

PDCAP 443

PROJECT PAPER

TUNISIA

RANGE MANAGEMENT

664-0312.8

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER

Tunisia

Range Management 664-0312.8

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I. SUMMARY AND BACKGROUND

A. Summary

1. The Problem

Demographic growth in Central Tunisia during the past twenty years has triggered a dramatic increase (quadrupling) of livestock inventories in the area. To illustrate, sheep population has increased from about 635,000 animals in 1950 to a current total of over two million. Simultaneously, the large nomadic herds that grazed the area in the past have been replaced by small, poorly managed flocks as the livestock raisers (eleveurs) have made the transition from nomadic herders to sedentary farmers. This change in lifestyle has been accompanied by an increase in cereal and fruit tree (olives and almonds) production, which is occurring on the most fertile grazeland areas. Throughout this process, little attention has been given to the development of forage crops or to management of natural vegetation--a fact which coupled with insufficient rainfall and overgrazing has contributed to serious erosion problems. In combination, the result of these factors is that current productivity is below par, the total area left for grazing purposes is being reduced, and deterioration of existing rangeland is progressing at an ever increasing pace.

2. The Project - Proposed Solution

In recognition of this problem, the Government of Tunisia (GOT) has included strengthening of rangeland management capability in its program for development of Central Tunisia. This Central Tunisia Rural Development (CTRDR) subproject will assist the Government of Tunisia's Ministry of Agriculture (MOA) to launch an experimental effort to design and implement socially and technically sound approaches to improved rangeland management. During the life of the subproject, twelve experimental sites will be developed. The sites will be selected in order to account for the variety of micro environmental settings as well as the principal land tenure arrangements (collective and private rangeland) found in Central Tunisia. Interventions at each site will include improved range utilization and stock raising techniques. The subproject will be implemented by the MOA's Office of Pastures (OEP) in coordination with the Central Tunisia Rural Development Authority (CTDA) and other departments within the MOA. At the community level, the technical assistance will be channeled through range management committees, organized with the help of local leaders, into socially acceptable formats.

At the end of the subproject, there will be a functioning range management unit within the MOA that will have the capability to replicate the successful interventions of this pilot effort throughout Central Tunisia. In addition, improved range and herd management systems will have been introduced and accepted by stock raisers on 12 perimeters. On at least three of the sites sufficient measurable progress concerning improved range conditions and increased flock productivity will have taken place to induce eleveurs to continue the recommended practices and encourage non-participating farmers to adopt them.

B. Background

The subproject is one of a number of related interventions being implemented with AID participation in Central Tunisia. The main AID vehicle for assistance is the Central Tunisia Rural Development Project (664-0312) authorized on March 28, 1979. In the agriculture sector previously obligated subprojects include Small Scale Farmer Irrigation, Dryland Farming Systems, and Rural Extension and Outreach. This subproject will be linked closely to the latter two activities, drawing on the research results of the Dryland effort and the information dissemination capabilities of the Extension intervention respectively, throughout implementation.

The basis for selection of Central Tunisia as the project area, a description of the target population, as well as a statement of the goal and purpose of the core project are described in the Central Tunisia Rural Development PP. The approximately 200,000 people in the area are among the poorest in Tunisia. The wide majority of the households practice a combination of dryland farming and animal raising. Production is small scale with a major orientation toward meeting subsistence needs although there is some participation in markets.

C. Subproject Committees

USAID/Tunis Subproject Committee:

Mr. William G. Kaschak, Assistant Program Officer, co chairperson
Mr. Harry Dickherber, Assistant Agriculture Development Officer,
co chairperson
Mr. C. John Fliginger, Agriculture Development Officer
Mr. Patrick Demongeot, Rural Development Officer
Mr. Steven Carlson, Regional Legal Advisor
Mr. Said Ben Chouikha, Controller (Acting)

Also participating in the design of the subproject were:

Mr. Jabber Ammar, Director, Office de l'Elevage et des Paturages,
Tunisian Ministry of Agriculture
Mr. Salah Souki, Agriculture Engineer, Office de l'Elevage et des
Paturages, Tunisian Ministry of Agriculture
Mr. Hamadi Hassen, Director of Agriculture Central Tunisia
Development Authority
Mme. Fatma Larbi, Assistant to the Director of International
Cooperation, MDA.
Mr. Henry D. Galt, USDA/PASA Range Management Advisor
Mr. Walter Graves, USDA/PASA Agronomist Advisor
Mr. Ralph Dunlap, USDA/PASA Sheep Husbandry Advisor

Director's Development Assistance Committee: USAID/Tunis:

Mr. William F. Gelabert, Director Chairperson
Mr. Richard Zenger, Assistant Director, Office of Housing (HEJUDO/Tunis)
Mr. Said Ben Chouika
Mr. John Fliginger, Agriculture Development Officer
Mr. Buddy K. Dodson, Food for Peace Officer
Mr. Patrick Demongeot, General Development Officer
Mr. Richard S. Stevenson, Science and Technology Officer
Ms. Dale Gibb Health and Family Planning Development Officer
Mr. Edmond Auchter, Program Officer
Messrs. Anthony Wallace, Chief Economic Commercial Section,
U.S. Embassy/Tunis
Patrick Dumont, Director, Peace Corps
Steven Carlson, Regional Legal Advisor, Near East Bureau, AID/W
Robert Parker, Country Director, Catholic Relief Services/Tunisia
Tim Aston, Country Director, Care Medico/Tunisia

II. SUBPROJECT DESCRIPTION

A. Goal, Purpose and Assumptions

The goal of all Central Tunisia Rural Development subprojects is to improve the quality of rural life and real incomes of poor majority in the target area. The purpose of this subproject is to introduce improved rangeland management and stockraising practices among the farmers in Central Tunisia thereby contributing to melioration of the rangeland in the area.

The key assumption linking the purpose and the goal is that improved range management and stockraising practices will improve the quality of the sheep flocks which in turn will increase the market price of animals and contribute to higher productivity. Other important assumptions are:

- (1) that the stock raisers will respond to the price incentive offered by this effort and adopt the recommended changes;
- (2) a multiplier effect will take place as interventions made at the pilot sites will be taken up by other farmers in Central Tunisia; and
- (3) the rotational grazing system and reduced herd sizes, key elements of this subproject, will continue after the project ends.

B. Technical Interventions

1. Technical Components

This subproject will address the problem of deteriorating rangeland by assisting the Ministry of Agriculture establish up to twelve pilot sites on which to introduce a comprehensive package of technical interventions for improved rangeland management. This package will include upgraded vegetation control and stocking procedures such as rotational and deferred grazing, mechanical treatments of the soil, range seeding, range water development, and improved animal raising techniques like genetic improvement and enhanced nutrition.

These interventions will be implemented by the OEP in coordination with the CTDA and other Ministry of Agriculture Organizations. A host country contract with a U.S. University or consortium of universities will provide technical expertise to OEP to assist with implementation. This assistance will encompass identification of sites to be included in the subproject, development of intervention plans for each site, organization of orientation visits, procurement of imported commodities and identification of needed training requirements for OEP staff.

2. Project Implementation

With respect to land tenure, rangeland in Central Tunisia is divided into four categories--collective, land in extreme indivision, private and state owned. On collective perimeters the land has gone through a titling process conducted by the Directorate of Land Titling (Affaires Foncières) of the MOA. The range is owned by a juridical person, the community, and in theory every household in the community has access to it. Normally, privately owned plots, used for cereal and fruit tree production, are adjacent to the communally held land. Available data indicate that in the Governorates of Kasserine, Sidi Bou Zid, Kairouan, as well as the northern portion of Gafsa there are currently 86 collectives. These units total approximately 650,000 hectares of land.

In addition, Affaires Foncières plans to process 300,000 hectares over the next six years.

Land in extreme indivision refers to former tribal land which has not gone through a titling process and hence about which ownership is uncertain. This land is being encroached upon by individual families who use it in a private manner although they lack legal title. This land is eligible for the collectivization titling process. It is also possible that it could undergo a second titling procedure. Current occupants, by working the land for seven years and filing a petition for ownership according to which the key element is that the land claimed is uncontested by neighboring farmers, can gain ownership. While data on this type of range are incomplete, in the Governorate of Kasserine 163,000 hectares are currently in extreme indivision.

Private land is as the name suggests, range that is owned by individual farmers and to which access by neighboring farmers is limited if not prohibited. The total land area that currently is privately owned is relatively small; for example in Kasserine there is 13,100 hectares of private rangeland. However, the potential for at least some of the land in extreme indivision becoming private, increases the importance of including privately owned rangeland in this subproject.

State land is owned by the Central Government which controls access to it. To a large degree these lands are covered with alpha grass cut by small farmers and marketed for use in a pulp mill in Kasserine. These lands represent an important source of income for poor households as well as a valuable resource. For these reasons the GOT is attempting to discourage the grazing of animals on this land. Hence this category of range will not be included in the subproject.

Interventions will take place at both collective and privately owned sites. This approach is taken to fit the project to the land tenure realities of the target area. As described in the social analysis, ownership of land in Central Tunisia is in a state of flux. While the GOT is supporting a collectivization policy, according to which collectives are created by granting title to rangeland to the community and adjacent parcels to individuals, there is a parallel process of atomization according to which rangeland is being titled on a private, individual basis. In some instances, individuals have in the past and are continuing to obtain legal title to such land.

As noted above, there will be a total of 12 pilot sites included in this subproject. Through the five year life of the subproject, the sites will be "phased in" according to the following plan:

Year 1:	2 sites
Year 2:	1 site
Year 3:	2 sites
Year 4:	3 sites
Year 5:	4 sites

Beyond the life of this subproject OEP, in collaboration with CTDA and other MOA entities, will continue to expand the number of sites adding four in each year, beginning in year six, for an indefinite period of time.

This phased strategy has a number of advantages. First, this is a pilot effort without benefit of a backlog of first hand experience. Hence proceeding slowly at the outset (only 3 sites in the first two years) will provide the opportunity to experiment with different combinations of range treatments thereby developing intervention packages which have a high probability of succeeding. Moreover, limiting the number of sites in the early years will allow the fledgling range management unit within OEP to gather needed expertise and experience to successfully implement the project. Beginning in the year three, as both the range management unit's expertise grows and the experimental interventions yield results, sites will be phased in at an accelerated pace.

Of the two sites chosen for the first year of the subproject, one will be a collective and the other privately owned. A probable candidate for the collective site will be the community of Brikat---a collective range located in Kairouan Governorate. The likely nominee for the private site is El Allah, a perimeter also located in Kairouan Governorate. Both sites are situated in the CTRD geographic area and both have been intensively researched.

Data contained in this subproject paper has been drawn in large part from field research at both perimeters. Selection of subsequent sites will be done by OEP in conjunction with the long-term technical advisors. In selecting sites they will abide by the following criteria:

1. Land Ownership issues must be almost completely resolved;
2. Sites must be within the 22 delegation CTRD area;
3. 80 percent of the farmers must have 25 or less hectares of privately owned land;
4. A request must be submitted from farmers in the area to OEP soliciting inclusion in the program;
5. On collective sites management committee(s) must be established prior to submission of request for participation;
6. In addition to the privately owned land selected in the initial year of project implementation, at least one other entirely privately owned perimeter must be included in the project;
7. Site selection must, to the extent possible, take into account climatic and other environmental variations in the region.

The OEP will have overall responsibility for subproject implementation. The Office, with the support of the technical assistance team, will design and carry out the specific interventions, establish and sustain contact with the participating farmers, train and assign qualified personnel, and provide logistical support for the field agents. Throughout implementation, OEP will coordinate involvement of appropriate GOT entities such as Affaires Foncières for questions of land titling, MOA Division of Rural Engineering in matters related to mechanical treatment of the soil the construction of water catchment basins and water diversion activities and CTDA for matters of evaluation and coordination with other interventions in Central Tunisia.

Currently, OEP has a cadre of qualified technicians, the recently created Range Management Unit (RMU) which has expertise in Sheep Husbandry, Forage Materials, and Range Management, to implement the subproject in its initial phases. Staff expansion and training while the project is in progress will give them the capability to manage the full complement of sites in this subproject plus an additional load to be undertaken by the GOT after this activity terminates.

3. Subproject Inputs

The total cost of this subproject is U.S. \$5.6 million. Of this total U.S. \$2.6 million will be AID funded with the balance (U.S. \$3 million) contributed by the GOT (budget details appear in Section III) AID financed inputs will include technical assistance, training, and commodities. GOT will meet expenditures for staff, office space, locales for incountry training, logistical support for field staff, and certain commodities.

a). U.S. Inputs:

i) Technical Assistance

A large portion of U.S. inputs to the subproject will center on contract services procured from a U.S. university. These services will include three resident technicians who will be assigned for periods of four, three, and two years. All technicians the first who will be a range management specialist and Chief of Party, and the second who will have expertise in animal husbandry, and the third who will be a plant materials expert will serve as advisors to the (RMU) within OEP. The Chief of Party will serve as the counterpart of the RMU director with whom he will work closely on site selection, appropriate mix of interventions for each site, identification and management of training requirements for MOA technicians, in addition he will liaison with U.S. backstop office on commodity procurement and scheduling of short term technical assistance. The livestock and plant materials specialists will each have counterparts on RMU's core staff. The former will assist in developing the sheep improvement component of intervention package for each site and assist his/her counterpart in overseeing timely procurement of local commodities such as supplemental feed and breeding rams.

In addition to assisting the RMU's central staff in site selection and overall planning of subproject implementation, they will provide direct support to the technicians in the Unit's four field offices that will be established in the subproject area (Scopes of Work for the resident advisors are included in Annex A). Short-term specialists (a total of 13 person months) will complement the expertise of the resident advisors during subproject implementation.

ii) Training

AID financing for training totals U.S. \$640,000. This training will consist of 30 person years of long term academic study in the U.S. and/or other third country. The long term study will be structured to give 5 MOA technicians with M.S. degrees in rangeland management, 3 with M.S. degrees in livestock raising

and 2 with an M.S. in seed selection and multiplication. Each course of study will include ample exposure to rural sociology as well as the technical field of concentration. Short term training will total 40 person months divided into 16 units--each of 2 1/2 months duration. It will consist of matters directly related to rangeland management and the organization of social groups in rural areas.

iii) Commodities

U.S. financing of commodities will be U.S. or Code 941 and include automobiles (automobiles are U.S. source only), trailers, and range improvement implements such as a land imprinter, range seeder plows and other specialized equipment. Purchase and procurement of these items will be carried out by the Government of Tunisia (with regard to the vehicles) and by the University Contractor for the other items.

b). Government of Tunisia Inputs:

As noted in the Summary the Government of Tunisia will contribute approximately 50 percent of the total dollar value of this subproject. The GOT will pay the recurring costs of the RMU, both central office and field stations, provide land and buildings to house the unit, and conduct training sessions for farmers. In addition the GOT will contribute to the cost of training and the procurement of some commodities.

i) Training

The Government will pay international travel costs of trainees and partial salaries for long-term trainees. The GOT also will finance participating farmer orientation sessions in Tunisia and transportation for short-term TDY technicians will be other expenses borne by the GOT.

ii) Commodities

In addition to usual office equipment and supplies, the GOT will finance the purchase of 5 tractors, 4 one ton trucks, and certain other shelf items. Furthermore, the GOT will bear the cost of the supplemental feed to be provided farmers at subsidized rates, to minimize the potential risk of participating in this project.

4. Other Donor Activity

Previous range development activities in Tunisia have been limited in both number and impact management practices vis-à-vis this resource. Nevertheless, they do provide a number of lessons that have been taken into account in the design of this project.

The most significant past activities include: (1) a series of studies and reports financed by FAO and UNDP; (2) studies and trials conducted in relation to the Man and the Biosphere and the Tunisian Presaharan projects; and (3) the planting of forage reserves--principally spineless cactus and atriplex.

With regard to projects that have been implemented, the most important is the spineless cactus and atriplex forage reserve effort conducted under the auspices of OEP and FAO/SIDA. The project has been a success in so far as some forage reserves have been established. However the integration of animal and range management systems proposed by this effort has not been achieved.

The relevance of the FAO/SIDA activity to the project proposed here is the fact that the deferment of grazing while the cactus was being established, clearly demonstrated the regenerative capability of degraded range areas as growth of other native forage plants has increased in these areas.

Under the Tunisian Pre-Saharan project a number of deferred and rotational trials were conducted. These trials demonstrated that even with present stocking rates, simple deferred and rotational grazing patterns can make drastic differences in the percentage of ground cover and amount of forage produced. These plots have been used in training sessions for OEP agents, and it is expected that they will also serve as an effective demonstration to farmers and project technicians of the type of improvements which can be achieved.

III. ANALYSES

A. Social Soundness Analysis

1. Overview of Beneficiaries

The immediate beneficiaries will be the approximately 3600 participating farm families residing on the twelve rangeland perimeters selected for this subproject. Ultimately the number of beneficiaries will be expanded considerably as the range improvement interventions undertaken in this pilot effort are diffused throughout Central Tunisia.

A complete analytical description of the target group appears in Annex D. This description points out that the beneficiaries are mainly subsistence oriented farmers far removed from the main-stream of Tunisian society. On the basis of quality of life indicators such as literacy and infant mortality, they are clearly among Tunisia's poor majority. Their principle source of income is gained from a combination of stock raising (sheep) and the cultivation of cereals and fruit tree crops. Holding sizes are small, in most cases below 20 hectares, and production systems are governed by traditional practices.

In terms of social organization the target population is in flux. Traditional tribal structures, especially those governing allocation of resources and local authority, are rapidly disappearing. There is a marked trend toward independent activity, particularly in the economic sphere, by individual households, but cooperation among kin related households persists with regard to non-economic matters.

2. Sociocultural Feasibility

This subproject considered the principle sociocultural constraints to successful implementation. For each constraint corrective strategies have been devised and made a part of this intervention. These constraints include: (1) social organization; (2) land tenure; (3) risk behavior; and (4) prestige and savings as they relate to size of sheep flocks.

a. Social organization:

A key element of this subproject is the formation of committees of participating farmers to oversee joint utilization of the range and implement improved range management practices. Given the trend toward independent activity by farmers the question must be asked if this approach is feasible.

As noted above, in spite of the trend toward individualization there is on both collective and private perimeters ample evidence (reciprocal work exchanges, sharing of food money and feed in time of need, and public courts for settling land disputes) of cooperative behavior to serve as a basis for formation of rangeland management committees. On the collectives, it is suggested that a committee be formed for each rangeland section, rather than one large committee

For the entire community. This strategy would take advantage of natural groupings of people who have a vested interest in their own section of the range and have established systems for using it in a shared fashion. It would also provide units of manageable size with which field technicians could deal.

On private perimeters the problem is more delicate because there is no collectively controlled rangeland. For those farmers owning sufficient range, a minimum of 40 hectares, to support the rotation-grazing intervention there will be no need for cooperation and a management plan could be designed for each individual farmer. However, the wide majority of farmers have holdings of about 22 hectares (equally distributed between range and crop land) thereby necessitating a cooperative arrangement for use of the range. The question then is how to achieve type of arrangement in the face of trend toward independent activity by individual farmers. One possible solution is to form loosely associated groups based on close kin (brothers, cousins) ties. Field research on a private perimeter revealed that farmers are willing to pool land for improvement purposes under this type of arrangement. Groups would include 8-10 households and 100 or so hectares. Each farmer would retain title to his own land and have the right to pasture a number of animals commensurate with the number of hectares he contributes (e.g. on the basis of 2 head by hectare a farmer contributing 10 hectares could graze 20 animals, while a second farmer contributing 5 hectares could graze 10 animals).

For both situations, that is collectives and private perimeters, the committees could function to enact interventions on their particular section of range. Such management will include decisions on which blocks of land are to be rested, type of fencing to be used, and whether or not guardians should be employed. Composition of the committees and identification of candidates to serve as committee officials will be done with the assistance, on a site specific basis, of the local leadership structure--Delegue, Omda, and arty cell.

b. Land Tenure:

As noted above, in conjunction with the dissolution of traditional tribal structures, there is a strong trend toward encroachment upon former common grazing areas. The land taken over is used independently and access to it is limited. The problem posed by this trend could arise if farmers interpreted an intervention that emphasized joint use of rangeland as a rouse for expropriating occupied land thereby raising the probabilities of farmer resistance.

There are two design strategies built into the subproject to deal with this matter. First, only perimeters, (both collective and private) that have undergone the land titling process will be eligible for assistance. Areas where land tenure issues persist, including all lands in the Extreme Indivision category, will be excluded. Second, and this applies especially to private perimeters, the local leadership (Omdas, Delegue, etc.) will be used to assure farmers that participation in the subproject does not entail forfeiture of individually owned land.

c. Risk Behavior:

Adoption of new technologies is hindered or enhanced by the risk management behavior of the intended beneficiaries. To the extent that they are risk adverse the adoption process is retarded; to the degree that they are risk takers the probabilities for innovation are increased.

While not adverse to risk the small farmers in Central Tunisia manage it with a strategy which minimizes the possibility of loss but limits the potential gain. Hence the farmers are often hesitant to adopt a new technology until they are convinced through tangible evidence that it will be of benefit to them.

