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COUNTRY REPORT NO. 3

BACKGROUND DOCUMENT FOR THE RURAL EXTENSION AND OUTREACH PROJECT FOR CENTRAL TUNISIA

UNIVERSITY OF WISCONSIN MADISON

REGIONAL PLANNING AND AREA DEVELOPMENT PROJECT
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BACKGROUND DOCUMENT FOR THE RURAL EXTENSION AND OUTREACH PROJECT FOR CENTRAL TUNISIA

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ACRONYMS

ODTC	:	Office de Développement de la Tunisie Centrale
CRDA	:	Commissariat Régional de Développement Agricole
DPV	:	Direction de la Production Végétale
DERV	:	Direction de l'Enseignement, de la Recherche et de la Vulgarisation
OEP	:	Office de l'Elevage et des Pâturages
DRES	:	Direction des Ressources en Eau et en Sol
GIAF	:	Groupement Interprofessionnel des Arbres Fruiters
GID	:	Groupement Interprofessionnel des Dattes
GIL	:	Groupement Interprofessionnel des Légumes
CTV	:	Cellule Territoriale de la Vulgarisation
INRAT	:	Institut National de Recherche Agronomique de Tunisie
INAT	:	Institut National d'Agronomie en Tunisie
PAM	:	Programme Alimentaire Mondial
FOSDA	:	Fonds Spécials pour le Développement Agricole
FAPI	:	Fonds pour l'Agriculture des Périmètres Irrigués
FAI	:	Fonds pour l'Agriculture Irriguée
PDR	:	Programme de Développement Rural
BNT	:	Banque Nationale de Tunisie
SCM	:	Société de Caution Mutuelle
ESSU	:	Extension Support Services Unit
AES	:	Agricultural Extension Service
CTDA	:	Central Tunisia Development Authority
MOA	:	Ministry of Agriculture

INTRODUCTION

During the month of March, 1980, the University of Wisconsin Regional Planning and Area Development Project fielded a team to prepare a background document for incorporation into the project paper of the Rural Extension and Outreach Project in the central Tunisia target area (see map). The project design resulted from a collaborative effort between the University of Wisconsin and the Central Tunisia Development Authority (CTDA).

The team's prime objective was to use the Project Identification Document prepared in December, 1979, by the United States Agency for International Development (USAID) in identifying the detailed components, specifying the beneficiaries, and establishing a plan for implementing the project. This task was executed through field work in central Tunisia and meetings with the Government of Tunisia Ministry of Agriculture and USAID personnel in Tunis.

In designing the project, the following field visits were conducted: agricultural institutes training extension personnel--Le Kef, Moghrane, and the Agricultural High School in Sidi Bouzid; agricultural research institutes--INRAT/Tunis, INRAT/Ousseltia, OEP/Tunis, and Le Kef; agricultural projects--FAO/SIDA, Sidi Bouzid; public irrigated perimeters--Sbeitla, Feriana, and Sidi Bouzid; farming operations--Sidi Bouzid, Djedlianne; farmer information day--Mansourah; credit programs--BNT, PAM, and CTDA; and governmental service organizations--DPV/Tunis, CRDA/Kasserine, Service Foncier/Kasserine, DERV/Tunis, National Office of Family Planning/Tunis.

These five underlying questions were given primary consideration in designing the project:

