RISKS

XII.1. There are five main risks which can be identified at this stage:

- The development of livestock production under these prevailing fragile conditions is considered to be the most challenging and complex issue. That is because it depends on the progress of other disciplines associated with livestock production such as soil and water resources and range management. The progress of these disciplines would provide better feeding and hence improving the prevailing conditions in which the animals are kept. However, the experience gained from the previous studies undertaken in the NWC would furnish the base to the success of the range management component of this project. Moreover, the expertise project members responsible for such component have gained lots of experience in range management and livestock improvement from other projects in the NWC as well as from some of the FAO projects in other similar areas.
- Flock owners in the NWC are usually reluctant to use any rams from outside their flocks. However, the main objective of this project is to develop the hardiness and highly adapted Barki sheep to enhance their production efficiency in an environment similar to that of the Bedouins. Thus, breeding animals would be practiced under extensive system of natural grazing while selection would be carried out under the most stringent conditions. Probably, this would be the way for stock breeder to ensure that these distributed rams are well adapted to his specific conditions, and in future he would realize that effective genetic progress in his flock could be attained by purchasing the best performers out of a similar environment.
- The present range use policy which is free open access system (land tenure rights) considered to be the key obstacle to conserve and improve rangeland resources of the NWC. Furthermore, lack of proper alternative sustainable range use systems that can be presented to decision makers is another problem in which institutions failed to address. However, this project would depend entirely on the participatory approach to ensure that Bedouins are fully involved and cooperated in the planning and design of this project. Moreover, some incentives would be directed to Bedouins such as priorities in having distributed rams and seedlings of some improved shrubs, veterinary care, feed rations, etc. On the other hand, one of the main objective of this project is to introduce some improved systems to be practiced by the Bedouins such as rotational grazing or else in order to conserve and improve rangelands. It is worth to mention that an outline of the project activities has been introduced to Bedouins, through other projects in NWC, for which they expressed their needs and willingness to have such activities.
- Local inhabitants are lacking experience and extension, therefore, one of the main components of this project would be devoted to a practical program for training and extension for Bedouins to increase the capacity and develop their awareness.
- An efficient marketing policy for the woollen products and other small scale industries would be needed to ensure higher and more encouraging economic return for Bedouins.

Appendix: Location of Project Area