The largest potential risk in this subproject is associated with the deferred-rotational grazing scheme described in the technical intervention. Sheep grazing is an important element of the farmer's economy. Sufficient range-land is critical for the maintenance of herds, yet the present grazing area is inadequate for current sheep population. For example, last year the amount of forage available in most areas was sufficient for only a five months period. For the first two years deferred-rotation system will reduce by one half the amount of available range to allow blocks of land to rest and recuperate. Hence farmer skepticism of this approach and reluctance to adopt it are likely to be substantial during the initial stages.

While there is no easy solution subproject design includes several elements to overcome this constraint. First, emphasis will be placed on frequent contact between field technicians and recipients to establish the rapport and mutual confidence necessary to facilitate farmer adoption of a high risk intervention. Under the subproject technicians will receive specialized short-term training to give them insights as to the source of farmer risk behavior and how to deal effectively with it. Second, technical assistance will be provided to the farmers on establishing or improving household feed lot operations. Third, supplement feed (concentrate and hay) will be made available to participating farmers at subsidized prices.

There is a potential problem associated with provision of supplemental feed--namely farmers securing it at a subsidized price and selling it in turn at a profit. The results of subproject related field research suggest that the probabilities of this occurring are extremely low. While there is reciprocal borrowing of feed there is no evidence of buying and selling among farmers. Moreover, owing to the short supply of concentrate, farmers are currently purchasing it on a parallel market at prices significantly higher than government established levels. They are willing to pay the additional cost because they recognize the value of the concentrate. It is unlikely that the quantities provided under this subproject will cause a glut at the local level. Farmers will welcome its availability and use the feed for their own animals.

d. Prestige, Savings and Herd Size:

A key technical intervention will be an attempt to induce farmers to maintain a balance between forage available from the range and herd size in order to

improve the quality of animals--i.e. increase production of kilograms of meat per hectare. For example, if a normal size herd were kept at the same size (25 animals) after two years with the program, it is anticipated that 110 kilograms could be added to weight of marketable lambs. Current market prices for animals is about 1.300 T.D. per kilo. Hence this would represent an increase of 153.4 T.D. a year. There is some evidence that farmers appreciate the concept of improved animal quality (most farmers interviewed during the design of the subproject noted that while they sell sheep by the head they do receive more money for a quality animal), however, convincing farmers to not increase herd sizes will be a difficult undertaking requiring constant attention of field agents. In large part prowess as a sheepherder is measured by the number of animals one has. Hence the potential of prestige loss among peers could work against farmers consenting to not increase herd size. Field research indicated that animal quality is equally important to quantity in terms of peer prestige. Principle qualities include, animal size, quality of wool, and size of tail. Technicians, emphasizing to farmers that these qualities can be attained through the project, as well as noting the economic gains that could accrue, should be sufficient to offset the threat of prestige loss by not increasing herd numbers.

3. Role of Women

While women play an extensive and important role in agricultural production, their role in decisions concerning use of rangeland and breeding and marketing of animals is minimal. Moreover, the number of female household heads in the target area is extremely small. Defined behavior patterns limit judgement on farming matters and allocation of resources to men. In cases of death of the husband, the wife acts as the steward not the owner of the holding, until sons are old enough to assume management.

These factors place obvious limits on the direct impact the subproject can have on women. Nevertheless, efforts will be made to organize seminars among women of the target population on matters dealing with proper grazing practices, improved animal nutrition, and genetic upgrading of sheep. This activity will be coordinated with the Extension Services Support Unit of the Central Tunisia Rural Development Authority (CTDA). As a part of its function under the Rural Extension and Outreach Subproject the ESSU will develop information packages tailored specifically for women. These packages will focus on production activities with which women are heavily involved (e.g. shepherding and maintenance of household feed lots). They will be designed to increase knowledge and adoption of improved techniques thereby contributing to the enhanced productivity of the household and the women's place within that unit.

E. Administrative Plan/Analysis

The Office of Livestock and Pastures (OEP) of the Ministry of Agriculture, as a natural continuation of its leading role in livestock and forage development in Tunisia, will have overall responsibility for subproject implementation. This Office will assign personnel to the effort, and provide logistical support to both office and field agent staff. In addition, it will enlist support from and coordinate project activities with other Ministry of Agriculture

agencies. OEP will collaborate closely with CTDA in the overall planning of this subproject. CTDA will in turn be responsible for insuring that this effort is coordinated with other development activities in the Central Tunisia area and will assist in subproject evaluation.

The detailed planning and daily implementation of activities will be carried out by the RMJ of the OEP. This unit, which will be headquartered in Kairouan, the center of the subproject area, will be staffed initially with a director and four technicians with specializations in Range Management, Sheep Husbandry, and Forage Materials. This core technical staff will be complemented by a financial director and support personnel (secretaries, messengers, drivers and maintenance people) to sustain the headquarters operations. The core unit will be provided with a budget, based on submission by the RMJ director of a yearly work plan, to carry out local procurement of items (for example rebar and cement for the construction of catchment basins) needed for site interventions.

In addition to the core RMJ staff, frontline range technicians will be assigned to the staffs of the OEP offices operating in the five governorates in which the subproject will be implemented. The task of establishing and maintaining contact with participating farmers and local authorities will be shared equally by the core staff and frontline workers. For surveying sites for inclusion in the subproject this will require visits with local officials (omdas and delegates) meetings with potential participating farmers to discuss and explain the interventions and initial assessments of physical conditions of the rangeland and sheep flocks. After sites have been selected the principle tasks of the field staff will focus on visits to range management committees to explain particular facets of the program, assist in procurement distribution of commodities such as breeding rams and supplemental feed, and supervise the carrying out the mechanical, rotational grazing, and for seeding treatments of the rangeland. It is expected that when the interventions at a particular site are at their highest level a RMJ technician will have to meet with every range committee at least once bi-weekly. At a site like Sayada (El Allah) which could have as many as 30 range management committees could require the services of 2 or perhaps 3 frontline agents supported by core unit technicians, on a full time basis. Other agencies of the MOA that will assist in the implementation of this subproject include the Directorates of Forestry, Land Ownership and Legislative Affairs, Rural Engineering, and Soil and Water Resources. The Directorate of Forestry is the office in the MOA concerned with natural resources conservation and will support the RMJ in planning and implementation of soil and water conservation interventions--specifically, it will provide assistance in mapping the range area, developing access routes to range perimeters, and implementing mechanical treatments, such as contouring and construction of water spreading devices. The Directorate of Land Ownership and Legislative Affairs will continue its role in the project area of establishing land title and setting firm boundaries between individually and collectively held lands. A principle task of this directorate will be to identify range perimeters, as potential subproject sites on which all land tenure issues have been resolved proceed with the delimitation of range land according to the legislation controlling collective land in Tunisia. The Directorate of Rural Engineering will help in the design and construction of water catchment facilities on the range perimeters where: (1) grazing is controlled, (2) the

terrain is amenable to such facilities; and (3) water points are needed for improved range and flock management. They will also assist in carrying out some of the mechanical soil treatments. The Directorate of Soil and Water Resources will provide the subproject staff with climatic data as well as an inventory of the soils and water points in the area of intervention. They will participate in detailed soil surveys of the chosen perimeters and the development of soil conservation strategies as a part of the range management plan. In order to assure that participation of each of these agencies occurs in a timely fashion attached as Annex H is a copy of the minutes of a meeting held among representatives of all the MOA offices involved in this effort. These minutes, ratified by the Minister of Agriculture, underscore the fact that mutual consent have been reached on the role to be played by each office as well as the recognition by all entities involved, of OEP as the lead organization.

During implementation, support in the form of a technical assistance team, will be furnished to OEP by a U.S. university under a host country contract with the MOA. This team will consist of three resident advisors, one specializing in range management and the second in sheep husbandry, and a third in forage plant materials who will work directly with the RMJ staff. As an adjunct to the resident advisors 13 person months of consultant services will be included under the contract to treat specific project problems or furnish discreet areas of specialization.

In addition to providing technical support, the contracting university will assist in developing detailed specifications for project commodities and procure and ship all imported AID financed commodities to Tunisia. Receiving and customs clearance of commodities will be the responsibility of OEP in coordination with CTDA. The contracted university will also be responsible for carrying out the participant training activities, both long and short term, included in this subproject.

A subproject coordinating committee will be created to monitor project implementation and resolve issues as they arise. The committee will meet quarterly and include representatives of the MOA/Directorate of International Cooperation, Plan, Forestry Rural Engineering, Animal Production, Affair Foncier, and OEP, CTDA, CRDA's of Central Tunisia, and the contracting university. USAID will have an observer status only on the committee. This committee will report to the Minister of Agriculture.

C. Technical Interventions

The program to deal with the deteriorating rangeland situation in Central Tunisia will consist of two elements: (1) a rangeland management plan, including applied research and development activities with native forages; (2) a livestock improvement scheme.

1. Rangeland Management.

A rangeland management plan will be implemented to improve existing vegetation with respect to composition of forage species and total forage production. This in turn will provide more permanent forage in both the short and long term.

Sites for enacting the interventions will be selected in such a fashion so as to represent the main types of rangeland tenure patterns in the area. A portion of the sites will be range perimeters that are collectively owned and grazed by the users, and the balance will be range area that are privately owned. In every case a primary criteria for inclusion in the project is prior resolution of land titling issues.

At collective sites a key element of the plan will be to divide the existing rangeland perimeters into multiple sub-management units of approximately 150 to 200 hectares. These management units will coincide with established residences and grazing patterns within each rangeland unit as described in the social analysis. With the assistance of the Omda a committee of participating farmers will be organized to manage the rangeland units at each site. The composition of each committee will conform to socially acceptable configurations. They will work with the OEP technicians in implementing the program, and their principal responsibilities will be to govern use of the range under their jurisdiction to assure that the recommended interventions are being applied. On perimeters where private ownership is the norm participating farmers will be organized into groups to facilitate the transfer of technical information. Range management plans will be developed for each group to fit the specific situation.

The management units will be divided into several oblocks that will be grazed under a deferred-rotation system. The advantage of this approach is two-fold: (1) it allows for longer period of rest between grazing cycles; and (2) it results in more uniform use of range plants. Initially it is expected that the rotation plan for each unit will consist of division into only two blocks. Progressively, as the participating farmers become familiar with deferred-rotation grazing, the number of blocks per management unit will be increased to as many as six or eight. For the first two years, all range will be rested during the spring (February thru April) growing season. Thereafter, periods of rest and grazing will be based on the deferred-rotation grazing plan as shown diagrammatically in the following section.

The deferred-rotation grazing plan will be flexible, in terms of stocking rates and movement of sheep among parcels, to promote animal weight gain and optimal vegetation growth. As forage production rates vary from year to year, in accordance with moisture conditions, stocking levels will be adjusted annually to coincide with actual plant growth. Normally, to permit regeneration of plant material, use of the major perennial forage plants will not exceed 50 to 60 percent of annual plant growth on a weight basis. Grazing of annual plants will be controlled to leave sufficient plant residue for ground cover and to permit reseeding the following year. The goal is to produce all the vegetation the existing climate and soils will permit and correspondingly to graze as many animals as possible without harming the vegetation.

It is anticipated that boundary fencing will be necessary as well as guardians to keep out intruders. Boundary fencing used during the initial phase will vary among management units and the types will be determined in collaboration

with the management councils with an eye cast toward social acceptability and cost effectiveness. The types to be tried will include barbed wire fencing, woven wire, electric fence, natural boundaries known to and recognized by the people of the area, and life-fencing including various acacia, atriplex, and cactus species.

Stocking rates will vary with yearly climatic fluctuations, kind, condition and quantity of range vegetation, soil properties, past erosion, and response of vegetation to treatment. The initial stocking rate and length of grazing periods will be determined at the time of project initiation. Recommended stocking rates for the region range from 1 to 5 hectares/ewe/year. It is anticipated that an adjustment period will be necessary at most sites to bring herd size into balance with the quantity of forage produced. Recommendations on herd size will be part of the animal selection and improvement component of the project. The adjustment period will vary and could take up to two years in order to not require unnecessary economic adjustments by owners.

The following is an example of the type of grazing plan that will be applied. According to this plan the range theoretically will be grazed for six months during the first two years; beginning in year three the period will be extended to nine months. Of course actual duration of grazing periods will depend on yearly rainfall conditions and response of vegetation to improvement and will be developed on a site specific basis. Throughout the implementation of this plan, sheep will be maintained during the period between August and October on private land adjacent to the range. This will allow not only for range regeneration, but will coincide with the lambing period and permit closer attention of the sheep during a critical period.

TABLE 1
DEFERRED-ROTATION GRAZING PLAN

Months:	Feb	March	April	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.	Jan.
Weeks:	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234
1st year		Rest		Grazebloc 1		Pvt. land		Grazebloc 2				
2nd "		Rest		Grazebloc 2		Pvt. land		Grazebloc 1				
3rd "		Grazebloc 1		Grazebloc 2		Pvt. land		Gr. #3 & rest #4				
4th "		Grazebloc 4		Grazebloc 3		Pvt. land		Grazebloc #2 & rest #1				
5th "		Gr. #1 Gr. #2		Gr. #3 Gr. #4		Pvt. land		Gr. #5 Gr. #6				

The first and second years the management unit is divided into two blocks. The 3rd and 4th year into 4 blocks. The 5th year into 6 blocks.

The animals will be moved between blocks based on actual use of vegetation rather than calendar dates. Calendar dates are used only as a guide. During good years a block may be reserved for the next year. The number of blocks per management unit will be within practical operation ability for the herdsmen and the needs of vegetation and animals.

Water catchments will be installed in those areas which have a scarcity of water points and favorable terrain and soil type conditions. These catchments will be similar to those which have already been developed and proven feasible in Central Tunisia. They will be located in fields away from houses and will provide water only for animals. They will consist of a small cement tank (8 to 12 cubic meter capacity) and will collect water from micro (approximately 1 - 2 hectares) watersheds. The catchments will collect sufficient water during those periods in which rainfall is adequate for good plant growth and enable the animals to make most effective use of the vegetation. Availability of water near feed sources has the dual advantage of (1) reducing unnecessary expenditure of energy and weight-loss by animals suffered when searching for water; and (2) diminishing the detrimental effect to the range of trampling caused by the animals moving relatively long distances for water. During periods when rainfall is insufficient for good plant growth it will also be insufficient to fill the catchment tank, hence eliminating the threat of creating an imbalance between water and feed resources.

At each site, an applied research effort on native forage plants will be undertaken on selected blocks of the range and will be started in tandem with the implementation of the grazing plan. This effort will include mechanical treatment of the soil (contour furrowing, and pitting to break the soil crusting), shrub thinning, and range seeding. Contour furrowing and pitting are two mechanical treatment practices that are applied on rangeland to conserve moisture and break up surface soil sealing or crusting. Soil sealing or crusting is caused from soil erosion and excessive trampling from heavy grazing pressure. Mechanical treatment provides a more favorable seedbed for range seeding and for native plant seed to regenerate. Both practices are applied with a minimum amount of destruction to the existing vegetation. Range seeding may be used in conjunction with contour furrowing in which case it can be accomplished with a range interseeder. A range interseeder makes four furrows (cluster plow) 2 to 3 feet apart. Furrow widths are between 1.5 feet to 2 feet and their depth is 2 to 3 inches. The implement has a seeder attachment which broadcasts seeds into the furrow.

Contour (level) furrows are usually spaced from 8 to 10 feet apart. They are approximately 14 - 20 inches in width and 3 to 6 inches in depth. Ploughing is made with a cluster or moldboard plow. In the latter case the soil is pushed to the lower side on sloping land.

Contour furrows are best constructed so that their length does not exceed 70 - 100 feet. The plow is pulled out of the ground and quickly replaced by the tractor operator to leave a space of about 3 feet between the end of one furrow and the beginning of another. This makes a dam effect which holds water more evenly on rough uneven rangeland.

Pitting is the pulling of a heavy roller or axle having a series of spikes that breaks up soil crusting. It was only a temporary effect to help water infiltration and improve the seedbed for native plant species to begin growth. It makes a series of small pits or guages in the surface soil.

Pits are about 4 x 3" and about 10 .. 14" apart and spaced 18 .. 24" between rows. Depth is 2 - 4".

In areas where an excessive amount of shrubs competes with better forage plants, pitting or furrowing may be complemented with shrub thinning. Because many of the shrubs are beneficial to sheep seasonally (e.g. Artemisia Herba Alba) the shrubs would be thinned to about 40 to 50 percent composition until seeding and deferment results of grasses and legumes are obtained. Grass species that appear appropriate for seeding in Central Tunisia are: Dactylis Glomerata ("Derber" orchard grass), Oryzopsis Miliaceae (small millet), Ehrharta Calycina ("Mission" veld-grass), Cenchrus Ciliaris, and Hyperhennia Hirta--a species native to Tunisia. In addition, several annual species such as Ryegrass Lolium Regidum, Brome Grasses, and certain legumes such as local Medicago Spp and Vicia Dasycarpa, "Lana" vetch appear to be promising.

In all cases range seeding and mechanical treatment will be followed by complete deferment until establishment of the planted species. This will depend upon climatic conditions but usually grazing is not recommended until the second growing season after seeding.

Interventions to improve the ground cover will be complemented by an initiative to improve forage production on the adjacent private parcels. The majority of private land receives additional run-in water which provides an opportunity for water spreading. Efforts will be made to introduce some forage crops on these sites.

Small enclosures and transects will be established on each of the perimeters to monitor and evaluate plant growth under various rates of grazing intensity and timing of grazing. The effects of grazing will be determined by both a comparison of the various grazing blocks and by clipping trials. Nutritional quality as well as animal preference of various plants will be evaluated so that the development of the most beneficial species can be encouraged.

In 1980, OEP, in cooperation with CTDA, INRAT, INAT, Cereals Institute, Le Kef Institute, initiated a long-term program to collect, evaluate, and produce seed of native perennial grasses and legumes from northern and central Tunisia. This effort will be continued and strengthened as a part of this subproject with the goal being to establish a plant materials program that will continue to evaluate and provide seeds of quality range plant species. Future plans are to use seed of plants collected, evaluated, and multiplied from Central Tunisia for the range management project. Approximately 130 ecotypes of native forage species have been collected to date. These have been planted for observation at El Grine Nursery (Kairouan), Sbiba, Said (Tunis), and Cereals Institute (Le Kef). Promising selections will be made at those locations and then be field tested in the range project. There are also seed increase fields of several species at El Grine that have application for range seeding.

2. Livestock Improvement

The livestock improvement program will be made up of three components-- nutrition, genetic improvement, and health practices.

Proper sheep nutrition includes optimum use of available range pasturage and timely application of supplemental feeds. Grazing practices to be introduced were described in the previous section and need not be repeated. Suffice to say that the deferred-rotation system will be coordinated with the supplemental feeding activities. Hence technicians will assist farmers to adopt a variety of improved practices related to feeding. For example, they will emphasize the importance of ewes' supplemental feed requirements during breeding and lambing in order to produce hardier offspring. Similarly they will introduce creep feeding (providing supplemental feed to lambs beginning at the age of two weeks) stressing the twin advantages of an accelerated growth rate and a significant reduction (60 to 45 days) in the weaning period.

The genetic improvement program will focus on providing farmers with information to upgrade the quality of stock through selective breeding. Technicians will stress critical factors (weaning, weight, body size, and meat qualities) to be considered in choosing animals for mating. The disadvantages of current inbreeding will be explained and farmers will be offered a ram, in exchange for one of their own, in an effort to add vigor to the flocks.

Animal health practices to be emphasized in the project include control of internal and external parasites and flock hygiene. Explanation will be given on the use of proper chemicals to reduce the incidence of internal parasites, such as roundworms and tapeworms.

Feeding Program:

The feeding element will be included in the project in an effort to: (1) reduce the risk (reduction of available grazeland) posed to the farmers by the deferred-rotation range management plan; and (2) improve the quality of the livestock. OEP will make available to participating farmers hay and commercial concentrate feed at 50 percent below the market price. The feeding program will be synchronized with efforts to improve vegetative growth on the range. During the first two years of the project full maintenance allotments will be supplied for six months in two increments. The first increment will be the August thru October period when the only available forage is the post harvest cereal stubble on plowed land adjacent to the range and when ewes have the additional nutritional requirements of parturition.

The second increment will be from February to April during which time animals will be kept off the range to allow for regeneration. In addition, during November and December, when the ewes are grazing on the range, feed supplements will be provided to meet requirements of nursing lambs.

After year two of the project, the feeding element will be reduced to the August - October period and limited supplements will be given during the breeding (May June) and lambing (October) periods, when the animals are on the range.

The following Table No. 4 shows the nutritional needs of a 35 kg ewe and gives the feeding scheme and rangeland supplements in U.F. by month for the life of the project:

TABLE 2.

Nutritional Needs for a 35 kg Ewe-Year and Range Supplementation Plan

<u>MONTH</u>	<u>MONTHLY NEEDS</u>		<u>DRYLOT FEEDING AND SUPPLEMENTATION</u>			
	<u>U.F.</u>	<u>M.A.T. (kg)</u>	<u>FIRST 2 YEARS</u>		<u>3RD TO 5TH YEAR</u>	
			<u>Feeding</u>	<u>Suppl.</u>	<u>Feeding</u>	<u>Suppl.</u>
			<u>U.F.</u>		<u>U.F.</u>	
February	28	2.1	28			
March	17	2.1	17			
April	17	2.1	17			
May	17	2.1		3		3
June	19	2.1		3		3
July	19	2.1				
August	19	2.1	19		19	
September	19	3.6	19		19	
October	42	5.3	42		42	
November	42	5.3		8		8
December	42	3.6		4		4
January	28	3.6				
T TAL	309	36.1	142	13	80	18
- 15% grazing energy						
	46					
	355	U.F.				