1. How to develop an effective extension service in central Tunisia which complements existing extension activities.

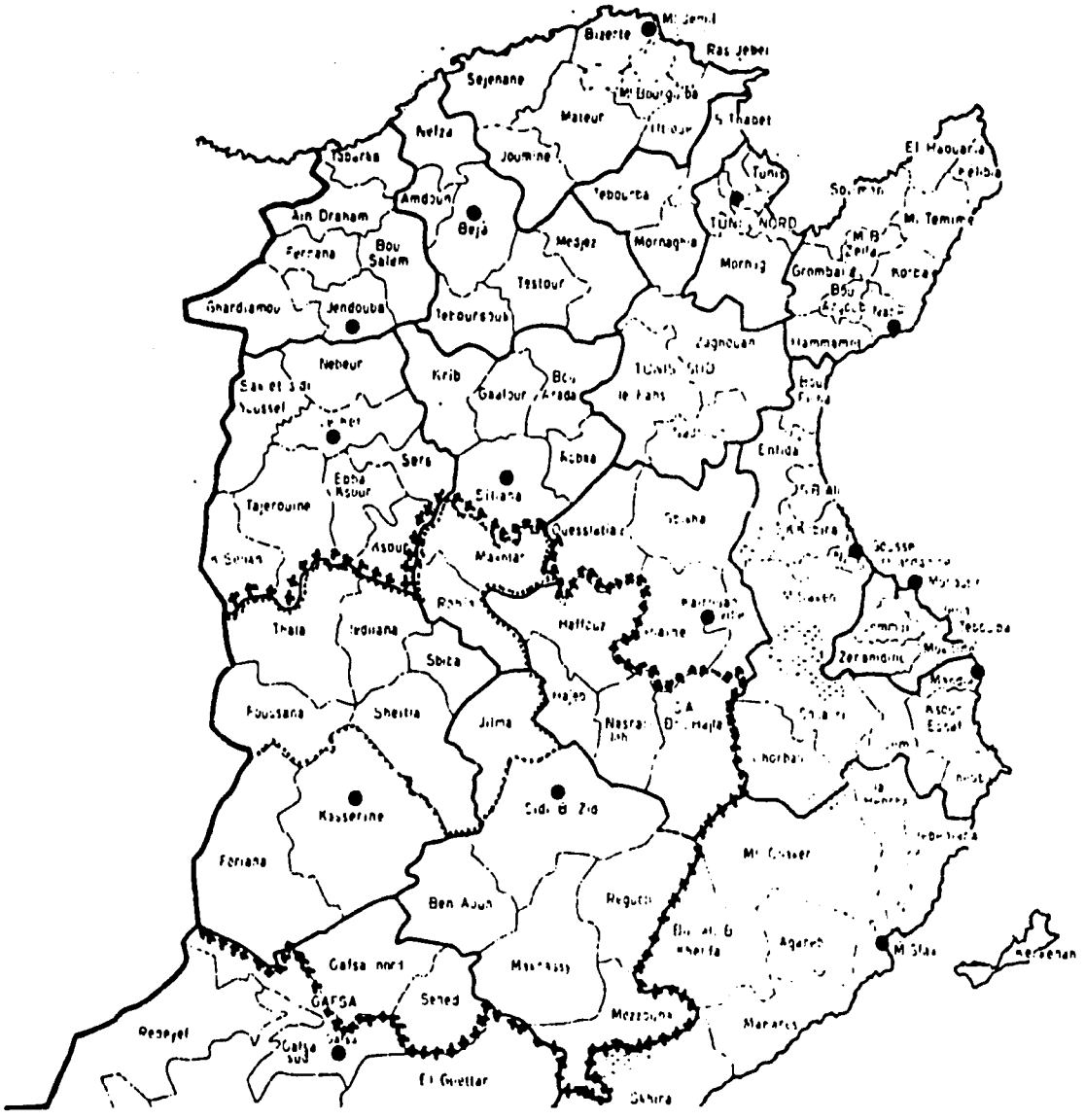
2. How to institute a method for adapting research findings to field application.

3. How to improve communication between extension agents and rural residents in order to establish a strong bond of confidence.

4. How to establish a coordinating mechanism for all activities in central Tunisia which entail extension components.

5. How to improve technical competency of extension personnel.

The actual project design emerged as a result of careful exploration of these five basic questions with a variety of extension and research specialists throughout central Tunisia.



TUNISIA
Study Area

key:
—— gouvernorat
—— délégation
● chef-lieu du gouvernorat
····· zone clef
♦♦♦♦ région opérationelle

0 ——— 90 km

Delegations in Target Area: Makthar, Kesra, Rohia, Thala, Djilma, Djedlianne, Sbiba, Foussana, Sbeitla

Additional Delegations in ODTC Area: Maknassey, Sidi Bouzid, Ben Aoun, Mezzouna, Ouled, Haffouz, Regueb, Feriana, Kasserine, Nasrallah, Bouhjla, El Alam, Hadjeb El Aoun, Sned, Gafsa Nord

The team consisted of the following individuals:

Dr. Bassam Abed, Anthropologist, Pennsylvania State University
Ms. Laurie Cohen, Agricultural Economist, University of Wisconsin
Dr. Jacques Denis, Agronomist, Mississippi State University
Dr. John Fett, Agricultural Journalist, University of Wisconsin
Mr. Naceur Hanzouli, Agronomist, Central Tunisia Development Authority
Dr. Raymond Penn, Agricultural Economist, University of Wisconsin
Dr. David Stanfield, Communications Extension Specialist, University of Wisconsin

The project design was greatly facilitated by the continual assistance, cooperation, and guidance provided by Mr. Hanzouli of the CTDA. His liaison efforts were instrumental in providing an insight into the realities and constraints entailed in establishing an effective extension service for the rural residents of central Tunisia. In addition, the Planning Unit of the CTDA assisted the team's effort by furnishing baseline data.

The observations, judgments, and recommendations presented in this document are those of the authors, who take full responsibility for them. This document should provide the basic components of a comprehensive extension service for the CTDA which will be acceptable to funding agencies, feasible in terms of on-going extension efforts of government service organizations, and most importantly, beneficial to the people of central Tunisia.

The Wisconsin team was funded under the Area Development Contract that the University of Wisconsin-Madison has with the Bureau of Development Support, Office of Rural Development and Development Administration (DS/RAD) of USAID/Washington (Contract No. AID/DSAN-C-0060).

I. BACKGROUND

Within the nine delegations of the present central Tunisia project area, the small mixed farm with dryland crops, irrigated fields, and livestock component constitutes the basic unit of production. Agricultural production consists mainly of grains (wheat and barley), tree crops (olives, apricots, figs, apples, pears, peaches, and pistachios), vegetables (onions, tomatoes, potatoes, peppers, squash, melons, etc.), cactus (for fruit and fodder), cattle, sheep, goats, poultry, camels, donkeys, mules, and horses. In addition, in many areas farmers may also be involved in apiculture, hunting, or collecting either alfa or rosemary. Farming is practiced on both dry and irrigated lands.