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D. ECONOMIC ANALYSIS

The economic analysis of this project is divided into 3 parts. Part one is an analysis of the impact of the project interventions on the individual farmer. Part two is an analysis of the total costs and benefits of the project and part three is an analysis of questions of who should pay the cost of range development.

1. Average Farmer Income and Projected Benefits

Based on MOA data on population, land area in production and animal numbers in Central Tunisia it is estimated that the average farmer has at his disposal approximately 22 hectares of land. This area is divided among cereals crops, orchard crops and rangeland. It is estimated that he pastures approximately 17 head of small ruminants (predominantly sheep) on this land. The present income from this hypothetical average farm enterprise is estimated at 29 TD. The improvements sought through this project genetically higher quality (larger and more reproductive) flocks and better nutrition for them from supplemental feed and improved forage resources from rangeland should result in as much as a 150 percent increase in annual animal production. The table below shows the incremental annual cost and benefit from participation in the pilot phase of the project.

TABLE 3
Farmer's Costs and Benefits

	<u>Additional Cost</u>	<u>Additional Income</u>
Year 1	64	80
Year 2	42	133
Year 3	21.5	209
Year 4	41	218
Year 5	41	200

Using a 15 percent discount factor this gives a 3.73 benefit-cost ratio which is considerably higher than the minimum normally expected to be required to ensure farmer participation and adoption of recommended practices.

2. Total Subproject Analysis

The total subproject analysis is based on the assumption that the GOT will continue to expand project interventions to at least 4 new sites each year after AID participation is terminated. It is also assumed that the average size for all perimeters will be approximately 3,000 hectares with approximately 350 families each. The cost and benefits were computed for a 15 year period.

Based on these assumption the Internal Rate of Return for this subproject will be approximately 27.8 percent. If benefits are reduced by 20 percent the IRR is still a very favorable 20.4 percent. In computing the above rate of return only the measurable benefits in terms of increased animal production are calculated. While significant additional non quantifiable benefits such as

the soil conservation improvements resulting from improved range management are extremely important they have not been included in the calculated benefit stream for two reasons. The first is that these benefits are long term by nature and have relatively little impact on the IRR because of the discount factor. The second reason is that they are extremely difficult to quantify and would require more data than is currently available to estimate the impacts of flash floods, reduced productivity due to reduction in top soil, improved infiltration of water into the ground water supply, etc.

3. Cost Sharing

The cost of implementing the pilot range management interventions in this subproject will be borne almost totally by the Government. Because it is a pilot effort and costs and risks involved are considered to be too great for the beneficiaries to absorb this is considered to be a legitimate social investment. As the subproject progresses, and in so far as benefits accrue to participating farmers, it is expected that they will absorb a higher portion of the cost. For this reason it will be important for project staff to keep good records on the cost and benefit of individual site interventions so that these can be examined at the midterm and final project evaluation. These evaluations should make and support project staff recommendations on how the cost should be divided between government and individual direct beneficiaries in the development of future range sites. This may require that additional intermediate or long term credit be made available to farmers and should be so included in the cost sharing recommendations.

A second sense of beneficiary cost sharing will be in terms of labor contribution. It is expected that participating farmers will provide the manual labor for construction of catchment basins, installation of fences and other similar tasks as may be agreed upon by the range management committees and OEP technicians

E. FINANCIAL ANALYSIS AND PLAN

The financial analysis and plan for this subproject consist of two components :
(1) an analysis of the AID and GOT cost of implementing the subproject; and
(2) the recurrent cost to be borne by the GOT in continuing subproject activities and expanding them to additional range perimeters.

1. AID and GOT Costs

2. AID Costs

TABLE 4 - Estimated AID Costs (\$000)

Technical Assistance

3 Long-term Technicians (9 years total).....	\$ 845
13 PM Short-term Consultants	\$ 130
Contractor Home-office Backstopping	\$ 160
Inflation	\$ 202.5
Sub-Total	\$1,337.5

Commodities

12 Subcompact Cars	\$ 96
Office and Training Equipment	\$ 25
Range Development:	
a) Farm Equipment	\$ 105.5
b) Fencing	\$ 60
c) Scientific and sheep handling equipment	\$ 40
d) Range Seed	\$ 50
Plant Materials:	
a) Field equipment	\$ 110.3
b) Seed cleaning equipment	\$ 34.2
c) Miscellaneous scientific	\$ 3.5
Contingency 10 (percent)	\$ 58
Sub-Total	\$ 582.5

Training

10 MS Degree Programs	\$ 540
40 PM Short-term Training (15 people)	\$ 100
Sub-Total	\$ 640
Evaluation	\$ 40
Grand Total	\$2,600

Training and personnel costs are based on average current cost for U.S. technicians in Tunisia and training programs being implemented under "host country" contracts with U.S. educational institutions. The current costs for long-term technical assistance are approximately \$ 95,000/year and short-term technical assistance costs are estimated at \$10,000/month.

Part-time personnel on the U.S. campus for backstopping the in-country technicians, identifying and arranging travel of consultants, commodity procurement and dispatching, and participant placing and administration are estimated to cost approximately \$50,000 for the first 15 months declining to \$40,000 per year thereafter. Inflation factor of 8 (percent) per year on technical assistance costs has been added, starting in the second year of project implementation.

Training costs for long-term participants are calculated at \$54,000 per 3 year academic program. This includes an estimated 10 (percent) inflation factor over the amount currently budgeted for the MIAC/ATT project contract. Short-term training costs are budgeted at \$2,500 per participant month.

Commodity costs for the items are identified in Table # 4 and are based on 1980 costs for similar equipment and supplies and include a 25 (percent) margin for shipping and handling cost.

GOT Contribution/Costs

The Government of Tunisia's contribution to this effort will include all local personnel costs, international travel and support cost for participants, commodities including tractors and trucks and all local operating costs. These costs, shown below, are a combination of estimated in kind costs for personnel, equipment and facilities that are already paid for by the GOT and will be made available to the subproject, and additional cash outlays that will be budgeted specifically for this subproject.

TABLE 5 - GOT Budget in Dinars (TD000)

Personnel

Salaries and Benefits	TD	341.15
Operating Cost:		
Offices, Equipment, Supplies, etc.....	TD	47.5
Vehicle Operating Costs	TD	<u>126.5</u>
Sub-Total	TD	<u>515.15</u>

Training

Local Training	TD	20.5
Participant Travel and Support	TD	<u>124.0</u>
Sub-Total	TD	144.05

Commodities

Tractors	TD	70.0
Trucks 3/4 ton	TD	32.0
Irrigation Pumps	TD	28.5
Water-Tank Trailers	TD	8.0
Equipment for Range Seed Production	TD	17.0
Feed/Water Troughs	TD	<u>5.0</u>
Sub-Total	TD	<u>160.5</u>

Other Cost

Animal Feed and Supplies	TD	612.3
Range Improvement Work	TD	308.0
Plant Materials Equipment and Seed Production	TD	<u>75.0</u>
Grand Total	TD	<u>1,815.45</u>

(est. \$4,028.04)

The personnel costs of the GOT are based on an initial assignment of 11 technical staff and 6 support staff to this intervention with a gradual progression to 30 technical staff working full-time on range management in Central Tunisia by the end of the subproject. The local training costs represent the local cost of organizing and supporting training sessions for farmers and MOA technicians. The GOT will continue to pay international travel and partial salary for participant trainees in accordance with arrangements previously established for other projects. Under the commodity section of the budget the GOT will finance four 70 horse power tractors with attachments available in Tunisia (special range equipment will be provided under the AID portion of the budget) and 4 pick-up type trucks capable of towing trailers for transporting tractors and equipment between sites. The amount budgeted for these items include customs duties normally paid by the MOA for this type equipment.

The largest component of the GOT budget represents cost of animal feed and supplies and range improvement work (60 percent)--all of which will impact directly upon the target population. In that, this is a pilot effort to adapt known flock and range management activities to the project area, it is reasonable that the Government should absorb a high percentage of the cost at this stage. As the subproject progresses it is understood that only those interventions demonstrated to be cost effective will be continued. Once the most cost-effective approaches are determined and the benefits demonstrated it is assumed that farmers will be able and willing to pay a higher proportion of these costs (see the Economic Analysis, Annex . .

Recurrent Costs

The recurrent costs for this subproject are divided into two categories. The first category includes all administrative costs for OEP to operate their range management unit which will be developed as a part of this project. These costs include

	(TD 000)
Personnel.....	TD 92.6
Office Space/util	TD 5.0
Office Supplies	TD 2.0
Training Seminars & training materials	TD 5.0
Other Operating Costs:	
Cars	TD 14.0
Trucks	TD 4.7
Commodity Replacement:	
Vehicles	TD 16.6
Scientific and Research Equipment	TD 4.0
Total	TD 143.9

Given the recent attention that range management has received by the GOT in recognition of the importance of protecting and developing this natural resource and the priority being placed on agricultural development, there is no reason to believe that the GOT will be unwilling or unable to continue to meet these costs after AID assistance has stopped.

The second category of costs represents those costs which are directly attributable to the development of each range perimeter.

The costs of development per range perimeter are:

<u>TABLE 6</u>	
Animal Feed	TD 36.655
Misc. animal supplies	TD 206
Animal Health Supplies	TD 1.512
Breeding Stock	<u>TD 720</u>
Sub-total animal improvement	TD 39.093 ¹

Catchment Basins	TD 13.000
Range Seed and Fertilizer	TD 9.000
Boundary Fencing	TD 18.000
Mechanical Land Treatments (farrowing, pitting, seeding, etc.).....	<u>TD 7.400</u>
Sub-total	TD 47.400 ²

These costs are recurrent costs in that they represent the annual cost of expanding the range development program to cover an additional 4 sites each year. One of the important studies to be conducted by project staff will be to determine how these costs might be shared between the Government and the farmers who are the direct beneficiaries.

Once a site is developed it is assumed that the major continuing cash outlay required will be the supplemental feed and animal health supplies to be bought by the farmers--approximately 41 TD per farmer per year or 14.350 TD per perimeter. In addition to this range pitting or ripping and brush and weed control tractor rental, at a cost of approximately 3,500 TD per year or 10 TD per farmer, will be required. Maintenance of catchments, contours, and water spreading devices will require some local labor but no significant cash cost.

1 Animal feed costs are computed for a 3 year period

2 Range improvement work includes the depreciation cost of project equipment or equipment rental.

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TABLE 7

BUDGET - AID INPUT - Dollar Cost (\$'000) .

	<u>CY 81</u>	<u>CY 82</u>	<u>CY 83</u>	<u>CY 84</u>	<u>CY 85</u>	<u>CY 86</u>	<u>TOTAL</u>
	<u>(Jun-Dec)</u>					<u>(Jan-Jun)</u>	
Long Term Technical Assistance							
Range Mgr.		95	95	95	95		380
Sheep Husbandry		95	95	95			285
Plant Materials		65	95	20			180
Short Term Technical Assistance	20	40	30	20	20		130
Home Office Backstop	20	40	30	30	30	10	160
Inf.		26.4	51.9	59.3	61.3	3.6	202.5
				sub-total			1,337.5
TRAINING							
LI/MS starts		(3)	(4)	(3)			
LI/MS cost		54	126	180	126	54	540
ST Starts/PM		4/12	4/12	4/12	4/4		
SF Cost		30	30	30	10		100
					Sub-Total		640
Evaluation				20		20	40
COMMODITIES							
12 sub-compact vehicles	96						96
Tractor Equipment:							25
4 range inter-seeder/plows	25						10
4 land imprints	10						20
4 tractor/implement trailers	20						10
4 lister plows	10						12
4 chisel plows	12						5
Utility blades	5						10.5
Contingency on field equipment 25%	20.5						

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BUDGET - AID INPUT -- Dollar Cost (\$000) (continued)

	<u>CY 81</u>	<u>CY 82</u>	<u>CY 83</u>	<u>CY 84</u>	<u>CY 85</u>	<u>CY 86</u>	<u>TOTAL</u>
							20
Misc. Scientific equip.	20						15
Audiovisual equipment							15
training aids	15						45
Fencing materials exclosures	15						
Boundary fencing	45						20
Sheep handling and							50
Hgt. equipment	20		15	15			21
Range seed	20	15					
3 30" Rest Threshers	21						5.8
7 Office Clipper Tester							32
w/screens	5.8						9.8
1 Seed Harvester, Suction Type	32						3.5
2 Plot Harvesters	9.8						
6 Drying Ovens	3.5						17
1 Pick-Up Attachment for							5
H 714 Combine	17						1.6
1 Muller Scarifier	8						10.5
Sample Seed Hull & Scarifier	1.6						20.8
1 Swather, Self Propelled	10.5						2.0
1 Seed Cleaner	20.8						14.7
4 V-Belt Plot Drills	2.0						
3 Grass Drills	14.7						3.4
Misc. (Moisture Tester, Hammer							50.9
scales, books)	3.4						
Contingency							
							582.5

							2,600

Sub-total

Grand Total

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TABLE 8

BUDGET -- GGP INPUT -- Dinar Cost (TD 000)

	<u>CY 81</u> (Jun-Dec)	<u>CY 82</u>	<u>CY 83</u>	<u>CY 84</u>	<u>CY 85</u>	<u>CY 86</u> (Jan-Jun)	<u>TOTAL</u>
I. TRAINING							
Local training - Farmer training		1	1	1.5	2	2	7.5
Technical Seminars		2	2	2	2		8
Bus Rental		1	1	1	1	1	5
Participants IT travel & support		15	20	25			60
SP travel & support		12.0	12.0	25.6	12.0		64
					Sub-total		144.5
II. PERSONNEL	16.25	36.5	50.5	54.5	76.6	92.6	341.15
III. OPERATIONAL COSTS							
A. OEP Import							
Vehicles (cars)		14	14	14	14	14	70.0
PU trucks		4.7	4.7	4.7	4.7	2.35	21.15
Tractors		5	7	7	0	8	35
Office space/Utilities	2.5	5	5	5	5	3	25.5
Office Supplies/Equipment	12	2	2	2	2	2	22
							173.55
B. Range Development							
Feed		45.8	66.5	94	125.5	183.4	515.3
Improved rams		6	9	9	15	21	60
Misc. Livestock Supplies		2	1	2	3	4	12
Livestock Health Supplies		2	3	5	5	9	25
Catchment basins		16	8	15	24	32	96
Caterpillar rent		10	5	10	15	20	60
Range and Pasture seed		11	5	0	12	15	51
Fertilizer		6	4	4	6	8	28
Material for live fencing		2	1	2	2	4	12
Cement, post, etc.		2	1	2	3	4	12
Local labor		4	2	4	6	8	24
Guardians		2	3	5	5	7	25
					Sub-total		920.3
C. Plant Materials							
Field Supplies, Books, etc.		1	1	1	1	1	5
Nursery Support Personnel		13	13	13	13	13	65
Professional Serv. & Travel		1	1	1	1	1	5
					Sub-total		75

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F. IMPLEMENTATION PLAN

1. Site Selection and Development

This subproject will be implemented as a pilot range management effort starting with the trial and adoption of known technology on 2 range perimeters totalling about 5,000 hectares of rangeland. Progressively the effort will expand from that base to cover 12 perimeters (36,000 ha) by the end of the subproject. It is anticipated that the OEP Range Unit will have the capacity of extending range and herd management technique to at least 4 new perimeters each year after AID assistance terminates. Technical interventions will be undertaken in the first year on two of the perimeters that have been identified and studied in the process of subproject design. The implementation team will proceed to identify and select additional perimeters throughout the life of that project. Criteria for selection of perimeters to be included appear above in Section II. The proposed phasing of implementation is as follows:

<u>Project Year</u>	<u>Technical Intervention Starts</u>	<u>New Perimeters to be Investigated</u>
1	2 perimeters	2
2	1 perimeter	3
3	2 perimeters	5
4	3 perimeters	6
5	4 perimeters	6

The first activity to be undertaken after a perimeter has been tentatively identified will be to organize the local range management council(s). In collaboration with that council, the boundaries of the range area to be improved and managed will be established and the area will be divided into the various grazing blocks. In the first year, fencing, if necessary and socially acceptable, will be erected; a designated area of the range will be rested and affected farmers will be provided with supplemental feeds to offset the temporary loss of forage. The possibility and need for water catchments will begin. Areas where mechanical treatments are feasible will be identified and pitting, contour plowing, water spreading, and reseeding, as appropriate, will be undertaken. In conjunction with the range improvement activities, an intensive extension effort will be carried out to assist farmers in sheep management techniques. Included among the techniques to be introduced are genetic improvement, animal health care, and supplemental feeding to meet critical nutritional requirements during breeding, lambing, and creep feeding of lambs. These activities are described in detail in the following implementation schedule. In the second year, the above activities will be continued with necessary adjustments as more information is developed and grasses respond to the applied treatments. In the third year, as the range improves, increased forages become available and the local farmers and range councils become experienced in management techniques, the special feed concentrates provided by the subproject will be phased out. Assistance of OEP technicians to the range councils will continue at lower level of intensity from the fourth year on. In the first 2 years, a small group of farmers will be selected from each participating perimeter and taken on a tour of various sites in central and southern Tunisia to observe the effects of deferred and rotational grazing being carried out under similar projects. Sites to be included will be the Arid Lands Center at Medenine and the Rotational Grazing Site at Sbeitla.

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In the third and following years, these farmer orientation-training trips will be continued but confined to the perimeters in central Tunisia and include the prior year project sites.

2. Development of Range Management Capabilities in OEP

The newly created Rangeland Management Unit will be given primary responsibility for assisting farmers to improve range management. This subproject will not only be a pilot effort for the Range Unit but will serve as a development exercise for them. In the first year of the subproject, this unit will be staffed with an Office Director and at least four Technicians with specializations in range management, forage production, forage seed production, and sheep husbandry. In addition to the range management unit, two range management technicians will be assigned to each of the four governorat OEP offices. Local seminars and training sessions will be arranged and conducted for them by the project technical assistance teams. In each of the first two years, four of these technicians will be given approximately three months training in range management in the U.S. or third-countries. This will be increased to eight participants for three months in the third and fourth years. In order to begin to meet long-term human resource requirements, ten participants will be trained to the MS level, five in range management with minor fields of study in sheep husbandry, agriculture engineering, rural sociology, agriculture economics or agriculture education, and three in animal husbandry with minors in range management and two in plant materials. The first three long-term participants will start training in the first year of the project to insure at least one year of overlap with the technical assistance team. The other seven participants will all have started training by the end of the third year of the project.

The most important project contribution to the development of the range unit will be the hands-on experience of designing range management plans and implementing on the pilot perimeters that will be acted on under this project.

3. Implementation Plan

a. Pre-Implementation

1. Subproject paper approved and authorized
2. Subproject agreement signed May 29, 1981
3. Subproject contracts negotiated and signed Aug. 15, 1981

b. August - September, 1981

1. Contractor 2 PM TDY planning and organization
2. Contractor recruits resident technicians
3. OEP mobilization of staff
4. OEP designates project officer
5. MOA CP met
6. OEP develop procurement plan with contractor TDY
7. MOA orders vehicles
8. Initiate implementation planning for 2 perimeters with residents

c. October - December, 1961

1. Contractor resident advisors arrive
2. Complete planning for implementation on 2 perimeters (p 1 & 2)
3. Develop training plan for OEP range technicians
4. Select initial participants
5. Range Management Unit of OEP staffed and technicians assigned in two governorats.
6. Order commodities

d. January - June, 1962

1. Begin interventions on p 1&2
2. Conduct local seminar for OEP agents on range and herd management
3. Conduct orientation/training tour for farmers from first 2 perimeters.
4. Identify 2 additional perimeters for detailed technical and social investigation
5. First 3 M.S. participants depart
6. Commodities arrive

e. July - December, 1962

1. Continue interventions on p 1&2
2. Identify one additional perimeter (p 3) for interventions in the next year
3. Organize management council for p 3 and develop detailed implementation plan
4. First group of 4 short-term participants depart and return
5. Select second group of long term participant

f. January - June, 1963

1. Evaluate and adjust interventions on p 1&2
2. Start interventions on p 3
3. Conduct orientation-training for farmers on p 3
4. Conduct second seminar for OEP technicians and technicians of related organizations
5. Arrange 3 month training for 4 additional OEP staff
6. Identify 3 additional perimeters for detailed technical and social investigation
7. Second group of long-term participants depart

g. July - December, 1963

1. Continue interventions on P 1,2,3
2. Identify P 4&5 for intervention in the next year
3. Organize management council P 4&5 and develop detailed implementation plan
4. Second group of short-term participants training
5. Select third and final group of long-term participants

h. January - June, 1964

1. Evaluate and adjust interventions of P 1 : 3
2. Start interventions on P 4 & 5
3. Conduct third session for OEP technicians
4. Conduct fourth farmer orientation program
5. Identify 4 additional perimeters for detailed technical and social investigation
6. Third and final group of long-term participants departs

i. July - December, 1964

1. Phase down level of activities (assistance) on P. 1&2
2. Continue intervention on P 3,4,5
3. Identify P 6,7,8 for integration into program in the following year.
4. Organize new management councils and develop detailed implementation plan
5. Third group of short-term participants trained
6. Evaluation of impact of P 1,2,3 to include:
 - Range condition changes;
 - Flock management changes;
 - Net offtake;
 - Social acceptance;and develop long-term plan for

j. January 1965 - June 1966 (planned activities are subject to change based on implementation successes to date and interim evaluation)

1. Continue activities on previous perimeters moving toward the goal of starting at least 4 perimeters each year
2. First group of long-term participants return
3. Last group of short-term participants trained
4. OEP staff seminar and farmer training continue
5. Contract resident advisors depart
6. Contractor submits final report
7. Second and third groups of long-term participants return
8. Final evaluation

G. EVALUATION PLAN

1. General

The evaluation plan for this subproject will be congruent with the overall CTRD project evaluation strategy currently in preparation. Evaluation for the overall project will be conducted at three levels: (1) achievement of CTRD project goals; (2) achievement of CTRD subproject purposes; and (3) adequacy of subproject inputs and outputs. The evaluation plan for this subproject will be concerned only with levels two and three. However, it will take into account linkage between achievement of this subproject purpose and global project goals as well as ties among subprojects, i.e. how the outputs of one subproject might contribute to achieving the purpose of a second subproject.

2. Responsibilities

The Evaluation and Planning Unit (EPU) within the CTDA will be responsible for collecting ^{data} needed to satisfy CTRD and subproject evaluation requirements. This unit will be responsible for establishing and managing an information system that will centralize the processing, storage, retrieval and analysis of these data. Actual data collection and analysis for mid-project and end of project evaluations of this subproject will be the responsibility of EPU in conjunction with OEP and independent AID-financed consultants.

While the CTDA will be responsible for management of the Central Tunisia-based information and evaluation systems, it will be accountable to the Ministry of Agriculture (the overseeing ministry) for its performance in managing and/or monitoring the CTRD program. More specifically, the Ministry's Director of Planning will be responsible for insuring that the continuous CTRD evaluation process is carried out effectively and for undertaking the two major (ex-post) evaluations scheduled to coincide with Evaluation Seminars in year 3 and 5 of subproject implementation. He will be assisted in that task by a joint GOT/AID evaluation committee (which he will chair) and by Tunisian and US consultants as needed.

3. Data Requirements

The data requirements for the evaluation exercise are divided into three types:

a. Baseline Data

Accurate baseline data on the farming, social, and economic status of the target population will be necessary to measure the effects and/or the impact of the project.

Much of this data already exists and will be obtained from the CTDA (MDA), MOH, CNEA, and National Office of Family Planning. Additional information will be obtained by requesting the Direction de la Planification, des Statistiques, et des Analyses Economiques (MDA) to incorporate delegation-level data gathering into their annual agricultural survey of the country.

b. Continuous or Monitoring Data

This type of data includes financial expenditures, subproject acquisitions (material and human), and physical outputs of the subproject. Financial data will be obtained from the subproject accounting unit on a regular basis (quarterly) and will be compared with planned expenditures and planned execution in the subproject budget and implementation plan. Information on physical inputs, outputs, and some of the immediate effects will be obtained through a monitoring information system with data inputs provided by the field technicians. The availability of this type of data will allow comparison of actual input activities and output with the original plan and identify potential implementation problems requiring corrective action.

c. Survey Data

These will include:

1. Agricultural production, increase in amount of forage produced
2. Income level
3. Living conditions (infrastructure)
4. Land tenure
5. Rural resident receptivity to technical interventions
6. Local adaptation of agricultural research findings with regard to range grasses
7. Changes in herd size and quality of animals
8. Formation of range management committees
9. Functioning of range management committees
10. Development of household feed lot operations

These will be obtained from: (1) the monitoring information system; (2) regular reporting systems; (3) observation; and (4) special sample surveys.

This approach to the evaluation of the rangeland subproject will help identify problems at an early stage and allow for corrective action to be taken during the life of the project.

IV. ANNEXES

ANNEX A

REQUEST FOR TECHNICAL PROPOSAL
Supply of Technical Services for
Rangeland Development Subproject
of the
Central Tunisia Rural Development Project
by
A U.S. Land Grant University
to
The Ministry of Agriculture of Tunisia
and the
Central Tunisia Development Authority

A contract with the
Government of Tunisia
Funded by the Agency for
International Development

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REQUEST FOR TECHNICAL PROPOSAL

TUNISIA

May 29, 1981

Subject: Request for Technical Proposal to Supply Services for the Rangeland Management subproject of the Central Tunisia Rural Development Project.

Gentlemen:

The Government of Tunisia ("Government") acting through the Ministry of Agriculture (MinAg) is seeking proposals from U.S. land grant universities and/or consortia of such universities to provide the services described in this Request. This Request is issued pursuant to a loan made to the Government by the Agency for International Development (A.I.D.) Negotiations will be conducted in accordance with applicable Government and A.I.D. regulations. After this solicitation, the Government contemplates entering into a cost-reimbursement contract for the services described herein. Price shall not be included in the technical proposal.

The request consists of the following parts:

- (I) Project Description and Scope of Work
- (II) Selection Criteria
- (III) Instructions to Offerors

This RFTP in no way obligates the Government to award a contract, nor does the Government assume any responsibility to pay any cost incurred in the preparation and submission of the proposal.

If you decide to submit a proposal, an original and five copies in French plus a copy in English of such proposal must be received by the above-mentioned no later than _____ on _____.

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I. Project Description and Scope of Work

A. Objectives

The Government of Tunisia (The Government) has begun a long term effort to increase income and improve the quality of life of the inhabitants of Central Tunisia, a relatively disadvantaged section of the country. This effort includes interventions in the fields of agriculture, health, and potable water. The major objectives of the agricultural portion of the CTRD program are to maximize farm productivity and incomes of families operating small holdings in the semi-arid lands of Central Tunisia. To date subprojects include: (1) development of dryland farming technology packages; (2) establishment of linkages between researchers and the extension system to facilitate dissemination of technological information and provide feedback to the researchers on the results and difficulties of the recommended interventions in actual farm use; and (3) improve the on-farm use of ground water resources on small irrigated holdings. A needed complement to these interventions is the activity contained herein -- improved management of rangeland. The objective of this effort will be to develop within the Ministry of Agriculture a unit that will have the capability to replicate the interventions employed under this subproject throughout Central Tunisia. Principle strategies that will be used to achieve this objective are:

- (1) establishment of up to twelve pilot sites on which to introduce a comprehensive package of technical interventions for improved rangeland management. This package will consist of upgraded vegetation control and stocking procedures, mechanical treatments of the soil, and improved stockraising techniques;
- (2) formation within the Office of Livestock and Pastures (OEP) of the Ministry of Agriculture of a Range Management Unit to implement this project and carry out similar interventions after this project has terminated. This element will include provision of in service training for the cadre of individuals who will staff the RMU to upgrade their skills.

B. Background

USAID is financing the host country contract with a U.S. university or a consortium of U.S. universities to provide technical assistance, training, and commodities to help attain the objectives of this subproject. The CTRD program is currently receiving assistance from the United States Agency for International Development (USAID). USAID has funded a contract with a U.S. university to secure technical assistance, commodities, and other services to the Dryland Crop Institute at Le Kef to develop packages of farm technology adapted to the project area. A second USAID financed contract between a U.S. university and the GOT is providing technical expertise, training, and commodities to the Central Tunisia Development Authority in the development of a rural extension and outreach effort.

C. The Subproject - CTRD Rangeland Development and Management 5 years

This subproject has two components, both of which are geared to developing within the Ministry of Agriculture the capability to effectively implement rangeland improvement interventions throughout Central Tunisia. The first element will be the establishment of a Range Management Unit (RMU) within the OEP of the Ministry of Agriculture. This Unit will be situated in Kairouan, in the center of the project area. In the first year of the subproject, the RMU will be staffed with an Office Director and at least four technicians with expertise in range management, forage production, forage seed production, and sheep husbandry. This core technical staff will be complemented by a financial manager and support personnel (secretaries, messengers, drivers, and maintenance people) to sustain the headquarters operations. In addition to RMU staff, frontline technicians will be assigned to the agricultural staffs of the OEP offices in the five governorates in which the subproject will be implemented. Apart of this first component will be training (10 long term people to the M.S. level, and 40 person

months of short term training) to enhance their capability to carry out rangeland improvement activities.

The second component will be implementation on twelve pilot sites in Central Tunisia of a comprehensive package of technical interventions for improved rangeland management. This package will include upgraded vegetation control and stocking procedures such as rotational and deferred grazing, mechanical treatments of the soil, range seeding, range water development, and improved animal raising techniques like genetic improvement and enhanced nutrition.

C. Scope of Technical Services

(1) General

The contractor will assist the Ministry of Agriculture, principally the OEP, through technical assistance, training, and commodity specification and procurement. It is anticipated that the work will begin not later than October 1981 and will be completed by June 1986.

(2) Specific

a. Site selection

Pilot sites (two) for the first year of the subproject have been selected. Nevertheless the contractor will be required to assist the Tunisian Ministry of Agriculture and A.I.D. to identify and select sites to be included in the ensuing years.

Selection of sites will take place according to the following criteria:

- (1) Sites must be within the 22 Central Tunisia Rural Development (CTRD) area;
- (2) 80 percent of the farmers at each site must have ^{each} 25 or less hectares of privately owned land;
- (3) Land tenure issues must be completely resolved;
- (4) A request must be submitted from the farmers in the area to OEP soliciting inclusion in the program;

- (5) On collective sites management committee(s) must be established prior to submission of request for participation;
- (6) In addition to the privately owned land perimeter selected in the initial years of the project, at least one other privately owned site must be included in the subproject;
- (7) Site selection must, to the extent possible, take into account climatic and other environmental variations in the region.

b. Advisory Services

The contractor will be responsible for assisting the OEP in implementing range management programs at the 12 selected pilot sites. Interventions at each site will consist of two elements: (1) a rangeland management plan, including applied research and development activities with native forages, and (2) a livestock improvement scheme. Components of the range management plan will include an inventory of the extent of forage cover, the formation of range management committee(s) among participating farmers, formulation of a deferred-rotation grazing scheme including control of animals on range sections, technical treatments of the soil, construction of catchment basins, development of household feedlot operations, and genetic and nutritional upgrading of the herds.

This subproject will have a team of three long term contract advisors all of whom will be stationed in :Kairouan: to work with counterparts in the RNU. Of the three, one will be a specialist in Range Management, a second in Sheep Husbandry, and a third in the development of plant materials. It is anticipated that the range management specialist will serve as the Chief of Party.

The long-term resident advisors must have a capability in French at the S-3, R-3 level as tested by the Foreign Service Institute of the U.S. Department of State. Facility with Arabic is also desirable and may be substituted for French. The long-term advisors will be complemented by short-term consultants. The precise

mix and timing of short-term expertise is flexible and will be left to the contractor and OEP to develop via mutual consent and on the basis of experience gained in the first year of the subproject. These consultants will address specific technical aspects of the subproject, assist in the organization of farmer information days, and assist in the procurement of certain essential items for the plant materials development, and range improvement segments of the project.

c. Training

As stated above an important element of the subproject is the development within OEP of a cadre capable of carrying out range improvement interventions. A critical part of this development will be upgrading the skills of the MinAg employees who will make up the RMU. Hence the contractor will assist the Min. Ag. in the selection of participants, development of courses of study and placement of ten OEP employees in training programs at the M.S. level in U.S. universities. Focus in preparation of the training programs will be on fields of study directly related to range management, sheep husbandry, and rural social organization. The contractor will also be responsible for assisting the OEP to program 40 person months of short term training. Such training will be technical in nature, and range in duration from one week or two weeks seminars to three month courses. It can be located in country, in the U.S. or in a third country dependent upon availability of the particular expertise needed.

d. Commodity Procurement

The contractor also will be responsible for the importation of certain commodities required for subproject implementation. The source and origin of these commodities will be U.S. or Code 941 (Developing Country). Included among these commodities will be farm trailers, plant materials, and range improvement implements, range seeder plows, a land imprinter, and other specialized items. Purchase and procurement of U.S. source and origin vehicles (12) to be used in subproject implementation

will be the responsibility of the Ministry of Agriculture.

e. Supervision

The Ministry of Agriculture, through the Director of OEP, will supervise the activities of the RMU and coordinate the involvement of other entities, Central Tunisia Development Authority, Genie Rural, Direction de Forets, and Direction des Affaires Foncières, in the implementation of the subproject.

f. Logistical Support

The contractor's administrative and logistical support will be provided by the host government. Project vehicles will be furnished the resident advisors for official use only.

g. Contract Technical Services

The contractor will be obliged to provide staffing adequate to meet the objectives of the subproject. Present estimates of team composition are as follows:

	P.M.
1) <u>Long Term</u>	
Range Management Specialist	48
Sheep Husbandry Specialist	36
Plant Materials Specialist	20
2) <u>Short Term</u>	
Agricultural Economist	3
Agricultural Engineer	3
Plant Taxonomist	2
Seed Specialist	2
Rural Sociologist	2
Senior Range Consultant	1

h. Terms of Reference for Scope of Work: Resident Advisors

1. Range Management Specialist.

The incumbent must have previous experience, minimum of 5 years, in the development of rangeland perimeters in semi-arid climates. Included in this experience must be a demonstrated ability to adapt technical principles to the social fabric of the recipient population. Prior experience in program management is also required.

Academically he must be trained to the M.S. level in range management with strong minors in agronomy and animal science.

The responsibilities of this advisor will encompass the following activities:

- (a) as Chief of Party he will be responsible for planning, coordinating, and implementing with Tunisian counterparts the Central Tunisia Range Management subproject.
- (b) he will direct, and schedule the work program of the other two long term resident advisors, and coordinate the involvement of the short term consultants.
- (c) he will assist in the planning of both long term and short term participant training programs and will participate in the selection of trainees.
- (d) he will assist Tunisian counterparts in the selection of sites for pilot interventions under this subproject.
- (e) he will assist counterparts with the formation of rangeland committees among participating farmers.
- (f) in collaboration with Tunisian counterparts, he will develop a range management plan for each committee of participating farmers.
- (g) he will assist in the procurement of dollar funded commodities from either the U.S. or code 941 countries.

2. Sheep Husbandry Specialist.

The incumbent must have previous experience, at least 5 years, with sheep raising under semi-arid conditions. Minimal academic requirements are a M.S. in animal husbandry. The incumbent must also have a proven ability of working well with small scale sheep raisers.

Included among the duties of this advisor will be the following:

- (a) he will develop, in collaboration with RMU staff, a program for nutritional improvement of sheep flocks among participating farmers.

- (b) he will design and implement, in collaboration with host country counterparts, a scheme for genetic improvement of the flocks of participating farmers.
- (c) he will assess the information level of both RMJ field staff and participating farmers in animal nutrition and breeding, and institute a program to correct the deficiencies where identified.
- (d) he will design and institute, in cooperation with RMJ technicians, a program to expose sheep raisers for the benefits of increasing the quality of animals while keeping the size of flocks constant.

3. Plant Materials Specialist.

In general, the incumbent will be required to assemble, test, and promote diffusion of plant materials from existing Tunisian forage plant ecotypes and imported seed varieties. Selection of species for diffusion will be governed by plant material properties related to controlling for soil erosion, providing rapid vegetation of depleted areas, and a marked improvement in the quality and quantity of range vegetation. Hence, the incumbent must have at least 5 years previous experience in development and adaptation of forage materials for semi-arid areas and a proven ability to work constructively with host country researchers, frontline technicians, and small scale stock raisers. Specially, the incumbent will have the following duties:

- (a) he will identify suitable plant materials for use in Central Tunisia;
- (b) in cooperation with RMJ counterpart(s) and researchers at the El Grine National Plant Materials Center, he will carry out comparative field plantings, under a variety of soil and climatic conditions in Central Tunisia, promising forage plant species;

- (c) in collaboration with technicians at INAT, INRAT, Forest Service, he will arrange for the dissemination of improved forage plant varieties and arrange for the maintenance of breeder stocks at the El Grine Center.
- (c) he will assist RMU technicians in encouraging Grafoupast, an association of commercial seed producers, to produce seed of improved forage plant varieties and promote their use in resource conservation and improvement programs.

SOCIAL SCIENCE ANALYSIS

Annex 3

1. Profile of Target Population

The direct beneficiaries of this sub-project will be the approximately 1600 participating farm families living on the 12 range perimeters selected as experimental sites. Indirectly, through a multiplier effect, the sub-project will impact on a far greater number of small holders in Central Tunisia. The people are part of the large rural lower class and as such are at the end lines of communications and access to goods and services that radiate out from urban centers.

The chief source of income for most beneficiaries comes from a combination of animal raising (mainly sheep) and cultivation of cereals (barley and wheat) and tree crops (olives and almonds). Produce is directed principally toward meeting household subsistence needs, although this is increasing market participation, especially through the sale of sheep and fruit crops.

The majority of farm units are small, range in size from 2 to 20 hectares, although there are a few with up to 100 hectares. As will be described below, on collective perimeters the size of an individual unit is augmented by access to commonly controlled rangeland. Under the pressure of demographic growth, the size of holdings is being continually reduced.

Off-farm employment, principally migratory labor to France and urban areas of Tunisia, is an important complementary source of income for most families. While data are not available on the exact amount of money furnished by the migrants, field observations indicate that it is sufficient to enable some families to cross the subsistence barrier.

Indicators of general quality of life (education and health statuses) for rural Central Tunisia, further reflect the sub-standard condition of the target population. Of the five economic/geographic zones in the country, Central Tunisia ranks next to last in number of primary schools, has the lowest rate (26.5 percent) of school attendance among school age population, the smallest ration of female (39) per 100 male students and the highest illiteracy rate (69.3 percent) among the population 10 years of age or older.

The health situation is similarly below par. The diet of small farmers is determined in large part by the subsistence element of their agricultural system. Consequently, caloric in-take is heavily unbalanced in favor of carbohydrates while deficient in animal protein and other essential vitamins. Central Tunisia has the fewest number of health centers (49) of any region in the country, while having the highest number (11,410) of dispersed rural population per health center --a figure that is almost double that of other zones. As a consequence of inadequate health services and poor nutrition, a variety of health problems are critical. For example, infant (less than one year) mortality rates for Central Tunisia are estimated to be 130/1000 live births-- the highest in the country and about 20/1000 above the next highest geographic zone.

2. Social Organization

The social organization in Central Tunisia, as it is relevant to this sub-project, must be considered on two levels: (1) national government structures at the local level that could be of assistance in eliciting farmer participation and; (2) those elements around which the beneficiary population are organized. The former are enacted institutions in so far as they have been created by the national government to administratively service the rural areas. In fact, they are replacing the organisms of social organization

that were a part of the decaying tribal structure. From a bureaucratic or seat of authority perspective the most important of these structures is that of the delegates ^{are} they appointed by the Ministry of Interior and are the chief national government administrators at the local level. While they have no direct involvement in policy formulation, their position as principle government representative places them in a critical role as concerns mobilization of local administrative machinery to support development efforts in their areas of jurisdiction.

The Onda, or chef de secteur, is the head civil service officer, under the delegate. Ondas are the national government's representative at the grass roots often being a native of and residing in the communities they administer. The position has its origin in the office of the Sheikat under the traditional tribal structure. However, the national government has been incorporating the role into the modern administrative system. In their official capacity as the Government's representative at the local level, and in their unofficial role as a respected elder in the community and "go-between" for the community and outsiders, the Ondas could provide a reliable service in explaining the components of the sub-project to the farmers, eliciting beneficiary participation, assisting in the formation of farmers into committees for range management, and encouraging participants to apply the recommendations made by sub-project technicians.

The final enacted institution is the party cell --the lowest level of political organization. Each sector or community has a cell and its leadership is made up of a committee composed of a president, secretary-general, and treasurer. Additionally, the Onda, while an administrative official, often plays a dominant role in the workings of the cell. While there will

be no attempt to politicize the sub-project, the fact is that cell members, especially officers tend to be the most respected residents of the community and hence could play a role similar to that of the Omda in encouraging farmer participation.

At the community level, the social organization is tied closely with the economic base and land tenure patterns --all of which have been undergoing considerable change. Throughout Central Tunisia, social organization is marked by a breakdown of traditional tribe authority and structures and a trend toward independent activity by stem (a married patriarch and several married sons living in close proximity) and nuclear families.

This movement toward independent activity is most apparent in the economic sphere. The economic base has changed from almost total independence on sheep-herding and accompanying nomadic existence to a system which combines livestock raising with crop production and a more sedentary life style. With the decline of the tribal structure, matters like allocation and management of resources and disposition of farm produce have become decisions made within the stem or nuclear families.

Accompanying this change in social structure is a pervasive trend toward the privatization, of what was in the past communally held tribal land. This process is not uniform and has taken on different configurations. The first is the collectivity --an entity created by law to legitimize claims to former tribal lands. Under this arrangement the community becomes a legal person. At the request of the residents the land that the community claims is surveyed and divided into range perimeters that are commonly controlled and to which all members have us rights, and privately owned plots to which access is limited to the owners.