The low level of economic return on farming operations in central Tunisia allows little or no margin for farmers to assume risks. Farmers' willingness to adopt relatively attractive new practices must be based on considerations of what they might lose under unfavorable production conditions rather than on what they may gain under more favorable conditions. For this reason, the large majority practice small-scale mixed agriculture involving several crops and livestock, thereby reducing the risk of complete failure in any year. This cautious behavior results from a preference to minimize losses (thereby minimizing gains in good years) rather than from a resistance to change.

The mixed agricultural production system coupled with the multiplicity of extension efforts result in farmers having to interact with a whole series of extension agencies and government service organizations. There are many rural development organizations in central Tunisia. Each department or subdivision of a department tends to deal with a single agricultural product or service. Problems typically are not dealt with in a systematic or integrated fashion.

The harsh climatic conditions of central Tunisia, plus the limited research findings directly applicable to the area, result in a limited number of recommended practices available to extend to farmers. Furthermore, research findings are not disseminated in a systematic fashion to all agencies and extension agents. As a result, field agents are not aware of all new agricultural findings; therefore they cannot address all of the farmers' needs.

A dynamic extension service should combine all existing agricultural information and research findings for extension agents working in the field. This information should consist of developments in new cultural practices, crops, or varieties; credit sources for a variety of types of investments; suppliers of agricultural inputs; and market outlets. The extension service must be able to furnish the field agent with all necessary information to implement an effective farm plan on an individual basis.

In summation, central Tunisia suffers from:

(1) The lack of a two-way communication and information flow between research organizations and extension service units.
(2) Low levels of information dissemination both horizontally (among government service organizations involved in extension activities) and vertically (from the extension agent to the farmer).
(3) The lack of extension staff ability to establish permanent contacts with rural residents.
(4) The lack of extension staff involvement in field research programs and a lack of utilization of existing research results.

The Ministry of Agriculture (MOA) has decided to create a multi-level Extension Service within the Central Tunisia Development Authority (CTDA) to deal with these deficiencies. This subproject will assist the CTDA in developing a comprehensive Extension Service by providing technical assistance, equipment, vehicles, and training.

Within the context of the CTDA, the development of an effective Extension Service requires the establishment of a communication network comprised of three subsystems:

(1) A system linking the extension unit of the CTDA with the rural population of the region.
(2) A system linking the CTDA extension activities with other government service agencies, institutions, and semi-private organizations in the region and throughout the country.
(3) A system linking the activities of the various entities within the CTDA.

These subsystems are described below.

(1) Communication Linkages Between the CTDA and the Rural Population. Identifying and prioritizing needs of the central Tunisian population requires that the CTDA collaborate with other agencies' activities and assessments of needs in the region. The CTDA will develop its own information gathering and assessing capabilities in certain problem areas. The degree of relevance and appropriateness of production techniques and information furnished by field agents will determine the extent that farmers trust and accept the extension agents. This is the most critical and most delicate component in the development of the field staff.

(2) Communication Linkages of CTDA Extension Activities with Other Agencies, Institutions, and Semi-Private Organizations. Inter-agency communication entails developing a cost-effective delivery program which provides services in a complementary and sequential fashion. Technical solutions regarding land and water use must be developed in a coordinated manner by all service organizations to avoid conflicting or contradictory recommendations at the farm level. The technical unit of the CTDA

Extension Service will develop the necessary links with researchers, extension agencies, and educational institutions.

(3) Communication Linkages within the CTDA. The multi-activity responsibilities of the CTDA require constant circulation of information among its units in order to achieve effective project planning, implementation, and evaluation. In developing the Extension Service within the CTDA it will be very important that strong links in work are established with the Planning Unit, the Service for Credit and Supplies, and the Service for the Improvement of Living Conditions as well as others. These units must provide support functions to Extension Service activities. The Credit and Supply Service will be critical to facilitating annual farm investment by furnishing supervised loans to farmers. The Service for the Improvement of Living Conditions will provide the technical expertise necessary for the formulation of an extension information program to address basic rural needs--for example, health and nutrition. The technical staffing of the Planning Unit (cartographer, land economist, rural sociolist) will provide a land use planning function to the Extension Service. This will assist the Extension Service in directing extension endeavors to the most economically advantageous areas--given agronomic, climatic, and environmental limitations. A complete understanding of soil conditions, water availability, land status, and potential for future productivity is essential in providing appropriate extension services. Therefore, the Planning Unit can assist the Extension Service in determining the viability and appropriateness of different agricultural extension activities.

II. PROJECT DESCRIPTION

A. PROJECT PURPOSE

This subproject, to be implemented by CTDA, will consist of the development of two basic bodies--the Extension Support Services Unit (ESSU) and the Agricultural Extension Service (AES). The first unit will be comprised of technical and communication expertise to provide extension coordination and support; the second will be comprised of field agents working directly with the farmers. The ESSU will establish links between the AES and the research institutions, other extension services, agencies, and educational institutions.

The goal of the subproject is: to improve the quality of life and income in the rural areas of central Tunisia.

The subproject's purposes are:

(1) To establish a communication system which facilitates information flow between research institutes, credit programs, agricultural input suppliers, and all field extension agents of the Ministry of Agriculture.
(2) To develop a firm technical foundation among the ESSU specialists and the AES field agents.

B. TECHNICAL INTERVENTIONS

The subproject will focus on the nine delegations in the target area. The duration of the subproject will be five years, with implementation occurring in two phases. The first phase of the subproject (Year I, Year II) will concentrate on three basic areas:

(1) Developing an effective extension information program.
(2) Providing a complete technical package to the agricultural producers.
(3) Improving the technical capacity of the Extension Service both within the ESSU and AES.