However, collectives account for only a portion of the rangeland in Central Tunisia. Another type of arrangement is the perimeters in which all of the land, range and crop land alike, is titled privately owned property. Access to and use of the land is limited to the families who work the land and have title to it. On average the amount of land owned by any one family is around 22 hectares.

In addition to collectives and privately owned lands with titles, large amounts of land are utilized in undefined or irregular legal state designated as Terres Collectives d'Extreme Indivision. In other words, these are former tribal lands that have been encroached upon and are being worked on a private, individual basis but to which the claimants have no clear titles. While it is hoped, and is the policy of the government, that these lands become collectives it is possible that they could pass into the category of privately owned property. Because of the land tenure issue no such land will be included in this sub-project.

Even though there is a distinct trend toward atomization and the family is becoming the principle economic unit as well as the primary means of socialization and emotional support, there continue to be on both private and collective perimeters elements of mutual support among families that are important parts of the social fabric. For example, kinship and marriage bonds serve as a base of alliance among households which are enacted through assistance in such activities as house and stone fence construction and reciprocal exchanges of money, food, and livestock feed when needed. While these arrangements exist normally among kinsmen they often extend out to include non kin related neighbor as well.

More importantly, on collective areas there is an informal system that governs the use of rangeland. In most cases common land is not one sole expanse, but rather is divided into a number of sections. Households, grouped in stem family clusters, are located around the perimeter of the range. The number of families surrounding any given range section is dependent on its size, however, it is not uncommon to have 30 to 40 households boarding a range area. Theoretically, all of the common rangeland is open to every family in the collective. However, tacit arrangements among the residents, respected throughout the community, limit sheep-grazing on any given section to those farmers living at its edges. Further, mutual understandings among families sharing the range section further defines grazing areas.

Private perimeters do not have such land sharing arrangements. All the land, including the range, is held and worked on a individual family basis. Boundaries, while physically not existent, are known by all in the community, and in almost all cases are respected.

Finally, on both collective and private perimeters, informal public torts exist for settling land disputes. Disputants make their arguments before an ad-hoc group composed of neighbouring household heads. After to listening to both sides of the debate, this tort gives its judgement as to which of the two disputants has a more valid claim. Normally, land disputes are settled in this fashion; cases that cannot be are counted through formal channels, the Ouda and the Premier Dalegue, for resolution.

3. Agricultural Activity

Sheep raising continues to be the main agricultural activity of the target group contributing to both subsistence (each household slaughters a few animals every year) and cash (sheep are sold, intermittently, at local

markets needs. As noted above, herds tend to be small --20-30 head-- and are owned, managed, and tended to by the individual households. Although there is some variation in Central Tunisia caused by site specific micro-environmental conditions grazing takes place according to the following patterns. Herds are set on the range perimeters in October at the outset of the rainy season where they are grazed continually until the available forage is exhausted. Farmers hope for a nine month grazing period, however the overpopulation of animals and scarce rainfall reduces the period considerably (often to as little as six months) in most years. Hence, the stockraisers are forced into using a variety of strategies to feed their animals until there is vegetation on the range in the following year. Included in these strategies are household feed lot operations, transhumance treks to rented pasture lands in northern Tunisia, and grazing sheep on private fields in August and September after the cereal crops have been harvested. The first two tactics involve considerable expense. The mainstays of the household feed lots are commercially produced concentrate and hay white stubble and fallow fields, cactus and olive branches are used as complementary feed. Based on data obtained during field visits the average cost of feeding a herd of 25 animals for a 4 month period is frequently feed lots must be maintained for 5 or 6 months. Similarly, according to informants the cost of rented pasture land is 1 Tunisian Dinar per hectare per month. Normally from 25-35 hectares are necessary to graze a herd of 25 animals. Hence the cost to the farmer for the 3 month transhumance is 75-105 Tunisian Dinars.

Other than the use of commercially prepared feed livestock raising is governed by traditional practices. For example, little attention is given to selecting better adapted animals when breeding sheep. To the contrary,

hardier, larger ewes bring a higher market price and hence are sold, leaving the weaker animals for breeding. Over time this practice, in combination with a high degree of inbreeding results in reduced lamb size, loss of vigor and decreased lamb production. In several farmers are unaware that a significant portion (50 percent) of the increase in weaning weight is genetically determined.

Cereal and fruit tree production complement livestock raising. On collective perimeters cereals (wheat and barley) are grown on private plots adjacent to the range. On the private perimeters occupy the "home field" areas, the land closest to the home sites, although there is some indication that farmers rotate fields between plowed areas and range. In all cases cereals are used to meet household subsistence needs.

Arboriculture, chiefly olives and almonds, is a relatively new undertaking for the farmers of Central Tunisia. This produce is marketed on a regular basis and is an increasingly important source of income.

4. Social Feasibility

The social feasibility of this sub-project depends on developing strategies to deal effectively with a related series of real and potential constraints: These constraints include: (1) social organization; (2) land tenure; (3) risk behavior; and (4) prestige and savings as they relate to the size of sheep flocks.

a. Social Organization

A key element of this sub-project is the formation of committees of participating farmers to oversee joint utilization of the range and implement improved range management practices. Given the trend toward independent activity by farmers the question must be asked if this approach is feasible.

As noted above, in spite of the trend toward individualization, there is on both collective and private perimeters ample evidence (reciprocal work exchanges, sharing of food money and feed in time of need, and public torts for settling land disputes) of cooperative behavior to serve as a basis for formation of rangeland management committees. On the collectives, it is suggested that committee be formed for each rangeland section, rather than one large committee for the entire community. This strategy would take advantage of natural groupings of people who have a vested interest in their own section of the range and have established systems for using it in a shared fashion. It would also provide units of manageable size with which field technicians could deal.

On private perimeters the problem is more delicate because there is no collectively controlled rangeland. For these farmers with sufficient range, a minimum of 40 hectares, to support the rotation-grazing intervention there will be no need for cooperation and a management plan could be designed for each individual farmer. However, the wide majority of farmers have holdings of about 22 hectares (equally distributed between range and crop land) thereby necessitating a cooperative arrangement for use of the range. The question then is how to achieve type of arrangement in the face of trend toward independent activity by individual farmers. One possible solution is to form loosely associated groups based on close kin (brothers, cousins) ties. Field research on a private perimeter revealed that farmers willing to pool land for improvement purposes under this type of arrangement. Groups would include 8-10 households and 150 or so hectares. Each farmer would retain title to his own land and have the right to pasture a number of animals commensurate with the number of hectares he contribute (e.g. on the basis of 2 head by hectare a farmer contributing 10 hectares could graze

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20 animals, while a second farmer contributing 5 hectares could graze 10 animals).

Composition of the committees and identification of candidates to serve as committee officials will be done with the assistance, on a site specific basis of the local leadership structure --Delegue, Omda, and Party Cell.

b. Land Tenure

As noted above, in conjunction with the dissolution of traditional tribal structures, there is a strong trend toward encroachment upon former common grazing areas. The land taken over is used independently and access to it is limited. The problem posed by this trend could arise if farmers interpreted an intervention that emphasized joint use of rangeland as a rouse for expropriating occupied land thereby receiving the probabilities of farmer resistance.

There are two design strategies built into the sub-project to deal with this matter. First, only perimeters, collective and private both, that have undergone the land titling process will be eligible for assistance. Areas where land tenure issues persist, including all lands in the Extreme Indivision category will be excluded. Second, and this applies especially to private perimeters, the local leadership (Omdas, Delegue, etc.) will be used to assure farmers that participation in the sub-project does not entail forfeiture of individually owned land.

c. Risk Behavior

Adoption of new technologies is hindered or enhanced by the risk management behavior of the intended beneficiaries. To the extent that

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they are risk adverse the adoption process is retarded; to the degree that they are risk takers the probabilities for innovation are increased.

While not adverse to risk the small farmers in Central Tunisia manage it with a strategy which minimizes the possibility of loss but limits the potential gain. Hence the farmers are often hesitant to adopt a new technology until they are convinced through tangible evidence that it will be of benefit to them.

The largest potential risk in this sub-project is associated with the deferred-rotational grazing scheme described in the technical intervention. Sheep grazing is an important element of the farmer's economy. Sufficient rangeland is critical for the maintenance of herds, yet the present grazing area is inadequate for current sheep population. For example, last year, the amount of forage available in most areas was sufficient for only a five month period. For the first two years deferred --rotation system will reduce by one-half the amount of available range to allow blocks of land rest and recuperate. Hence farmer skepticism of this approach and reluctance to adopt it are likely to be high during the initial stages.

While there is no easy solution sub-project design includes several elements to overcome this constraint. First, emphasis will be placed on frequent contact between field technicians and recipients to establish the rapport and mutual confidence necessary to facilitate farmer adoption of a high risk intervention. Under the sub-project technicians will receive specialized short term training to give them insights as to the source of farmer risk behavior and how to deal effectively with it. Second, technical assistance will be provided to the farmers on establishing or improving

household feed lot operations. Third, supplement feed (concentrate and hay) will be made available to participating farmers at subsidized prices.

There is a potential problem associated with provision of supplemental feed --namely farmers securing it at a subsidized price and selling it in turn at a profit. The results of sub-project related field research suggest that the probabilities of this occurring are extremely low. While there is reciprocal borrowing of feed there is no evidence of buying and selling among farmers. Moreover, owing to the short supply of concentrate, farmers are currently purchasing it on a parallel market at prices significantly higher than government established levels. They are willing to pay the additional cost because they recognize the value of the concentrate. It is unlikely the quantities provided under this sub-project will cause a glut at the local level. Farmers will welcome its availability and use the feed for their own animals.

d. Prestige, Savings and Herd Size

A key technical intervention will be an attempt to induce farmers to increase herd size in order to improve the quality of animals --i.e. increase production of kilograms of meat per hectare. For example, if a normal size herd were kept at the same size (25 animals) after two years with the program, it is anticipated that 118 kilograms could be added to each animal. Current market prices for animals is about 1.3 T.D. per kilo. Hence this would represent an increase of 153.4 T.D. per year. There is some evidence that farmers appreciate the concept of improved animal quality (most farmers interviewed during the design of the sub-project noted that while they sell sheep by the head they do receive more money for a quality animal), however convincing farmers to not increase herd sizes will be a difficult under-

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taking requiring constant attention of field agents. In large part prowess as a shepherd is measured by the number of animals one has. Hence the potential of prestige loss among peers could work against farmers consenting to not increase herd size. Field research indicated that animal quality is equally important to quantity in terms of peer prestige. Principle qualities include animal size, quality of wool and size of tail. Technicians, emphasizing to farmers that these qualities can be obtained through applying the recommendations of this sub-project, as well as noting the economic gains that could accrue, should be sufficient to offset the threat of prestige loss by not increasing herd numbers.

e. Role of Women

While women play an extensive and important role in agricultural production, their role in decisions concerning use of range-land and breeding and marketing of animals is minimal. Moreover, the number of female household heads in the target area is extremely small. Defined, behavior patterns limit judgements on farming matters and allocation of resources to men. In cases of death of the husband, the wife acts as the steward not the owner of the holding, until sons are old enough to assume management.

These factors place obvious limits on the direct impact the sub-project can have on women. Nevertheless, efforts will be made to organize seminars among women of the target population on matters dealing with proper grazing practices, improved animal nutrition, and genetic upgrading of sheep. This activity will be coordinated with the Extension Services Support Unit of the Central Tunisia Rural Development Authority (CTDA). As a part of its function under the Rural Extension and Outreach Sub-project the ESSU will

develop information packages tailored specifically for women. These packages will focus on production activities with which women are heavily involved (e.g. shepherding and maintenance of household feed lots). They will be designed to increase knowledge and adoption of improved techniques thereby contributing to the enhanced productivity of the household and the women's place within that unit.

ECONOMIC ANALYSIS

ANNEX C

1. General

The economic analysis for this project is divided into 3 parts. Part one is an analysis of the income of a hypothetical average farmer in Central Tunisia showing current income from his farm enterprise and the increase in revenue he may expect from participation in this project. The second part is the computation of the IRR for the total project assuming that technical interventions will be successful and that OEP will be able to expand the project to cover an additional 4 sites per year after the pilot phase is completed and AID assistance is terminated. The third part is a description of the type of economic analysis that should be conducted as a part of project intervention and evaluation to: (a) provide an adequate base for policy decisions on continuation of range development interventions; (b) determine how cost might be shared between the farmers and the Government; and (c) the need or rationale for providing credit to herdsmen in the project area.

A. Income of Hypothetical Average Farmer

I. Average Farm Income and Projected Benefits

The following table is computed from MDA data ^{1/} on the number of farms, livestock, land use and yields in Central Tunisia in 1976. Income is based on estimated prices for 1980.

<u>Average Farm Resources*</u>		<u>Income/Year</u>
Cereals cropland	6.8 ha	TD 75
Tree cropland	4.9 ha.	TD 75
Rangeland	6.5 ha)	
Small ruminants	17 head)	<u>TD140</u>
		TD290 2/

* Irrigated land and large animals represent only a very small percentage of total resource and have been deleted here.

The income estimate for cereals is based on the assumption that 50 percent of a farmer's land is cultivated each year 4.4 HA with an average yield of 2 quintals per hectare after deducting the seed and hired tractor rental cost from total production. This net production of 2 quintals per hectare represents the farmer's returns to land, family labor and management. The net yield estimate of 2 qx/ha. is considered by some to be high for Central Tunisia. In many years rainfall is insufficient to produce any grain and the standing crop is used as pasture when it becomes evident late in the season that there will not be enough grain produced to make it worthwhile to harvest. Some farmers have reported average yields as low as 100 kilos (1 ql) per hectare.

Animal production is also difficult to estimate as reported lambing rates range from 30 percent to 40 percent. The lambing rate, however, is often offset by losses due to disease and malnutrition which claim approx. 50 percent of the lambs before they reach market age. Also during cyclical droughts as much as 50 percent of farmers' breeding stock are reported to be lost. While the above estimates are open to debate the table above is believed to give an indication of average farm income for the area.

b. Effect of this Project on Average Farmer Income

The effect of the project on farmer income will be entirely through the live stock portion of his total enterprise. In those cases where land previously planted to cereals is to be returned to permanent range plants it is assumed to have a minimal net effect on his grain production. It is assumed here that farmers will be willing to return only the least productive of his cereal land to pasture and the cereal production from this land is currently estimated to be approximately equivalent to his seed. Farmers have in the past tried to produce cereals on this land for two significant reasons. Increased population in the area has forced farmers to try to produce a crop on marginal

land as they continue to try to meet family consumption requirements from their own production. Farmers have also cultivated rangeland because only through the cultivation of land were they able to gain clear title to it. Now having gained title to the land and/or discovered that cereal production is not an economically viable use of this land because of the low yields achievable, some farmers in the area have indicated a desire to return these areas to permanent grassland.

The types of increases in production considered possible in the project are shown in the table below for a hypothetical flock of 100 ewes. The 100 ewe flock has been selected simply for clarity of presentation. Actual flock sizes range from 5 to 150 head with 20 to 30 head being the most common management unit and 17 being the mean.

Table C-1

<u>YEAR</u>	<u>BASE</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Number of Head	100	90	80	70	60	50
Lambing Rate	40	50	60	60	90	95
Lambs Produced	40	45	48	56	54	57
Replacements	20	18	16	14	12	12
Lambs sold	20	27	32	42	42	45
Kg/Lamb Kg/Meat	1.	22	26	20	29	29
Liveweight of Lambs	360	594	832	1176	1216	1305
Value of Lambs*	460	772	1008	1529	1503	1696
Value of Culled Ewes	<u>350</u>	<u>525</u>	<u>325</u>	<u>525</u>	<u>525</u>	<u>305</u>
Total Income (TD)	1110	1297	1506	2053	2100	2001

*Recent informal market surveys show that a premium is definitely paid for larger lambs and prices range from 1.3 TD to 1.5 TD/kilo. A price of 1.3 TD/kilo is used here.

This table shows a 150 percent increase in income from a flock only 50 percent the size of the original. These benefits are achieved primarily through improved nutrition and secondarily through improved selection of breeding stock and improved parasite and disease control leading to a high quality flock in terms of reproduction capability.

In the context of this project the initial improvements in nutrition will be achieved through project provided feed supplements. As range management improves it is expected that an increasing percentage of the nutritional requirements can be furnished from the range resources and supplemental feeds reduced. For the average farmer in the project area with 17 ewes his income from sheep production could increase as follows:

Base = 140, Y 1 = 220 Y 2 = 273; Y 3 = 349; Y 4 = 350; Y 5 = 340

The relatively high values in Y3 and Y4 of the example are achieved by selling off breeding stock. These reductions are believed to be necessary if the range is to provide most of the feed required and thereby reduce dependence on and cost of the supplemental feeds. Farmers will continue to have the option of maintaining larger flocks but to do so they will have to reduce land in cereals to produce more feed or purchase feed to meet the requirements of the larger flocks. In that farmers interviewed during the project design have indicated that they would rather have a quality flock of 50 head than 100 weak animals it is expected that they will respond to recommendations to reduce flock size when they see the production capability with improved management. It is also possible to look at the increase in production capability from a land based perspective as well. Data available on the project area indicates that there are approx. 2 small ruminants per hectare of rangeland in the project area. Surveys have further indicated that approx. 50 percent of the feed requirement are met from the range. This gives us a production rate of

approx. 7.2 kilos of meat (liveweight) per hectare.^{3/} This conforms closely to other studies in Tunisia and mediterranean climate. that indicate that degraded unmanaged range similar to that found in Central Tunisia will produce 3 to 7 kilos of weight gain per hectare with 175 to 275 mm of precipitation. These same studies show that well managed range with favorable vegetation can produce 15 to 35 kilos of weight gain per hectare.^{4/} This gives us a potential increase of approx. 20 kilos of meat or 26 TD per hectare. This would give the average farmer an increase of 220 TD per year as a result of improved range management.

c. Cost to the Farmer

During the life of this project, the cost to the farmer will be minimal. This is intended primarily to enlist his full cooperation until the benefits of range management can be demonstrated. Given the CT farmer's relatively low income he is not in a position to absorb the major part of the cost involved in range improvement nor supplemental feed costs during deferred grazing. The risk involved in such a program would preclude his participation from the start especially on collective land. On collective land where benefits will accrue to the community there is presently no social organization capable of allocating cost of range improvements to individuals who are now sharing this resource. Allocation of grazing rights and benefits to rangelands improved under this project and the cost of maintaining the range will be one of the principal functions of the management councils that will be organized or revitalized. The only significant cash cost to be absorbed by the farmers will be his contribution to the cost of concentrates and hay that will be made available to him during the first 2 to 3 years. This feed (which is already subsidized by the government) will be made available at 1/2 the current official price to participating farmers. Quantities to be made available will be equivalent to

the nutritional requirement of his flock during those periods when it will be held off the range to allow: a) for regeneration of the native vegetation, and b) for planted species to become established. The cost per farmer for feed is estimated at 64 dinars the first year declining to 42 dinars the second year and 21.5 dinars the third. In that the farmer's increases in revenue are expected to be 80 TD, 133 and 209 TD for these same 3 years or more than three times his cost, it is expected that the immediate benefits will be sufficient to gain his cooperation and that longer term benefits, realized after 3 years participation in the project will be sufficient to insure his continued cooperation in range management.

After three years, assuming that rainfall has been adequate and the deferred and rotational grazing have had sufficient effect on the productivity of the range, the farmer will be expected to pay the full official price for supplemental feed.

3. Internal Rate of Return - Total Project Analysis

The benefit stream computed for this project is based on the increased amount of meat that is expected to be produced and marketed as a result of combined range management and animal husbandry practices to be introduced. It is assumed here that the average project site will be approx. 3000 hectares and have approximately 6000 head of sheep and goats when interventions start. The number of sites to be developed are 12 during the 5 year pilot phase of AID assistance with an additional 40 to be developed by the OEP range unit over the next ten years. At this rate, range management will be introduced to 152,000 hectares in Central Tunisia over the next 15 years with 105,000 sheep being grazed on the land.

The benefits per site are shown in Table C-1. This table shows an increase in the lambing rate of 10% per year in years 1, 2 and 4, primarily as a result

of improved nutrition and parasite control. An increase of lambing rate of 20% is expected to be achieved in year 3 as the results of better selection of breeding stock and the improved genetic quality of the herd are achieved. Along with the increase in lambing rates it is expected that the growth rate of the lambs can be improved and that market weight can be increased from the present 10 kilos/lamb to 29 kilos/lamb by year 5 as shown in line 6 of Table C-2. The combination of increased lambing rate and growth rate of lambs will result in an increase in income from sheep production of approx. 70,000 TD per year for each perimeter that is developed.

The costs of the project for this economic analysis include not only AID and GOT costs but also the increased cost of the participating farmers. The cost to AID and the GOT for the first 5 years are considerably higher per perimeter than the recurrent cost in years 6 to 15 because they include training cost for the OEP staff and research cost for identifying proper species for range seeding etc. Even with the R&D costs included the IRR as shown in Tables C-2 and C-3 is estimated at 29.2%.