In addressing increased agricultural production during the first phase of the subproject, primary emphasis will be on developing effective packages which will win the confidence of the farmer and on intervening in areas of agricultural production which will yield short-term economic results. Extension agents will provide the following assistance:

<u>Technical and financial assistance to farmers practicing irrigated agriculture</u>. Switching from traditional, dryland agriculture to irrigated agriculture requires the adoption of new cultural practices which demand outside technical assistance. Since the CTDA presently is supervising and providing

extension services on the irrigated perimeters and to private shallow well farmers, this is a logical point of departure for improving existing technical services. Economic returns on a per hectare basis fluctuate depending on crops cultivated, but returns on irrigated land tend to be from three to ten times greater than returns on dryland farming areas.

Establishment of trial plots in dryland farming areas to test new cropping practices, tillage practices, and new cereal varieties. This will be done in collaboration with the Le Kef Institute which is charged with the responsibility of developing new technology under the Dryland Farming Systems Project. Field agents will select the sites for trial plots, supervise the cultivation, monitor progress and submit an evaluation to Le Kef. This will be a first step in linking extension agents with dryland research.

Upgrading the technical capacity of the specialists and field agents working with the CTDA Extension Service will be addressed in the initial stages of the subproject. In-service training, short courses abroad, and a limited number of graduate scholarships will be used in building technical expertise among the extension personnel.

C. PHASE I OF THE SUBPROJECT (YEAR I AND YEAR II)

During Phase I of the subproject, a communications unit will be developed within the ESSU. It will collect, process, and disseminate information to field agents in the region based on the nature of their work activities. The ESSU will organize and provide materials for farmer information days in collaboration with other government service organizations. Pictorial materials will be prepared and workshops with audio-visual aids will be organized to address a variety of rural needs including agriculture, health, nutrition, and home economics.

A variety of different techniques will be used in adopting and introducing new agricultural packages to farmers. Demonstration plots which use the new crops, varieties, or cultural practices will be established on the farmers' fields in the irrigated areas. The farmers will participate in planting, cultivating, and harvesting the produce. The CTDA Extension Service will provide the seeds, agricultural machinery and equipment (small tractors, animal traction, and hand tools), and technical assistance to the farmers. The participants will be compensated with the produce harvested from the demonstration plots. The use of demonstration plots can be an effective mechanism for introducing new agricultural techniques since the farmers will benefit from technical supervision during the first cropping season and will immediately experience tangible economic returns.

The introduction of new agricultural technologies must proceed with caution in order to assure regional adaptability. The establishment of an experiment station in Year II of Phase I will minimize the risk of

present practices which introduce new plant materials directly on the farmer's fields. The experiment station will serve three important functions:

(1) It will sensitize extension personnel to the process required for introducing production techniques developed outside of the region.
(2) It will provide a period of cultivation under quarantine for certified materials from outside of the region which can constitute a danger of epidemics. This will allow thorough observation and evaluation of the plant material under local conditions which may differ from the eco-system where the material was developed.
(3) It will provide cultivated plots to test new agricultural equipment, fertilizers, and insecticides. Methods for usage can be developed before actual use on demonstration plots on farmers' fields.

The proposed location is on land of the agro-combinat in Sbeitla. The experimental research station will consist of five hectares of irrigated crops and ten hectares of dryland crops. A field agent will be permanently housed at the station in order to supervise daily operations.

Nine nurseries will be established and operated by the CTDA in various locations throughout the central region in collaboration with GIAF and GIL. At present, GIAF and GIL are not very active in the region, but they will be encouraged to install nurseries in central Tunisia. Nurseries will serve a two-fold purpose: (1) increase availability of improved seed varieties which have been adapted to local conditions and (2) create new employment opportunities. The CTDA should provide the land, materials, and technical assistance for establishing the nurseries. Eight nurseries will be established for vegetable crops (1/4 hectare each in land area) and one nursery for arboriculture (to be located in Sbeitla).

D. PHASE II OF THE SUBPROJECT (YEAR III, YEAR IV, YEAR V)

The work initiated in Phase I will continue and will build up the capacity of the communication program to address general rural needs. As additional development subprojects are undertaken in central Tunisia--for example, the Dryland Farming Systems, Rangeland Management, Potable Water, and Health projects--the ESSU should act as a support unit, disseminating the technical information developed by these subprojects to field agents. The ESSU also should be a coordinating mechanism for extension agents from DPV, OEP, CTDA, or elsewhere to assure assistance needs are satisfied. In certain cases, field agents from several different departments might coordinate their services, while in other situations a single department might take full responsibility.

During Year III and Year V of the project, an Evaluation Seminar will be held at the CTDA for five days. Seminar participants will consist of ten staff members from the CTDA, five Tunisian experts working in the field

of extension with other government organizations, and four foreign extension specialists. These seminars will evaluate CTDA extension activities, plan for future interventions, and incorporate new ideas and concepts into the CTDA extension program.

E. STRUCTURE OF THE CTDA EXTENSION SERVICE

1. ESSU

The Extension Support Services Unit will consist of a Technical Unit with four specialists and a Communications Unit with one specialist and two assistants. The ESSU will have three primary functions:

(a) Provide technical assistance to field agents and supervise delivery of extension packages.
(b) Act as a forward and backward linkage between research activities and farmer adaptability and receptivity to new cultural techniques.
(c) Act as coordinating mechanism between all extension activities in the region.

One of the five specialists will act as director of the Extension Service. The technical expertise of the ESSU will be in five specific areas. Some of this expertise is already in place at the CTDA while other expertise must be developed or recruited.

(1) Agronomist. An expert in crops and the efficient utilization of water and land resources. This specialist must be familiar with appropriate cultural practices, required fertilizers and insecticides, and proper tillage practices. This person must maintain contact with the research agencies in order to remain abreast of new developments--most importantly with INRAT for irrigated crops and Le Kef for dryland crops. He/she would be responsible for supervising the establishment of demonstration and trial plots on farmers' fields, selecting the site locations throughout central Tunisia to test for effects of varying water and soil conditions, and reporting the results to the research institutes. In addition, he/she will act as the technical backstop for the field agents working on the irrigated lands and in the dryland areas and for the communications specialist preparing information documents for the field agents.

(2) Animal Production and Range Management Specialist. An expert to assist livestock breeders in proper care of animals, improved feeding practice, and the introduction of improved varieties--basically working with sheep and goats. Work will also focus on increasing aviculture and apiculture production among dryland farmers. This specialist will establish close links with the research stations undertaking improvements in livestock breeding, such as INRAT at Ousseltia, the OEP research and development projects throughout the country, and the livestock institutes at Mateur and at Medenine. He/she will supervise the work of field agents who are working with farmers on problems related to improved forages and dryland

pastures, herd improvement, and apiculture. Technical assistance in preparing information packages also will be provided.

(3) Water Resources Management Specialist. Given the initial focus of the project on the irrigated lands, an expert on irrigation systems and the water requirements of different crops is needed. High yields are largely dependent on proper distribution of water throughout the cropping season. Through review of DRES technical studies, the water resources specialist will make an assessment of the potential for future exploitation of irrigable lands. The CTDA will provide a major input into decisions regarding government or private investment in wells, irrigation systems, and water and soil conservation programs. As water is the most limited resource and the greatest constraint to increased agricultural production in the region, it must be closely monitored. The water resource specialist will provide technical advise to extension agents in the irrigated areas and to those in dryland areas to maximize utilization of available water resources. Water diversion techniques should be explored and implemented.

(4) Agricultural Economist. Due to the complex agricultural production practices of most farmers and the multiplicity of institutions and agencies addressing farm needs, an expert in farm management is required. This person will aggregate materials related to credit sources, cropping patterns, and market outlets for the field agents. He/she also will develop procedures for maintaining farm records. This will enable the field agent to assist the farmer in making efficient production management decisions.

(5) Communication Specialist. The communication specialist should have training in general agriculture and rural sociology and in the use of communication techniques and equipment. He/she will: (1) draw together information pertinent to area development from various sources; (2) process, duplicate, and disseminate this information to agencies and their extension agents; and (3) provide an equipped service unit which would produce communication aides such as slides, charts, radio tapes, bulletins, newsletters, etc., that could be used by the CTDA and other agencies to support their extension programs. Personnel and/or information programs of other agencies would not be moved into the CTDA, nor would the CTDA duplicate their activities. New activities of the CTDA would complement existing efforts. Although the initial strategy will be to concentrate on irrigated and dryland farming, information on other topics pertinent to the integrated regional development approach for the CTDA will follow. Rural health and home economics will be high on the list of priority topics. This specialist should have two assistants trained in communication techniques who have some graphic arts skills. The extension program at Moghrane will supply this training. Future staffing depends on growth in CTDA activity.

The preferred training for these five specialists is the degree of Ingénieur Principaux (M.Sc.). If specialists with this level of training are not available, the degree of Ingénieur de Travaux de l'Etat (B.Sc.) will be acceptable, supplemented with training programs designed to compensate for technical deficiencies.

2. AES

The main function of the field agents of the Agricultural Extension Service (AES) will be to work directly with the farmers in solving their production problems on a daily basis. Approximately 15 to 20 agents will be permanently housed in their working environment.

The field agents working with irrigated agriculture presently total 48, or one for every 100 farmers. The field extension staff is sufficient in this area. In addition, eight of these field agents are directly linked to the dryland research program at Le Kef. They will be responsible for supervising and evaluating trial plots in the nine target delegations. Two new agricultural extension agents will be recruited from the Moghrane program to work with the communication support unit; one focusing on general agriculture and the second focusing on rural sociology and human resources development. During Year II of the subproject, a field agent will be recruited to supervise activities at the experimental research station. As other development projects get underway, agricultural extension agents from the implementing agency can address the new tasks. If the other agencies cannot meet the needs, the CTDA should have the financial means to recruit new field agents. The field extension agents of the AES should have the degree of Ingénieur Adjoint or Adjoint Technique. Any deficiency in their technical expertise can be remedied by participation in short-term training courses in Tunisia or abroad.

A director of the AES will be appointed in Year I of the subproject. The director will be responsible for coordinating field agents' work with the regional offices in each of the delegations, supervising work in the nurseries, programming research at the experimental station, and assessing training needs of the field agents.