Table C-2
CHANGES IN SHEEP PRODUCTION AND INCOME PER
RANGE PERIMETER AS A RESULT OF PROJECT
(Income in Tunisian Dinars)

	<u>EASE YEAR</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Number of Animals	6,000	5400	4800	4200	3600	3600
Lambing Rate %	40	50	60	80	90	95
Lambs Produced	2,400	2700	2880	3360	3240	3420
Replacements	1,200	1000	960	840	720	720
Lambs sold	1,200	1620	1920	2520	7520	2700
Kg/Lamb	10	22	26	28	29	29
Kg/Lamb sold	21,600	35640	49920	70560	73080	70300
Value of Lambs	28,080	45320	54060	91740	94900	101760
Value of Culled Ewes	<u>21,000</u>	<u>31500</u>	<u>31500</u>	<u>31500</u>	<u>31500</u>	<u>18300</u>
Total Income	49,080	77200	96360	123180	126400	120060

Table C-3 - INTERNAL RATE OF RETURN ANALYSIS - Figures in Tunisian Dinars

<u>YEAR</u>	<u>AID COST</u>	<u>GOT COST</u>	<u>FARMER COST</u>	<u>TOTAL COST</u>	<u>GROSS BENEFIT</u>	<u>NET BENEFIT</u>	<u>D.F. 27%</u>	<u>D.F. 30%</u>
1	370.5	331.5	44.0	759.0	56	-690.2	-550	-574
2	220.0	231.0	57.4	509.0	121.1	-388.7	-241	-230
3	24	315.4	74.0	539.2	240.35	-390.35	-190	-118
4	157.7	357.0	133.5	55	617.25	-44.55	-17	10
5	5.3	437.7	192.0	500	800.25	197.45	60	53
6		403.1	247.1	726.2	1175.7	449.5	107	93
7		403.1	294.0	771.9	1411	607.1	129	109
8		403.1	352.4	835.5	1741	905.5	134	115
9		403.1	410	893.1	2021	1127.9	131	106
10		403.1	467.0	950.7	2301	1350.3	124	99
11		403.1	525.2	1000.3	2501	1573	113	100
12		403.1	582.0	1055.9	2651	1795.1	102	77
13		403.1	640.4	1123.5	3141	2017.5	91	67
14		403.1	690	1111.1	3421	2239.9	7	55
15		403.1	755.6	1230.7	3701	2462.3	<u>69</u> 140	<u>49</u> -51

$$27 + 3 \left(\frac{140}{191} \right) = 29.2\% \text{ IRR}$$

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For the sensitivity analysis of this project the project-benefits have been reduced by two methods. First the level of benefits was reduced by a percentage factor. If project benefits are reduced by 20 percent the IRR is still a favorable 20.8% as shown in Table C-4. Reducing benefits by 33% still yields a IRR of approx. 15%. The second method of sensitivity analysis was a reduction in the number of perimeters that may be developed. Assuming only 1 perimeter is developed in each of the first 2 years and 2 perimeters per year are developed thereafter only 8 perimeters will be developed in the first 5 years of AID assistance instead of the 12 projected in this PP and only 20 are developed over the next 15 years covered by the Economic analysis instead of the 52 projected. In this case the project benefits are reduced by approx. 46% but project cost are also reduced for those cost categories which are dependent on the number of sites being developed (by the amount of feed required and the number of catchment basins to be installed are reduced.) With this reduction of quantified outputs by 46% the IRR is approx. 15.9% as shown in Table C-5.

TABLE C-4 - INTERNAL RATE OF RETURN BENEFITS REDUCED BY 20%

<u>YEAR</u>	<u>COST</u>	<u>BENEFIT</u>	<u>NET BENEFIT</u>	<u>DF 20%</u>	<u>DF 23%</u>
1	759.0	44.0	-715.0	-591.4	-577
2	509.0	96.9	-412.9	-200.0	-273
3	639.2	199.1	-440.1	-254.4	-236
4	650.0	491.4	-167.4	-100.7	-73
5	600.0	709	20.2	0.1	9
6	726.2	940.6	214.4	716	52
7	777.9	1160.0	390.7	109	92
8	835.5	1392.0	557.3	129.9	100
9	93.1	1616.0	723.7	140.4	112
10	950.7	1840.0	90.1	144.2	112
11	1000.3	2060.0	1060.5	143.2	109
12	1065.9	2280.0	1222.9	137	101
13	1123.5	2512.0	1399.3	125.2	94
14	1181.1	2736.0	1557.7	121.5	85
15	123.7	2960.0	1732.1	111.0	77
				<u>32.5</u>	<u>-200</u>

$$20 + 3\left(\frac{32.5}{232.5}\right) = 20.5\% \text{ IRR}$$

Table C-5
Internal Rate of Return with
Reduced number of Perimeters Developed

YEAR	CUMULATIVE PERIMETERS DEVELOPED	TOTAL COST	GROSS BENEFIT	NET BENEFIT	DF <u>.17%</u>	DF <u>.15%</u>
1	1	6719	224	-6495	555	565
2	2	4530	7455	-37925	277	261
3	4	6077	1757	- 432	270	284
4	6	5365	2905	- 230	127	136
5	8	4532	4417	115	5	6
6	10	4237	5600	1643	63	71
7	12	4525	7200	2755	92	104
8	14	4013	8600	3067	110	126
9	16	5101	10000	4979	121	147
10	18	5309	11400	609	127	150
11	20	3677	12000	7202	129	155
12	22	5965	14200	8315	126	155
13	24	6253	15000	9927	123	154
14	26	6541	17000	10539	117	149
15	28	6229	18400	11651	<u>111</u>	<u>143</u>
					-11,	90

$$15 + 2\left(\frac{90}{205}\right) = 15.87 \text{ IRR}$$

In addition to those benefits which have been quantified in the previous tables there should be significant non-quantified benefits from the project. The most important of these is the conservation of the rangelands for future generations. No attempt has been made to include these in the IRR analysis for this project for two reasons. The first reason is that these benefits are long term in nature and because of the discount factor having a minimal effect on the computed Present Value of the project. The second reason is that they are extremely difficult to quantify given the data available for Central Tunisia. It is known that improved ground cover will reduce both wind and water erosion of soil but the present rates of erosion are unknown and any projected quantity or value of soil to be saved would simply be a guess. The contour plowing, soil pitting and water spreading work to be undertaken are proven techniques for improvement in water infiltration rates and should contribute both to recharging groundwater and reducing flash flooding but again there is a lack of data to make even an educated guess of the intermediate or long term economic value of these actions. In that the planned interventions are based on similar work in other parts of the world and have been tried to a limited extent in Tunisia and are known to have a significant positive resource conservation effect they can be considered a non-quantified project benefit

4. Economic Analysis During Pilot Phase

If the pilot activities of this project are going to result in an expanded and continuing range development program for Central Tunisia certain types of analysis will have to be undertaken to provide guidance for the expanded program. The most basic data to be collected and analyzed is micro economic data on individual farmers enterprise to determine if the production and revenue increases projected are in fact being realized. This data should include cost of supplemental feed, rented pasture (transhumance), health supplies, veterinary services,

maintenance of boundary fences, soil pitting, range interseeding, pasture seeding, maintenance of water catchments, marketing cost and labor requirements. On the income site it will be necessary to collect data on the value of animals and wool marketed and estimate the value of meat, milk and wool retained for family consumption. In that farmers are considered to be operating at a near subsistence level it will be important to measure the cash flow as well as the economic feasibility of project interventions.

Once sufficient data is available to answer the question - is a continuation and/or expansion of project activities justified? The second question to be answered is who should pay for them. During the pilot phase individual farmers will pay only 17% of project cost but almost all quantified benefits will accrue to them. During the first 5 years the individuals benefit/cost ratio is projected at 5.33 using a discount factor of 6.5% (This is the current rate charged on agricultural loans in Tunisia). If the range management interventions are to be extended to the maximum number of farmers possible in the Central Tunisia area at the least cost to the GOT it seems reasonable to assume that farmers should be able and willing to assume a larger part of the cost. The micro economic data will provide an indication of what percentage of cost the farmers should be able to assume. The cash flow analysis will provide an indication of the credit levels and terms that may need to be available for farmers to undertake the recommended investments.

5. Conclusion

The social benefits of increased domestic meat production, development and conservation of the rangeland resources that are now being degraded and eroded, and the increases in income for one of the poorer disadvantaged sectors of society are believed to warrant GOT investment in this project and in expanding range development interventions to additional sites. An important role of the

project staff and the project coordinating committee will be to evaluate the costs and impacts of this project and recommend adjustments in implementations, maintenance, and cost sharing of investments on future site.

Benefits in this project are based on the increased production of sheep in the area. The principal benefits of range improvements and the application of range management systems are the improved forage nutrition that the range will continue to provide over the next 15 to 20 years for the sheep. Improvements in sheep management and nutrition are expected to lead to both an increase in the lambing rate and faster growing lambs. The lambing rate (lambs raised to market age) is expected to increase from 40% to 95% over a 5 to 6 year period and the average size at marketing is expected to increase from 1. to 29 kilos. While lambs are sold by head without the benefit of scales, informed viewers indicate that the premiums paid for "better" or larger lambs is almost directly proportional to weight. It is, therefore, believed that farmers will be adequately compensated for producing heavier lambs. There will also be conservation benefits such as reduced erosion, reduce rainwater runoff and silting downstreams, and preservation of this resource for future generations; no attempt is made in this analysis to quantify these benefits which are both hypothetical and long term in nature. The project staff, however, should monitor and quantify these benefits also and take them into account in making recommendations for cost sharing in the expansion of range development interventions to additional sites.

3. IT WAS UNDERSTOOD THAT TUNISIA IS DEVELOPING A LAND TENURE CODE THAT SHOULD AFFECT QUESTIONS OF TITLING AND LAND OWNERSHIP BY THE NEWLY SETTLED IN THE AREA. ALTHOUGH IT WAS AGREED THAT WE NEED NOT AWAIT THE ENACTMENT OF THIS CODE AS A CP TO THIS PROJECT, CLOSE PARTICIPATION BY THOSE DEVELOPING THE CODE MUST BE ASSURED IN ORDER TO GUARANTEE THAT THE CODE WILL FACILITATE THE FUTURE DIFFUSION OF RANGELAND MANAGEMENT PRACTICES. OTHERWISE PRACTICES DEVELOPED IN AN EXPERIMENTAL RANGE MANAGEMENT PROJECT COULD ACTUALLY RUN COUNTER TO THE FUTURE BEST LEGAL INTERESTS OF THE TARGET POPULATION.

4. THE PP SHOULD CLARIFY THE RELATIONSHIP OF THE TECHNICIANS PROPOSED FOR THIS PROJECT AS OPPOSED TO THOSE TECHNICIANS WORKING ON THE CURRENT LIVESTOCK FEED PROJECT (C2DS). IT IS SUGGESTED THAT AN ANALYSIS BE MADE OF EACH PROJECT TO DETERMINE WHICH TECHNICIANS COULD APPROPRIATELY BE UTILIZED UNDER EACH PROJECT AND MAKING THOSE REQUIRED FOR THE RANGE DEVELOPMENT PROJECT AVAILABLE TO THE PROJECT WITH FUNDING FROM THE BEGINNING. THE NEAC IS CONCERNED THAT BOTH PROJECTS HAVE PROPERLY QUALIFIED PERSONNEL WHOSE RESPONSIBILITIES ARE CLEARLY DEFINED. THE MISSION MIGHT WISH TO INCLUDE A SOCIAL SCIENTIST ON THE TA TEAM TO THE DEGREE THIS PROJECT WILL BE CONCERNED WITH SOCIAL CHANGE.

5. THE PP SHOULD PROVIDE A FINANCIAL AND BUDGETARY PLAN INCLUDING A BREAKDOWN OF INTENDED COMMODITY PURCHASES, LOAN/GRANTS AND GOT CONTRIBUTIONS.

6. NEAC DISCUSSED ROLE AND TYPE OF POSSIBLE CONTRACTORS E.G. PASA, UNIVERSITY, PRIVATE FIRMS, SUB-CONTRACT TO OTHER TA CONTRACTORS, ETC. WE PLAN TO AUTHORIZE MISSION TO APPROVE THE PP BUT FIRST WANT TO REACH MUTUAL AGREEMENT ON (A) ROLE OF FEED PROJECT TECHNICIANS AND (B) TYPE OF TA CONTRACT. CHRISTOPHER

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ANNEX E

UN ID/Tunis has on file an official request, dated December 29, 1977, from the Government of Tunisia for assistance for this project.

Issues Paper Rangeland Management Subproject

ANNEX F

The following issues have been identified by the NEAC in its approval of the PID and by the project design committee in the development of the subproject. Each issue is succeeded by a discussion of corrective strategies included in the design of the subproject.

1. Social Acceptability

The NEAC as well as the design committee noted a series of social questions (land tenure, organization related to farmer participation, farmer acceptability of the concept of limiting flock size and the possibility of creating a black market to deal in the sale of subsidized feed) that could present barriers to the successful implementation of the project.

a) Land Tenure

In conjunction with the breakdown of traditional tribal structures land tenure and ownership arrangements in Central Tunisia are in a state of flux. Some rangeland has gone through one of two titling processes (collectivization) according to which grazing areas are held by a juridical person--the community--while adjacent plots are privately owned. Other land has passed through a parallel system and become privately owned in its entirety. In addition there is former tribal land (Land in Extreme Indivision) that is being encroached upon and utilized in a private fashion without clear title or certificate of possession. The problem posed by this uncertainty related to land ownership is the possible interpretation by farmers that an intervention that emphasized joint use of the rangeland is a rouse for expropriating occupied land.

There are two design strategies built into this subproject to deal with this matter. First only perimeters, collective and private both, that have undergone

the land titling process will be eligible for assistance. Areas where land tenure issues persist, including all lands in the Extreme Indivision category, will be excluded. Second, and this applies to private perimeters especially, the local leadership (Omdas, Délégués) will be used to assure farmers that participation in the subproject does not entail forfeiture of individually owned land. Finally, a fourth category of land, state-owned range, will be excluded from the subproject. Much of this land is covered with esparto grass, a material used in the manufacture of paper. Because of the economic importance of esparto grass to the peasants who gather it and to the region as a whole, the GOT is attempting to discourage grazing on the lands where it is found.

b) Farmer Organization for Participation

A key element of the subproject is the formation of committees of participating farmers to oversee joint utilization of the range and implement improved range management practices. However, a trend toward independent activity by farmers in the area brings into question the feasibility of this approach. Field research, associated with the design of the subproject, provided ample evidence (reciprocal work exchanges, sharing of food, money and feed, and public torts for settling land disputes) of cooperative behavior among the beneficiaries to serve as a basis for rangeland management committees. Moreover, on collective perimeters committees will be formed for each rangeland section thereby grafting on to natural groupings of people with a vested interest in the land they currently use and who have an informal system for managing it. On privately owned perimeters committees will be organized among kinsmen with the stipulations that: (1) even though the land will be pooled each farmer would retain his own portion and; (2) each farmer would have the right to pasture a number of animals commensurate to the quantity of hectares he contributed.

In all cases formation of the committees will be done with the assistance of local officials (Omdas and Primere Delegates) and decisions concerning range use will be taken jointly by committee members and project technicians.

c) Flock Size

A key technical intervention will be an attempt to induce farmers not to increase flock size in order to improve the quality of animals. Since prowess as a sheep-herder is measured by the number of animals one has producing the desired change could be a difficult undertaking.

Fieldwork, again carried out in the design of the project indicated that animal quality is equal to quantity as a prestige factor.

Technicians, emphasizing that improved quality as well as economic gain can be obtained by the recommended range and herd management processes should be sufficient to overcome this barrier.

d) Supplemental Feed

The subproject design includes the provision of supplemental feed, at subsidized rates, as a mechanism to reduce the risk to participating farmers brought about by the temporary reduction in available rangeland through deferred rotational grazing. A question was raised as to whether the possibility existed of this intervention unwittingly creating a parallel market, i.e. farmers reselling the feed for profit rather than using it for their animals.

Information gathered during the design of the subproject indicated that the probabilities of this occurring are remote. Beneficiaries are currently in the habit of using processed feed and all type of animal feed (forage and processed) is in short supply. There is no evidence that processed feed is now being sold and a strong indication that farmers would like more to be made available to them and if it were they would use it for their animals.

2. Administrative Arrangements

The nature of the subproject and the division of responsibilities within the Ministry of Agriculture require the participation of a number of MOA entities-- e.g. OEP, CTDA, Genie Rural, Affaire Foncier, and the Directorate of Rural Engineering. Successful implementation of the subproject depends in large part on cooperation among all of these entities and the timely intervention of each. In order to insure that participation and cooperation occur as required by the needs of the subproject a meeting was held on May 21, 1961 among AID subproject design members and representations of each of the GOT entities involved. The role of each organization was discussed and a consensus was reached concerning the fact that, OEP would be the lead organization and would have the authority to call upon other organizations as needed. The attached process verbal of the meeting, signed by the participants, attests to their concurrence.

3. Technical Assistance

The NEAC recommended that the FP clarify the relationship of the technicians proposed for this project and those engaged in the current Livestock Feed Project (0293). This recommendation was made in order to assure that both projects have properly qualified personnel whose responsibilities are clearly defined.

This matter ceased to be an issue with the Mission decision to secure the required T.A. via a host country contract with a qualified U.S. university. This decision was communicated to AID/W (Tunis along with a request of NE/CC for a determination as to whether the university that was awarded the contract for the Rural Extension and Outreach project would be eligible to bid on this contract. NE/GC made a positive determination and communicated such to the Mission (STATE 083542).

4. Environmental Determination

Technical interventions in the subproject include mechanical (soil pitting) treatments of the soil as well as the construction of water catchment basins. These activities raised a concern by the Bureau's environmental co-ordinator as to the environmental feasibility of the subproject. Accordingly, the Mission provided the environmental co-ordinator with a draft of the PP's technical intervention section. Upon review of document AID/W informed Mission (STATE 091313) that the subproject had been given a "negative determination in conformance with the requirements of 22 CFR 216."

5. Prior/Other Donor Rangeland Activity

The NEAC guidance cable noted a lack of reference in the PID to any prior efforts in range development in Tunisia. The cable went on to recommend a review of these in developing to PP.

Such a review has been carried out, the synopsis of which appears in "Other Donor" section of the paper.

RANGELAND DEVELOPMENT AND MANAGEMENT SUBPROJECT

I. General

A. Objective

The overall goal of the Central Tunisia Rural Development Project (CTRD) and its subprojects is to improve the quality of rural life and real incomes of rural households in Central Tunisia. The specific purpose of the Rangeland Development and Management subproject is to introduce improved rangeland management and stockraising practices among the farmers in Central Tunisia thereby contributing to amelioration of the rangeland in the area.

The key assumption of this subproject is that enhanced range management and stockraising practices will improve the quality of the sheep flocks which in turn will increase the market price of animals and contribute to higher productivity. Other important assumptions are that: (1) stock raisers will respond to the price incentive offered by this effort and adopt the recommended practices; (2) a multiplier effect will take place as interventions at the pilot sites will be taken up by other farmers in Central Tunisia; and (3) the rotational grazing system and stabilized herd size elements of this subproject will continue to be implemented by the Ministry of Agriculture after the subproject ends.

B. Technical Interventions

This subproject will address the problem of deteriorating rangeland

by assisting the Ministry of Agriculture establish up to twelve pilot sites on which to introduce a comprehensive package of technical interventions for improved rangeland management. This package will include upgraded vegetation control and stocking procedures such as rotational and deferred grazing, mechanical treatments of the soil, range seeding, range water development and improved animal raising techniques like genetic improvement and enhanced nutrition.

These interventions will be implemented by Ministry of Agriculture's Office of Livestock and Pastures (OEP) in coordination with other Ministry organizations. The detailed planning and day-to-day implementation activities of the subproject will be carried out by the newly created Range Management Unit (RMU) within OEP, with the assistance of technicians trained by this subproject.

The Range Management Unit

The Range Management Unit will be head-quartered in Kairouan and will be staffed initially with a director and four technicians with specializations in Range Management, Sheep Husbandry, and Forage Plant Materials. This core technical staff will be completed by a financial officer and support personnel (secretaries, messengers, drivers, and maintenance people) to sustain the headquarters operations. The core unit will be provided with a budget, based on submission by the RMU director of a yearly plan of work to carry out local procurement of items needed for site interventions.

In addition to the core RMU staff, frontline Tunisian range technicians will be assigned to the staffs of the OEP offices operating in the five governorates in which the subproject will be implemented. The task of establishing and maintaining contact with participating farmers and local authorities will be shared by the core staff and frontline workers.

The specific areas of responsibility for the RMU will be:

(1) selection of the sites (range perimeters) to be included in the subproject; (2) development and implementation of a rangeland management plan, including applied research and development activities with native forages, for each perimeter, and (3) design and execution of a livestock improvement scheme for participating farmers.

a. Site Selection

There are expected to be a total of twelve pilot sites in this subproject. Through the five year life of the activity, the sites will be "phased in" according to the following plan:

Year 1: 2 sites

Year 2: 1 site

Year 3: 2 sites

Year 4: 3 sites

Year 5: 4 sites

At least two of the sites selected will be privately owned perimeters, with the balance being collectives.