The field staff of the AES provides the most crucial link in the Extension Service. Therefore, the interaction between field agents and farmers must be carefully addressed. The following practices will be incorporated into the implementation of extension activities to assure effective delivery of services:

(1) Each extension agent will provide a weekly work plan specifying the date, the location, and the nature of his/her work. One copy should be submitted to the ESSU in Kasserine; one copy should be submitted to the regional office where he/she is working; and the third copy should be carried into the field. This will facilitate systematic implementation of extension services and provide closer supervision of field agents work.

(2) Each extension agent will work with a small group of farmers--15 to 25--on an annual basis within a specified community. This group of farmers should be organized through an ommdah, community leader, or household head. Continual association with the same group of farmers

should facilitate introduction of new technologies and increase trust on the part of the farmers. It is also an effective mechansim to use in encouraging farmers to extend newly adopted practices to neighboring farmers. The extension agent will attempt to firmly establish this farmers' group in the community through regular meetings. These meetings should be attended by all farmers. In subsequent years, the leader should organize meetings and communicate problems expressed by the farmers to the extension agent. The agent can respond and provide assistance to 20 farmers through the group leader, greatly reducing his/her work load and allowing him/her to establish permanent contact with a new group of farmers. A three-member committee composed of CTDA staff not working directly with extension should evaluate the ability of the extension agent to train farmers in new agricultural practices. Farmers should be selected at random and this evaluating committee will visit the farmers' land to assess the extent of successful adoption of new techniques. Based on this evaluation, remedies can be derived for specific problems and the delivery of extension services can be improved.

(3) Young Farmers' Clubs will be organized in an attempt to sensitize farmers' sons to agricultural concerns at an early age. Members' age should range between 10 and 20 years. The club will undertake rural community projects--such as reforestation, soil conservation, and establishing pasture lands. Activities can be organized on a competitive basis with the winner receiving a prize, such as a sheep, goat, or an agricultural tool.

(4) Direct contact with farmers will be emphasized, demonstrating a willingness to listen to their problems and at the same time providing technical assistance. A total of 1100 demonstrations of new technologies will be the basic extension approach.

(5) A total of 500 farmer information days can be profitably organized around specific themes.

(6) Posters can be placed at demonstration plots, attracting attention to practices and giving information about the likely results.

(7) Radio will be used, particularly as a feedback mechanism relating what some farmers have achieved with the new technology, in the words of the farmers.

(8) One-to-two day training sessions for farmers will be organized by the CTDA, CRDA, and agricultural schools in the area. Such training would be appropriate when introducing a new crop or complicated cultural practice.

(9) Direct assistance will be given to farmers in the form of seeds, fertilizer, or other agricultural inputs. But such grants will be clearly identified as part of an experimental or demonstration program with a well defined time limit. More common will be the work of the extension agent in assisting farmers to seek out needed agricultural inputs, market outlets,

and other requirements of his family. The agent will have to be well trained to listen to the needs of the farmers and have means of providing solutions to these needs, agricultural and non-agricultural.

F. FOREIGN TECHNICAL ASSISTANCE

Two resident advisors will be recruited for the first three and one-half years of the project. One will serve as the principal advisor to the ESSU and the other as principal advisor to the AES. Short-term consultants will provide specialized assistance when needed during the five years of the project's life. They will be the only source of technical assistance during the last two years when resident advisors will be phased out.

Resident Advisors	6 Project Years
Short-term Consultants	24 Project Months

Short-term consultants might be recruited in the following areas depending on technical needs:

(1) Extension--Education and Communication
(2) Extension--Agriculture and Rural needs
(3) Agronomy
(4) Agricultural Economics
(5) Human Resources Development
(6) Water Resources Management

G. TRAINING COMPONENT

Objectives:

(1) Improve the technical skills of specialists and field agents in order to better address farmer needs.
(2) Provide all extension personnel with technical training in communication techniques and use of equipment in order that they can organize farmer information days in the rural surroundings.
(3) Provide institutes of advanced agricultural training with an insight into the real needs of agricultural personnel working at the farm level. Presumably, this will affect the curriculum design in these institutes.

Types of Training:

(1) <u>In-service Training</u>. All extension personnel (48) will undertake on-the-job training. Tunisian institutes of advanced agricultural education can be contracted to provide supplemental assistance if the resident (Tunisian and foreign) staff cannot handle the task. Research institutes will participate in this training.

(2) Formal, In-Country training. Field agents and extension specialists will participate in short courses at the research institutes in Tunisia (INRAT, Le Kef, Saiida, etc.). The course content will be defined according to the technical and organizational needs of the field and support staff. Approximately 15 extension staff members will be trained annually in communication techniques at Moghrane.

(3) Training Abroad. Short-term training will be provided for 12 extension specialists from the ESSU and field agents from the AES, consisting of four-to-six week courses at the agricultural institutes of Wageningen (Netherlands), Morocco, Syria (ICARDA), and the United States. The main objective is to reduce the technical deficiencies of the extension staff and to learn survey research techniques.

Master's level training will be provided for four ESSU specialists at a U.S. university, with courses focusing on extension organization for agriculture as well as other topics relevant to rural residents.

(4) Workshops. An annual workshop should be held for two weeks with the entire extension staff and outside participants invited from farmer organizations, research institutes, and other specialized agencies in the CRDA and abroad. The objectives of the workshop will be :

(a) Evaluate the past year's activities and establish and discuss objectives for the coming year.
(b) Provide technical education on selected, limited themes, e.g., new crop varieties or new cultural techniques.
(c) Discuss future technical needs based on new projects and new extension staff for both the CTDA and the CRDA.
(d) Present and evaluate studies done abroad by those staff members who participated in these programs.
(e) Introduce new CTDA extension recruitments.

This workshop can be held at the Agricultural High School in Sidi Bouzid, or perhaps can be rotated through different schools that can provide room and board for participants.

EXTENSION SERVICE ORGANIZATION

ESSU

Technical Unit (4)

- Agronomist
- Livestock and Range Management
- Agricultural Economics
- Water Resources Management

(Technical Assistance)

Communication Unit (3)

1 specialist and 2 assistants

- Communication Specialist
- Agricultural Assistant
- Health Assistant

(Training and Information)

↕

AES ≈ 55

Regional Extension Officer and Field Agents

Kasserine: Sbiba, Sbeitla, Thala, Foussana, Feriana, Djedlianne

Siliana: Rohia, Makthar

Sidi Bonzid: Sidi Bouzid, Djilma

III. TECHNICAL INTERVENTIONS FOR AGRICULTURAL EXTENSION

Agricultural extension services will focus on irrigated agriculture and dryland agriculture in central Tunisia.

A. Irrigated agriculture (farmers on irrigated perimeters and private surface well farmers cultivating parcels of land less than 20 hectares in area)

1. Vegetables and fruits (garden crops)
   Tomato, green pepper, onion, bean, watermelon, squash, potato, and winter vegetables

   a. Appropriate crop rotation and cropping patterns
   b. Water requirements and appropriate irrigation techniques

2. Forages (winter cultivation)
   Leguminous forages

   a. Appropriate crop rotation and cropping patterns
   b. Seeding density
   c. Intercropping to maintain proper nutrient balance in soil

3. Livestock

   a. Dairy cattle

4. Cultural techniques

   a. Animal traction
   b. Fertilization
   c. Plant protection
   d. Practices to reduce water and wind erosion

B. Dryland agriculture (productive lands)

1. Grains: wheat and barley

   a. Trial plots at agricultural research station and demonstration plots on farmers' fields
   b. Agronomy trials: seeding density, spacing, and fertilization

2. Forages

   a. Demonstration plots of vetch-oats and lucerne
   b. Pasture improvement

3. Fruit trees

   a. Maintenance of existing fruit tree orchards
   b. Planting of new fruit tree orchards, almond, and pistachio

4. Livestock

   a. Sheep and goats

On irrigated lands, emphasis must rest with proper utilization of both water and fertilizer in order to maximize production. A careful balance must be achieved in the application of these two elements in the preliminary stages. This will avoid negative effects on soil quality which might severely reduce yields over the long run.

In maximizing water utilization on the irrigated garden plots, cropping rotations should be established based on crops and varieties which have opposite rooting tendencies (vertical vs. horizontal). High-yielding winter and summer vegetable and fruit crops have been identified. Exact water requirements still must be determined which will greatly improve irrigation techniques and maximize output for given costs of production.

Cultivation of leguminous forages on the irrigated lands during the winter months will serve a two-fold purpose: (1) provide feed for livestock and (2) provide needed soil nutrients. The introduction of dairy cattle should be encouraged in the irrigated lands. Increased cultivation of winter forages will furnish feed supplies. In addition, livestock manure on the irrigated lands will improve water retention capacity of the soil. Beef fattening should not be encouraged in this region until pasture vegetation is improved so that it is adequate to support increased numbers of livestock.

Animal traction is the most appropriate method for cultivating the land in the irrigated areas. Agricultural mechanization should be limited to small, light tractors produced in Japan, England, and Brazil. Large tractors should be used only on heavy soils needing intensive work or for research purposes. Attention must focus on means to improve soil conservation on arable lands to alleviate existing soil erosion problems. In addition, proper fertilization procedures, plant protection, and measures to prevent water and wind erosion must be addressed in new cultural techniques extended to farmers.

Extension activities in the dryland areas should concentrate on lands which have agricultural potential. Selection of crops cultivated and cropping patterns utilized must maximize exploitation of available water resources.

Cultural practices must work toward improving soil conservation and increasing reforestation. Planting of grains on hilly terrain should cease and deep-plowing should be seriously discouraged.

Grain research should be directed toward adapting non-photosensitive varieties of wheat and barley with short growing seasons (60 to 70 days). These varieties should be cultivated on the plateau areas during the months with the highest rainfall. Increased forage production should focus on cultivation of lucerne and vetch-oats in the dryland areas.

The establishment of new tree orchards must entail trees with low water requirements, such as almonds and pistachios. Increased sheep raising should be encouraged in the dryland areas rather than cattle raising. These farmers have practiced sheep-herding for many years; lamb is the preferred meat and feed requirements are lower for sheep than for cattle.

Appropriate cultural practices are of utmost importance in the dryland areas in order to reduce water and wind erosion. These problems should be addressed in the preliminary stages of the extension interventions in the dryland areas.

IV. RURAL NEEDS

The needs of the central Tunisia rural population are many and varied. The basic needs that are crucial to the population's survival include agricultural knowledge and technology, health assistance, educational infrastructure, and capital inputs.