In selecting the sites the RMU will abide by the following criteria:

- i. land ownership and usage rights issues must be almost completely resolved;
- ii. sites must be located within the 22 delegation CTRD area of intervention;
- iii. a minimum of 80 percent of the farmers at each site must have 25 or less hectares each of privately owned land;
- iv. a request for participation in the program must be submitted by the farmers on the perimeter to OEP-RMU;
- v. range management committees, made up of participating farmers, must be established at each site;
- vi. site selection must, to the extent possible, take into account climatic and other environmental variations in the region.

b. Range Management Plan

At each site the RMU will work with participating farmers to develop a rangeland management plan. On both collective and privately owned perimeters, the range will be divided into blocks that will be grazed under a deferred rotation system. This system will be flexible, in terms of stocking rates and movement of sheep among parcels, to promote animal weight gain and optimal vegetation growth. As forage production rates vary from year to year, in accordance with climatic conditions, stocking levels will be adjusted annually to coincide with actual plant growth. Grazing of annual plants will be controlled to leave sufficient plant residue for ground cover and to permit reseeding the following year.

Matters concerning use of the range, such as necessity for and type of boundary fencing, need for range guards, mechanical treatment of the soil, construction of water catchment basins and regulation of the number of animals grazing, will be decided by the local range committee in consultation with OEP-RMU technicians.

As a part of the range development program small enclosures and transects will be established under OEP-RMU supervision on each of the perimeters to monitor and evaluate plant growth under various rates of grazing intensity and timing of grazing. Nutritional quality as well as animal preferences for plants will be evaluated so that development of the most beneficial species can be encouraged.

c. Livestock Improvement

The livestock improvement portion of the project to be implemented by OEP-RMU will consist of three components--nutrition, genetic improvement, and enhanced animal health practices. A key part of the nutrition element will be the provision of supplemental feed to stockraisers to offset the reduction in the amount of rangeland available through deferred rotation grazing system. In addition, technicians will assist farmers to adopt a variety of practices (supplemental feeding of ewes during breeding and lambing and creep feeding) designed to result in hardier animals.

The genetic improvement program will focus on providing farmers with information to upgrade the quality of stock through selective breeding. OEP-RMU technicians will stress to participating farmers the critical factors (weaning, weight, body size and meat qualities) to be considered in choosing animals for mating. The disadvantages of current inbreeding will be explained and farmers will be offered a ram, in exchange for one of their own, in an effort to add vigor to the flocks.

The health element will be comprised of instruction to farmers on proper treatment of the most common diseases affecting sheep flocks in the area.

Administrative Arrangements

While the OEP will be the lead agency in implementing this subproject they will be assisted by a number of other Ministry of Agriculture offices. The Directorate of Forestry will provide help in evaluation and seed production of Tunisian range ecotypes, mapping the range area, planning access routes to range perimeters, and mechanical treatments of the soil to be carried out by O.E.P. The Directorate of Land Ownership and Legislative Affairs (Affaires Foncières) will continue its role in the project area of establishing land ownership and delimitating between private and collective land. A principle task of this Directorate will be to help identify range perimeters, as potential subproject sites, on which land ownership questions have been to a large extent resolved, thereby making such perimeters eligible for inclusion in the subproject. The Directorate of Rural Engineering (Génie Rural) will help through the design and construction supervision of water catchment facilities and assist in carrying out some mechanical soil treatments. The Directorate of Soil and Water Resources will provide OEP-RMU subproject staff with climatic data as well as an inventory of the soils and water points in the area of each site chosen for intervention. They will participate in detailed soil surveys of the chosen perimeters and the development of soil conservation strategies as a part of the range management plan. Finally, the Central Tunisia Development Authority (CTDA) will be responsible for evaluation activities.

A subproject coordinating committee will be created to monitor project implementation as they may arise. The committee will be chaired by the Director of International Cooperation for the Ministry of Agriculture

and include representatives of SEP, CTDA, Affaires Foncières, Forestry Directorate, Rural Engineering, the Directorate of Soil and Water Resources, Directorate of Plan of the Ministry of Agriculture, the Directorate of Animal Production, and the Regional Commissariat for Agricultural Development (CRDA). It will meet quarterly and report to the Minister of Agriculture.

II. Subproject Financing

A. AID Financing

Assistance in the form of AID grant and loan dollar funds are provided for the following:

	(000 Dollars)
Technical Assistance	1,337.5
Commodities	582.5
Training	640
Evaluation	<u>40</u>
Total U.S. Financing	2.600

The above budget items may be shifted up to 10 percent without formal amendment of the project. Three Hundred Thousand Dollars of the U.S. contribution will be grant funds and the balance, Two Million Three Hundred Thousand Dollars will be loan funds.

B. Government of Tunisia Financing

In kind and Tunisian Dinar contributions are provided for the following:

	Estimated (000 Tunisian Dinars)
1. Personnel	341.15
2. Training	144.5
3. Rangeland Management Equipment	160.5
4. Other Costs	<u>1,168.95</u>

Total GOT Financing 1,815.1 Dinars
(Estimate of 3,630.02 Dollars)

400

C. Details of AID Financing

i) Technical Assistance

A large portion (approximately 50 percent) of U.S. inputs to the subproject will be for contract services from a U.S. University. The technical assistance financed by AID will include the services of three resident technicians (a range management specialist, a livestock specialist and a plant materials expert) who will work in Tunisia for periods of approximately four, three and two years respectively. These technicians will serve as advisors to the Director and technical staff of the Range Management Unit (RMU) within OEP. They will assist the RMU's core staff in the overall planning of subproject implementation, including such activities as selection of range perimeters, development and implementation of intervention packages for each perimeter, procurement of commodities and selection of participants for training. The resident advisors will be supported in commodity procurement and placement of participants in U.S. universities and short term training programs by a home office backstop from the university that is awarded the technical assistance contract.

Short term consultants, a total of up to 13 person months, will complement the expertise of the resident advisors throughout the course of the project.

ii) Training

AID financing for training totals U.S. \$640,000. It will consist of up to 30 person years of long term training in the U.S. This training is intended to train 10 Ministry of Agriculture technicians to the M.S. level in such disciplines Rangeland, and Livestock Manage-

ment and Seed Production Technology. As a complement to long term study AID will also finance a total of up to 40 person months of short term training. This training will be divided into 16 units with an average duration of 2 1/2 months each. It will consist of matters directly related to rangeland management and the organization of social groups in rural areas, and will take place either in the U.S. or a third country.

Selection of participants (both short and long term) will be made on the basis of a plan prepared by the Tunisian project manager with the assistance of the contract team in a form and substance acceptable to AID. Training plans will be based on the organizational needs of the RMU, and supporting agencies.

iii) Commodities

U.S. financing commodities will be U.S. or Code 941 and include 12 automobiles (Automobiles are U.S. source only), trailers and range improvement implements. Purchase and procurement of these items will be carried out by the Government of Tunisia (with regard to the vehicles) and by the University Contractor for the other items.

D. Details of GOT Financing

The GOT will pay the recurring costs of the RMU, both central office and field stations, and provide land and buildings to house this unit. Also, the GOT will provide commodities, equipment, and local cost financing to carry out the training and physical interventions planned for the twelve pilot sites. A specific commodity plan will be drawn up by the Tunisian project manager with assistance of the technical

advisory team in form and substance acceptable to AID.

i) Training

The Government will pay the international travel cost, of all trainees studying abroad and in the event the Government approves payment of salary to Tunisian participants, such salary payments would constitute an additional financial contribution. The Government will also finance at least 5 participating farmer orientation/training sessions in Tunisia and annual seminars for project technicians.

ii) Technical Assistance

In support of the U.S. technical assistance personnel the Government will provide office space, secretarial and other required support personnel, household furnishings previously assigned to U.S. technicians under the Livestock Feed Production Project (664-0293) and official in country transportation.

iii) Commodities and Other Costs

In addition to office equipment and supplies for the RMU, the Government will finance the purchase of five tractors, four one-ton trucks, and certain other shelf items. Furthermore, the GOT will bear the cost of the supplemental feed to be provided farmers at subsidized rates.

III. Technical Assistance Contracting

The Ministry of Agriculture will negotiate a contract with a U.S. university that has demonstrated research and implementation

capacity in rangeland management. The contractor also should have experience in procurement of commodities and services in accordance with AID regulations.

MEMORANDUM

TO: The Files
FROM: *Harold L. Dickherber*
Harold L. Dickherber, Acting Agric. Dev. Officer
CONCURRED BY: *Jabeur Ammar*
Jabeur Ammar, Director, Projet Intégré, O.E.P.
SUBJECT: Range Development Subproject No. 664-0312.8

The purpose of this memo is to record the agreements reached between A.I.D. and the Ministry of Agriculture covering the administrative arrangements for the implementation of the Rangeland Development and Management Subproject of the Central Tunisia Rural Development Program.

On Thursday, May 21, 1981 a meeting was held to discuss the draft Project Paper. Participants at this meeting were:

- Ms. Fatma Larbi, MOA/DCI
- Mr. Jabeur Ammar, P.I./O.E.P.
- Mr. Harold Dickherber, USAID/F&A
- Mr. William Kaschak, USAID/PROG
- Mr. Salah Mahjoub, USAID/F&A

The Government of Tunisia representatives reported that the draft Project Paper had been reviewed by representatives of all of its agencies of the Ministry that are expected to have a role in the implementation of the project. Based on the results of an internal MOA meeting held on May 19, 1981 and additional exchanges between the Office of International Cooperation and agencies that will be involved in this project they proposed an administrative plan (attachment A) which specifies the responsibilities of each agency and was accepted by the USAID representatives.

To improve project coordination throughout the implementation of the project the MOA representatives proposed that the coordinating committee for this project be expanded from that which was proposed in the draft PP. This change was also accepted (attachment B).

Other aspects of the proposed project including the implementation and proposed inputs and outputs were accepted with minor changes or as presented.

In the implementation of the project it was emphasized by the MOA officials that the planning of interventions that require the participation of agencies other than the lead institution, such as the water catchment work to be executed by the Rural Engineering Directorate, must be planned sufficiently in advance to allow them to schedule their activities in support of this project.

F&A:MDickherber:esa
5/27/81

Clearance: *elt*
PROG:WKGKaschak(draft)

ANNEX G - PROJECT DESIGN SUMMARY - LOGICAL FRAMEWORK (continued)

<u>Inputs:</u>	<u>USA</u>	Joint US/IDA evaluation system	1. a. Universities responding to proposals will offer suitable candidates.
<u>USAID:</u> 1. Advisors	1. Range Mgt. Forage 48 IM Range Ovins Specialists 36 IM Plant Material Specialist 24 IM Consultants 13 IM	OEP Records Project Evaluations Contractors reports and Audits.	1. b. Advisors will have cultural sensitivity required.
2. Training	2. IM 30 person years GT 40 person months (14 individuals)		2. Suitable candidates available.
3. Commodities	3. 12 vehicles with spare parts Assorted Farm Implements Assorted Office and Scientific Equipment		3. a. Reasonable delivery time 3. b. Services will be available
<u>GOT:</u>	Director RMU 4 RMU technicians 1 Financial manager Secretaries, guards, drivers as necessary 10 frontline workers in Governorat OEP offices	OEP staffing patterns	Suitable candidates available
1. Personnel and Support			
2. Other Costs a. Animal feed b. Replacement rams c. Catchment basins	a. 25,000 T during life of project b. Minimum of one for every participating farmer c. Number to be determined by joint GOT/US TA team in consultation with participating farmers	OEP records Res. Adv. reports OEP records Res. Adv. reports OEP records Res. Adv. reports	Adequate GOT budget Adequate OEP logistical support to procure and transfer required commodities.
3. Training a. Farmer workshops	a. A minimum of five through the life of the project	OEP records Res. Adv. reports Project Evaluations	Farmers agreeable to attending workshops
b. Technical seminar	. A minimum of 10 during the life of the project	OEP records Res. Adv. reports Project Evaluations	Adequate personnel for seminar
c. Participant support	. International travel costs met for up to 12 long term and 20 short term participants. Support in terms of at least partial salary for all participants during their entire period of training.	c. OEP records Contractor records Res. Adv. reports Evaluations	c. GOT policy change to provide at least partial salary to employees who are on long term training status
4. Commodities	1. Trucks, 4 tractors and adequate rangeland fencing	OEP records Res. Adv. reports Evaluations Audits	Incl. procurement possible or reasonable delivery time if not possible. Servicing and maintenance available

15

**ANNEX G - PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Life of Project: From FY 1981 to FY 1986
 US Funding: \$2,600,000
 Date Prepared: March 13, 1981

Project Title and Number: Central Tunisia Range Development, 664-0312.8

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Goal:</u> Increased real income and improved quality of life in Central Tunisia. (See Central Tunisia Rural Development Log Frame).</p>	<ol style="list-style-type: none"> 1. Household Expenditures up 2. Reduced Mortality and Morbidity 3. Increased Economic Activity 	<ol style="list-style-type: none"> 1. NIS household expenditures surveys 2. Health records 3. CTDA surveys 	<p>(About Purpose to Goal:)</p> <ol style="list-style-type: none"> 1. Better range practices lead to better animals, healthier herds and higher prices and more productivity.
<p><u>Purpose:</u> Improved rangeland and range use practices in Central Tunisia</p>	<ol style="list-style-type: none"> 1. Improved range in 12 pilot areas (36,000 ha.) 2. Animals are larger and of higher quality 3. 25 kgs of lamb produced per ha. 4. Wool production increased by 177. 	<ol style="list-style-type: none"> 1. Organized observation 2. Joint Evaluation system 	<p>(About Outputs to Purpose:)</p> <ol style="list-style-type: none"> 1. Rotating grazing program will continue 2. Staff and demonstrations will influence other pastoralists 3. Pastoralists will respond to price incentives 4. Staff functions will continue
<p><u>Outputs:</u></p> <ol style="list-style-type: none"> 1. Trained field staff 2. Trained backstop staff 3. Pilot units operating <ol style="list-style-type: none"> a. Vegetation control b. Rotational stocking c. Deferred grazing d. Mechanical treatment e. Range seeding f. Rangeland development g. Genetic improvement 4. Increased meat production 5. Technical bulletins 6. Land treatment 7. Specialized feeding programs 	<p><u>Magnitude:</u></p> <ol style="list-style-type: none"> 1. 26 agents 2. 12 support technical staff 3. 12 pilot areas, 36,000 ha. 4. Doubling of lambs marketed relative to flock size 5. 10 bulletins by 3rd year 6. & 7. To be determined in detailed plan for each site 	<ol style="list-style-type: none"> 1. & 2. Employment records 3. Project records 4. CTDA evaluation and statistical system 5. to 7. OEP and CTDA Evaluation 	<p>(About Inputs to outputs:)</p> <ol style="list-style-type: none"> 1. & 2. Adequate personnel can be hired by GOI under existing recruitment and placement rules. 1., 2. & 3. Adequate logistical support 3., 4. & 7. Farmers agree to participate and follow recommendations 5. Technical bulletins are effective means of educating extension agents, other relevant officials and literate farmers.

ATTACHMENT A

Analyse Administrative

L'Office de l'Elevage et des Pâturages (OEP) du Ministère de l'Agriculture, poursuivant son important rôle pour le développement de la production animale et fourragère en Tunisie, assumera la principale responsabilité dans l'exécution du sous-projet. Cet office affectera le personnel nécessaire et fournira le soutien logistique au personnel de l'office et aux agents de terrain. En outre, il demandera le soutien nécessaire aux divers autres services et organismes du Ministère de l'Agriculture et coordonnera avec eux les activités du projet. L'OEP collaborera étroitement avec l'ODTC pour la planification globale de ce sous-projet. L'ODTC sera, à son tour, chargé de coordonner ce sous-projet avec d'autres activités de développement en Tunisie Centrale et aidera à l'évaluation du sous-projet.

La planification détaillée et l'exécution journalière des activités seront assurées par le Service d'Aménagement des Parcours de l'OEP. Ce service dont le siège sera établi à Kairouan, centre de la région du sous-projet, sera dirigé au début par un directeur et quatre techniciens spécialisés en gestion des parcours, en élevage ovin et en production fourragère. Ce noyau de personnel technique sera complété d'un directeur financier et autre personnel de soutien (secrétaire, garçons de bureau, chauffeurs et employés d'entretien) pour assurer le fonctionnement du siège central. Ce service sera doté d'un budget, basé sur un plan de travail annuel soumis par le Directeur du Service d'Aménagement des Parcours pour l'achat d'articles: Locaux (par exemple: fer de renforcement et ciment pour la construction des bassins de captage) nécessaires pour les interventions dans les sites.

Outre le personnel du Service d'Aménagement des Parcours, d'autres techniciens seront affectés aux bureaux de l'OEP dans les quatre gouvernorats où le sous-projet doit être réalisé. La tâche d'établir et de maintenir le contact avec les agriculteurs participants et les autorités locales sera partagée également entre le personnel du Service d'Aménagement des Parcours et les agents de terrain. L'étude des sites à inclure dans le sous-projet nécessitera des visites auprès des responsables locaux (Omdas et Délégués), des réunions avec les agriculteurs participants éventuels pour discuter et expliquer les interventions et l'évaluation des conditions matérielles des parcours et des troupeaux ovins. Après la sélection des sites, les principales tâches du personnel sur le terrain incluront des visites aux comités de gestion des parcours pour expliquer les aspects particuliers du programme, aider à l'achat et à la distribution des biens tels que béliers de reproduction et aliments d'appoint, et surveiller le traitement mécanique du sol, la rotation des pacages et l'ensemencement des parcours. Quand les interventions dans un site donné atteignent leur plus haut niveau, un technicien du Service d'Aménagement des Parcours devra, selon que prévu, se réunir avec chaque comité de parcours une fois tous les quinze jours. Un site tel que Sayada qui pourrait compter jusqu'à trente comités de gestion, pourrait nécessiter les services de 2 ou même 3 agents de terrain à plein temps, aidés par des techniciens du Service. Les autres organismes du Ministère de l'Agriculture devant participer à l'exécution de ce sous-projet comprennent la Direction des Forêts, la Direction des Affaires Foncières et Législatives, La Direction du Génie Rural, la Direction des Ressources en Eau et en Sol, et la Direction de la Production Animale. La Direction des Forêts est le département du Ministère de

L'Agriculture chargé de la conservation des ressources naturelles et aidera le Service d'Aménagement des Parcours à planifier et à exécuter les interventions de conservation du sol et des eaux, elle aidera notamment à dresser la carte de la région des parcours, supervisera l'ouverture des routes d'accès aux périmètres de parcours et appliquera les traitements mécaniques tels que les cultures suivant les courbes de niveaux et la construction de dispositifs d'épandage d'eau. La Direction des Affaires Foncières et Législatives poursuivra son rôle dans la région du projet en vue de distribuer les titres de propriété et tracer des limites fixes entre les terres collectives et les terres privées. La principale tâche de cette direction sera d'identifier les périmètres des parcours pouvant être utilisés comme sites potentiels du sous-projet et procéder à leur délimitation selon les dispositions de la législation régissant les terres collectives en Tunisie. Les terres de parcours ne sont pas l'objet de distribution de titres de propriété. Une fois délimitées, elles peuvent être soumises au régime forestier. La Direction du Génie Rural aidera dans la conception et la construction des installations de captage d'eau dans les périmètres des parcours où (1) le pacage est contrôlé, (2) le terrain est jugé approprié pour de telles installations, et (3) les points d'eau sont nécessaires pour l'amélioration des parcours et la gestion des troupeaux. Elle prêtera aussi son concours pour la réalisation de quelques traitements mécaniques du sol. La Direction des Ressources en Eau et en Sol fournira au personnel du sous-projet des données climatiques aussi bien qu'un inventaire des sols et des points d'eau dans la zone de l'intervention. Elle participera à des études détaillées des périmètres choisis et à l'élaboration des stratégies de conservation de sol dans le cadre du plan de gestion des parcours. Afin d'assurer que la participation de chacun de ces organismes ait lieu en temps voulu, le présent sous-projet retiendra comme Condition Préalable au premier déboursement de fonds invitant les organismes précités du Ministère de l'Agriculture à fournir leur soutien en temps opportun à ce sous-projet. Les dates jugées opportunes pour un tel soutien seront définies par l'OEP.

ATTACHMENT B

Comité de Coordination

Un comité de coordination du projet sera créé pour suivre l'exécution du projet et résoudre les problèmes posés. Le comité se réunira trimestriellement et comprendra des représentants de la Direction de la Coopération Internationale du Ministère de l'Agriculture, l'OEP, l'ODFC, la Direction des Forêts, la Direction du Génie Rural, la Direction des Affaires Foncières et Législatives, la Direction du Plan et la Direction de la Production Animale et l'Université sous contrat. L'USAID aura seulement un statut d'observateur au sein de ce comité. Ce comité devra rendre compte de ses activités au Ministère de l'Agriculture.

DEPARTMENT OF STATE TELEGRAM

FILE *JF*
001122

664-312

<p>AMB DCM ECON CHRON</p> <p>CONF INFO AID(9) INFO/ D. PROG CONT HLA RD F&A CF EF</p>	<p>FROM OUTGOING AMEMBASSY TUNIS</p> <p>ACTION: SECSTATE WASHDC</p> <p>UNCLAS TUNIS 1122</p> <p>AIDAC</p> <p>E.O. 12065: N/A</p> <p>SUBJECT: CTRD: Range Development (664-0312.8)</p> <p>REFS: (A) STATE 021009; (B) TUNIS 0004, (C) 80 STATE 036099; (D) RFTP CTRD Rural Extension, 1/15/81.</p> <p>1. Per para 3 ref A, would appreciate notice of AID/W decision re: delegation to authorize subproject.</p> <p>2. Concerning sole source issue. It was USAID view that there was no need for sole-source waiver if range activity was made part of contract executed between GOT and U.S. university performing extension activity. Rationale was: CTRD is one "project"; university performing extension activity will be chosen competitively; and Ref D, Para III. D.6 provided notice of potential follow-on work in range and small enterprise activities. Thus HB 11, Ch, 1, 2.4.2 did not apply. Recognize that this is a close call,</p>	<p>CLASSIFICATION UNCLASSIFIED</p> <p>AMEMBASSY, TUNIS</p> <p>FEB 13 9 13 AM '81</p>
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<p>DRAFTED BY RLA:SECarlson <i>SLR</i></p>	<p>DRAFTING DATE 2/10/81</p>	<p>TEL. EXT. 375</p>	<p>CONTENTS AND CLASSIFICATION DIR:WFGelabert <i>WFG</i></p>
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CLEARANCES

PROG:ELAucher *EL*
CONT:HWormald *HW*
F&A:CJFliginger *CJ*

2/13/81 9:10am

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but believe: competition requirements will have been met through original competitive selection; and project implementation efficiency would benefit from this method. FYI: we believe both universities making extension proposals have capacity to perform range activity effectively; would have to evaluate small enterprise activity capacity later this year. End FYI.

3. Therefore would appreciate review of conclusion stated para 2 ref A. If it remains unchanged, USAID does not anticipate that it would, with our request A/AID sole source waiver, ~~given AID policy that activities known to require sole source waiver should be authorized by person with authority to issue same.~~

BOSWORTH



ACTION: AID-3
INFO: AXB BOM
ECON CTRCT/12

Advance
DEPARTMENT OF STATE
TELEGRAM *JG*

R 020920Z APR 81
FM SECSTATE WASHDC
TO AMEMBASSY TUNIS 4166
BT
UNCLAS STATE 083542

05717

AIDAC

E.O. 12865: N/A

TAGS:

SUBJECT: PENDING AID/W ACTIONS

REF: (A) TUNIS 2240 (B) TUNIS 1359 (C) TUNIS 1391
(D) TUNIS 1122 (E) TUNIS 1650

AID/W REGRETS THE DELAYS THAT HAVE OCCURRED REGARDING THE ABOVE ACTIONS AS PER REF A. THE CURRENT STATUS OF THESE ACTIONS ARE AS FOLLOWS:

1) REF B: AA/NE SIGNED CABLE STATE 078131 ON MARCH 27, 1981 GRANTING THE AUTHORITY TO THE MISSION DIRECTOR TO AMEND THE AGRICULTURAL TECHNOLOGY TRANSFER PROJECT 664-0304 AND INCREASE LIFE OF PROJECT FUNDING TO A TOTAL OF 5.8 MILLION DOLS. THE ADVICE OF PROGRAM CHANGE WAS SENT CONGRESS 26 MARCH. AID/W WILL ADVISE AT THE END OF THE WAITING PERIOD IF NO EXCEPTIONS ARE MADE.

2. REF C: WAIVER OF COMPETITION HAS BEEN PROCESSED AND SIGNED AS OF 3/31/81. THIS ALLOWS FOR A DOLS 200,000 AMENDMENT TO THE EXISTING CONTRACT WITH THE GOT TO BE EXECUTED TO PERMIT MIAC TO IMPLEMENT INAT TRAINING ACTIVITIES AS REQUESTED. COPY OF THIS WAIVER HAS BEEN POUCHED 3/31/81.

3) REF D: BASED ON USAID/TUNIS REASONING IN REFTEL D, NE/GC CONCURS THAT THERE IS NO NEED FOR SOLE SOURCE WAIVER IF RANGE ACTIVITY IS PART OF A CONTRACT THAT HAS ALREADY BEEN COMPLETED FOR BETWEEN GOT AND U.S. UNIVERSITY PERFORMING EXTENSION ACTIVITY. THIS PRESUMES ADEQUATE NOTIFICATION IN BIDDING DOCUMENTS THAT BOTH THESE ACTIVITIES WERE INCLUDED. SINCE REFTEL SUPPORTS REASONING THAT APPEARS SOUND, AND MISSION HAS ALL SUPPORTING DOCUMENTATION AID/W AGREES WITH THE ACTION YOU PROPOSE.

4) REF E: ACTION HAS BEEN TAKEN BY NE/PD. THEY HAVE CABLE STATUS IN STATE 078112. HAIG

BT
3542

ACTION: AID-8
INFO: AMB DCM
ECON CHRON/12

DEPARTMENT OF STATE
TELEGRAM

DE RUEHC 1313 1002338
Z NR UUUUU ZZH
R 102 14Z APR 81
FM SECSTATE WASHDC
TO AMEMBASSY TUNIS 4290
BT
UNCLAS STATE 091313

11 APR 81 11 25z

AIDAC

04156

E.O. 12065: N/A

TAGS:

SUBJECT: RANGE DEVELOPMENT PROJECT (0312.8) NEGATIVE
DECLARATION FOR IEE

REFS: (A) TUNIS 0894; (B) STATE 21966; (C) TUNIS 0316;
(D) FLIGINGER/LINTNER MEMO OF MARCH 2, 1981

LINTNER RECEIVED REF D. UPON RETURN FROM EXTENDED TDY
WISHES TO INFORM MISSION THAT PROJECT HAS BEEN GIVEN
A "NEGATIVE DETERMINATION" IN CONFORMANCE WITH THE
REQUIREMENTS OF 22 CFR 216. STOESSEL
BT

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SECRET: AIR-1
ENV: AIR-1
ST: AIR-1

SECRET
10-15-66

Page 2

ZNY 00000 440
R 141625Z FEB 61
FM SECRETARY WASHDC
TO AMEMBASSY TUNIS 3433
UNCLAS STATE 039463

17 FEB 61 10 37Z

ADM AID

1780

D.O. 12065-1/4

TAGE:

SUBJECT: CTRO 664-2312.8 RANGE DEVELOPMENT RP
MIS-ORGANIZATION

REF: (A) TUNIS 2304 (B) STAT 02109 (C) STAT 21966

1. AS REQUESTED REF A PARA 4, AID / REDELEGAT S AUTHORITY
TO THE MISSION DIRECTOR TO AUTHORIZE SUBJECT SUB-PROJECT.

2. FOR OUR INFORMATION, WE WOULD LIKE A COPY OF YOUR
PROJECT PAPER ASAP. WAIS

BT
SAGE

Handwritten marks and scribbles, including several vertical lines and arrows pointing downwards.

Office Memorandum

USAID/TUNISIA

TO : Mr. William F. Gelabert, Director
THRU : Edmund L. Auchter, Program Officer
FROM : William G. Kaschak, Assistant Program Officer
Harold Dickherber, F&A Officer (Acting)
SUBJECT : Project Authorization Rangeland Development and Management:
A Loan and Grant of 2.600 million dollars

DATE: May 27, 1981

Problem:

Your approval is required for an amendment to project 664-312, to provide a loan of \$2,300,000 and a grant of \$300,000 to the Government of Tunisia for the Rangeland Development and Management subproject (664-0312.8).

Discussion

The subproject is fully described in the subproject paper and draft project agreement annex, both of which are attached. In brief it consists of pilot effort to design and implement socially and technically sound approaches to improved rangeland management and the development of the institutional capabilities within the Tunisian Ministry of Agriculture's Office of Livestock and Pastures (OEP) to continue and expand on these activities. During the life of the subproject twelve pilot sites will be developed. Interventions at each site will center on improved range utilization and sheep raising techniques. The subproject will be implemented by the OEP and in coordination with the Central Tunisia Development Authority and other departments within the MOA. Attached are minutes of a meeting among all the MOA organizations involved noting their agreement to the role that each is to play.

Also attached is an issues paper which discusses the issues uncovered by the subproject committee and the resolutions the committee has agreed upon for those and for issues proposed by AID/W, various Mission offices, and yourself in the course of subproject design.

The question of whether technical services from a U.S. university will be obtained by direct negotiation with one already operating here, a short list of qualified universities, or a general Government of Tunisia's request for proposals was resolved by a cable exchange with AID/W. The Mission requested (TUNIS 1122) AID/W concurrence with the position that a sole source waiver would not be necessary if the contract for the range activity was to be executed with the same U.S. university performing the extension activity, Oregon State University. AID/W (STATE 083542) concurred with the Mission position.

No waiver for short term third country training in a developed country is included at the present time. The paper provides for such training in the U.S. or third countries. If, in the development of the detailed training programs called for in the agreement, some training in developed third countries is found to be desirable, the necessary waivers will be sought at that time.

Delegation of Authority

The MEAC, in reviewing the PID submitted for approval on January 24, 1980, withheld delegation to the field to authorize the PP pending clarification of the specific technician tasks to be performed under this subproject and the Livestock project and resolution of the contract issue. Subsequently AID/W (81 STATE 039463) confirmed delegation of authority to the Mission Director to authorize the subproject.

Environmental Considerations

A negative determination was requested through the Initial Environmental Examination submitted with the PID. On March 2, 1981 the Mission provided AID/W with a draft of the technical analysis section of the PP Project Paper. In response AID/W (STATE 091313) advised the Mission that a "negative determination" had been given and that the subproject was in conformance with the requirements of 22 CFR 216.

Justification to Congress

This subproject is part of the Central Tunisia Rural Development Project, which has been included in the FY 79, FY 80, and FY 81 Congressional Representations. The Fiscal Year 1981 CYB for this subproject is U.S. \$2.6, although the PID was approved at the U.S. \$2,860 level. The authorization proposed is within the totals already reported to the Congress for the Central Tunisia Project.

Human Rights Clearance

Clearance as required was requested for the Central Tunisia Rural Development Project (664-0312) in an action memorandum from the Assistant Administrator for the Near East Bureau to the Deputy AID Administrator dated March 26, 1979 recommending approval of the global CTRD project, and for this subproject when the PID was approved. There are currently no human rights issues in Tunisia as defined by the Foreign Assistance Act of 1961, as amended.

Recommendation

That you sign the attached subproject authorization.

AGENCY FOR INTERNATIONAL DEVELOPMENT
UNITED STATES A. I. D. MISSION TO TUNISIA

AMERICAN EMBASSY
TUNIS TUNISIA

FIFTH AMENDMENT

27 MAY 1981

TO

PROJECT AUTHORIZATION

Name of Country: Republic of
Tunisia

Name of Project: Central Tunisia
Rural Development

Number of Project: 664-0312

Number of Loan : 664-T-056

The Central Tunisia Rural Development Project for the Republic of Tunisia was authorized by the Administrator on March 28, 1979, which authorization was amended on September 1, 1979, June 27, 1980, August 21, 1980 and August 25, 1980. That authorization, pursuant to the delegation of authority of May 27, 1980 by the Administrator and subsequent redelegation of February 14, 1981 (81 State 039463) by the Acting Assistant Administrator, Bureau for the Near East, is hereby amended as follows:

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Range Development and Management subproject (the "Range Development subproject") for Tunisia involving planned obligations of not to exceed Two Million Three Hundred Thousand U.S. Dollars (\$2,300,000) in loan funds and Three Hundred Thousand U.S. Dollars (\$300,000) in grant funds during FY 1981, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the Range Development subproject.

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2. The Range Development subproject consists of efforts (including, but not limited to, technical assistance and pilot interventions) to improve rangeland management in Tunisia and to develop the institutional capabilities of the Tunisian Office of Livestock and Pastures (OEP).

3. The Project Agreement Amendment(s) which may be negotiated and executed by the officer(s) to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority shall be subject to the following essential terms, covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate:

a. Interest Rate and Terms of Repayment for Range Development Subproject

Tunisia shall repay the Loan provided in this Amendment in United States Dollars within twenty-five (25) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. Tunisia shall pay to A.I.D. in United States Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Conditions Precedent for Range Development Subproject

Except as A.I.D. may otherwise agree in writing:

(i) Prior to the initial disbursement or to the issuance by A.I.D. of documentation pursuant to which disbursement may be made for the Range Development subproject, Tunisia shall furnish in form and substance satisfactory to A.I.D.: evidence that the Office of Livestock and Pastures (OEP) has primary responsibility for range development on private and collective lands in Central Tunisia and evidence that the OEP has created a Range Management Division to initiate subproject interventions.

(ii) Prior to subsequent disbursements by A.I.D. for planned interventions for each subproject site, evidence that no significant land use rights remain unresolved for the major portion of such site.

c. Covenant for Range Development Subproject

Tunisia shall covenant to continue a regular pattern of range development, increasing the area of coverage, as long as such activities are cost effective and socially useful.

Except as amended hereby, the Authorization, as amended, shall remain in full force and effect.

William F. Gelabert
Director
USAID/Tunis

Date

<u>Clearances:</u>	PROG:ELAuchter	<u>JA</u>	date	<u>5/26/81</u>
	CONT:SBChouikha	<u>JA</u>	date	<u>5/26/81</u>
	F&A :HDickherber	<u>JA</u>	date	<u>5/26/81</u>
	F&A :SMahjoub	<u>JA</u>	date	<u>5/27/81</u>
	RDA :PDDemongeot	<u>JA</u>	date	<u>5/27/81</u>
	RLA :SECarlson	<u>JA</u>	date	<u>5/26/81</u>

Drafter:RLA:SECarlson:nm:5/26/81 JA

Project Number 664-0312
Amendment
Dated July 6 - 1981

TENTH AMENDMENT
to
PROJECT LOAN AND GRANT AGREEMENT
between
THE REPUBLIC OF TUNISIA
and the
UNITED STATES OF AMERICA
for
CENTRAL TUNISIA RURAL DEVELOPMENT

TENTH AMENDMENT DATED *JUN 5*. 1981 to the Project Loan and Grant Agreement dated May 18, 1979, as amended (the "Agreement") between the REPUBLIC OF TUNISIA ("Tunisia" or the "Government") and the UNITED STATES OF AMERICA, acting through the Agency for International Development ("A.I.D.").

WHEREAS the REPUBLIC OF TUNISIA and the UNITED STATES OF AMERICA entered into an Agreement for Economic, Technical, and Related Assistance dated March 26, 1957, pursuant to which this Amendment is entered into by Tunisia and A.I.D.; and

WHEREAS pursuant to Sections 2.1, 2.2 and 3.2 of the Agreement, Tunisia and A.I.D. are agreeable to adding a new subproject for inclusion in the Project entitled "Range Development and Management"; and

WHEREAS the Parties wish to specify their commitments of funding for this subproject; and

WHEREAS the Parties confirm their mutual commitment to the Project.

NOW THEREFORE the Parties agree as set forth herein:

1. The Agreement is hereby amended as follows:

A. By adding after Item Number 6 of Section 2.1:

"7. Annex 2-G. Range Development and Management."

B. By revising paragraph (C) of Section 2.2. to provide:

"It is anticipated that the United States ("U.S.") contribution for the seven subprojects mentioned above will reach the total of \$19,495 million, divided as follows:

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<u>Subproject</u>	<u>Amounts (in millions of Dollars)</u>		
	<u>Loan</u>	<u>Grant</u>	<u>Total</u>
Area Development	0	3,200	3,200
Dryland Farming Systems Research	0,350	2,800	3,150
Small Holder Irrigation Development	4,400	0,400	4,800
Potable Water System	0,750	0	0,750
Rural Extension and Outreach	2,805	0	2,805
Rural Potable Water	1,500	0,690	2,190
Range Development and Management	<u>2,300</u>	<u>0,300</u>	<u>2,600</u>
TOTAL	12.105	7,390	19.495"

C. By revising Section 3.1 to provide:

"SECTION 3.1 The Grant; the Loan.

To assist the Government to meet the costs of carrying out the project, A.I.D., pursuant to the Foreign Assistance Act of 1961, as amended, agrees to grant the Government under the terms of this Agreement, not to exceed seven million three hundred ninety thousand U.S. Dollars (\$7,390,000) ("Grant") and to lend the Government under the terms of this Agreement, not to exceed twelve million one hundred five thousand U.S. Dollars (\$12,105,000) ("Loan").

The Loan and the Grant are obligated to assist the following subprojects in the amounts stated below:

	<u>Amounts Obligated by the Agreement as Amended to Date (in millions of Dollars)</u>		
	<u>Loan</u>	<u>Grant</u>	<u>Total</u>
Area Development	0	3,200*	3,200*
Dryland Farming Systems Research	0,350	2,800	3,150
Small Holder Irrigation Development	4,400	0,400	4,800
Potable Water System	0,750	0	0,750
Rural Extension and Outreach	2,805	0	2,805
Rural Potable Water	1,500	0,690	2,190
Range Development and Management	<u>2,300</u>	<u>0,300</u>	<u>2,600</u>
TOTAL AMOUNT OBLIGATED	12.105	7.390	19.495

* of which an amount of \$1.5 million is allocated to the Experimental Fund.

The aggregate amount of disbursements under the Loan is referred to as "Principal". The Loan and the Grant together are referred to as the "Assistance". The Assistance may be used to finance foreign exchange costs, as defined in Section 7.1, and local currency costs, as defined in Section 7.2 of goods and services required for the Project".

D. By deleting from paragraph (B) of Section 3.2 "Fifteen Million Six Hundred Three Thousand Five Hundred U.S. Dollars (\$15,603,500)" and substituting in lieu thereof "Nineteen Million Two Hundred Thirteen Thousand Five Hundred U.S. Dollars (\$19,213,500)!"

E. By adding a new Section 5.4.4 as follows:

"SECTION 5.4.4 Conditions Precedent Applicable to Range Development and Management Subproject:

Except as the Parties may otherwise agree in writing, the following conditions precedent, which must be satisfied in form and substance satisfactory to A.I.D., are applicable to the components of the Range Development and Management Subproject identified below:

"a) Initial Disbursement

Prior to the initial disbursement of Assistance by A.I.D. for this subproject, or to the issuance of documentation pursuant to which disbursement will be made, the Government shall, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(1) an opinion of counsel that the loan amount obligated by this amendment, as well as the loan amounts obligated by the First, Second, Fifth, Sixth, and Eighth amendments, has been duly authorized by and executed on behalf of the Government and that such amendments

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constitute valid and legally binding obligations of the Government in accordance with all of the terms of this Agreement, as amended;

(2) evidence that the Office of Livestock and Pastures ("OEP") has the primary responsibility for Range Development on private and collective lands in Central Tunisia; and

(3) evidence that the OEP has created a Range Management Division, appointed a director to this unit and assigned to this unit sufficient managerial, technical and support staff to initiate project interventions.

b) Site Procedures

Prior to subsequent disbursements of the Assistance by A.I.D. for undertaking planned interventions on each subproject site, the Government will provide evidence in form and substance agreed upon by the Government of Tunisia and A.I.D. that the procedures of Affaires Foncières for delimiting collective land have been completed for such sites and that no issues remain unresolved for eighty percent of the land area of such sites."

F. By revising Section 5.5 and paragraph (B) of Section 5.6 to include "5.4.4" after "5.4.3" where that number appears.

G. By adding a new Section 6.8 as follows:

"SECTION 6.8 Covenant Applicable to Range Development Subproject

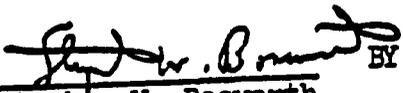
Except as the Parties may otherwise agree in writing, the Government will covenant to continue, through OEP, a regular pattern of range development increasing its areas of coverage by at least four sites (approx. 12,000 ha) each year as long as such activities are cost effective and socially useful.

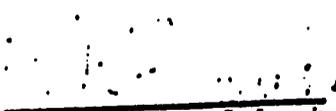
Except as amended hereby, the Agreement shall continue in full force and effect.

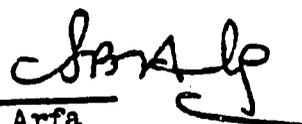
IN WITNESS WHEREOF, the REPUBLIC OF TUNISIA and the UNITED STATES OF AMERICA, each acting through its respective duly authorized representative(s), have caused this Tenth Amendment to be signed in their names and delivered on the day and year first above written.

UNITED STATES OF AMERICA

REPUBLIC OF TUNISIA

BY:  BY:
Stephen W. Bosworth
Ambassador of the
United States of
America

 BY:
William F. Galabert
Director
USAID/Tunis

 BY:
Ahmed Ben Arfa
Director General of
International
Cooperation
Ministry of Foreign
Affairs

ADDENDUM

Selected Rangeland Development
and
Management Bibliography

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2. Le Houerou, Henri Noel. Principle Methods and Techniques for Range Management and Fodder Production in the Mediteranean - Tunisia.
3. Trip Reports of USAID/Tunisia Livestock Project (664-0293) Resident Advisor Team Members.
4. Tunisian Ministry of Agriculture Office de l'Elevage et Paturage (OEP) Annual Reports for the Governorates of Central Tunisia - 1977, 1978, and 1979.
5. Tunisian Ministry of Agriculture Office de l'Elevage et Paturage (OEP) Program of Evaluation, Experimentation and Development of Tunisia Plant Material, (Mimeo).
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7. USAID/Cameroon - North Cameroon Livestock and Agricultural Development - 1978.
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