These are the primary needs of all the members of the rural household--men, women, and children. A good agent should be capable of spotting all of the rural family's needs, both manifest and latent. These needs could be in agricultural knowledge and technology or in other areas--health, family planning, education, credit, preventive medicine, potable water, etc. Since some of the household needs may be more urgent than others, priorities should be established to determine the order in which needs should be addressed.

A good extension program should be ready to address all of the needs listed above. The extension activities of the CTDA should, of course, address the issue of agricultural knowledge and technology. A field agent should be prepared to extend all possible technology pertaining to the agricultural and subsistence practices of the rural population. At the same time, it is equally important that the field agent be prepared to spot needs in health, education, and capital inputs. The CTDA extension program should not assume full responsibility for all needs but it should train its agents so they can assess needs, since the lives of farmers usually are not compartmentalized into discrete units. The extension agent should be able to communicate the needs to the agencies working in these areas. CTDA does have programs for credit and the improvement of living conditions. The primary responsibility for educational, health, and financial needs should rest with these programs. But the extension agent is in a good position to isolate the non-agricultural needs of the farm family and then give recommendations to other departments within the CTDA.

Generalists should be trained so they can address not only issues pertaining to their area of expertise, but also so they can evaluate the needs of farmers in other areas. Most farmers are going through a phase of rapid change affecting all aspects of their lives; their general situation needs to be constantly assessed by both specialists and generalists. Farmers are not only agriculturalists; their roles, duties, and needs are multiple. The status of their agricultural or pastoral activities is intricately tied to other conditions in their lives. If farmers are not healthy, their concerns about increased production are going to be superceded by their health conditions. If they lack the necessary capital, they are not going to be interested in improved varieties of wheat or irrigation techniques. If they hope to become self-reliant and self-sufficient and improve the living conditions of their families, they are going to be interested in educational facilities for their children. There-

fore, an extension agent should be prepared to identify the multitude of needs of farm families instead of dwelling on only one need. The agent essentially serves as the link between the farm family and the outside world. The agent's role in integrating the farm family with the rest of the population will be crucial.

In summary, it is important that field agents are generalists who are trained to understand the totality of the farm family's needs so they can make recommendations to the farmer as well as to the specialized agencies within the CTDA. Similarly, agents from the specialized agencies should be in a position of making recommendations to the Extension Service, thereby assuring a continuous flow of information between the different branches of the CTDA. The ultimate goal of the subproject is the improvement of the standard of living of the population by addressing the total needs of the rural resident.

V. LAND TENURE

One of the most complicated issues in the central region today is the issue of land tenure. The status of much of the land is uncertain, with some cultivable land held in "collective ownership" while other land is in a state of "extreme indivision." The Service Foncier has started a program of liquidating these two categories in the hope that assigning private ownership may promote better exploitation and utilization of the land.

Given this impetus on the part of the government, the CTDA should address the issue of land tenure, particularly in areas of surface well and deep well irrigation. A land tenure unit should be established within the CTDA (perhaps through the incorporation of, or collaboration with, the Service Foncier) to handle all issues pertaining to land tenure and land utilization.

Titling of the land seems crucial for some, but not all of the lands under CTDA jurisdiction. The push toward privatization of the land has been successful in two delegations: Sbiba and Foussana. Farmers seem to be increasingly aware of titling their lands, particularly in irrigated areas. The urgency of titling of grazing lands, however, is not immediate and these lands might be better left under communal ownership. This issue needs to be further investigated by the Service Foncier or perhaps by the CTDA.

Since agricultural production entails better utilization of the land, the issue of land tenure needs to be resolved to the satisfaction of the maximum number of participants. The current titling procedure can be very slow given the multitude of issues to be resolved. These issues can be administrative, legalistic, and technical. CTDA branches could give substantial technical service in proper land utilization. The current procedure of incorporating collective lands and lands of extreme indivision as one category should facilitate future work in the area of land tenure.

Other issues that need to be addressed include ownership vs. occupancy and the distribution of rural parcels. The CTDA should assume a major land tenure role because effective and better utilization of the land requires a variety of technical considerations. The CTDA should be in a good position to incorporate (or at least collaborate with) any agency that deals directly or indirectly with effective land utilization as a means of improving the living conditions of the population.

VI. TECHNICAL FEASIBILITY

This subproject will use both agricultural and communication technology. Much experience has been gained from the FAO-SIDA project in Sidi Bouzid in adapting vegetable, fruit, and forage crops to irrigated agriculture in certain regions of central Tunisia. Most of the work at INRAT research stations has focused on production systems in irrigated areas.

Two technical problems remain: (1) developing appropriate communication techniques to determine the needs and the potential of farming operations in central Tunisia, and (2) developing the most acceptable means of introducing a new technology to farmers who have not yet been convinced of its utility in rainfed and irrigated areas. The adaptation of new technologies involves testing the new varieties and cultivation techniques on a controlled basis. After careful analysis of the results, the new technology should be packaged and delivered to the farmer so that it makes sound economic and social sense.

The agricultural technology for the irrigated lands exists, but the delivery of new techniques to the farmer must be improved. Extension service specialists seem to be increasingly aware that "bribing" farmers to adopt a new technology will not lead to continued use after the gifts and other supports end. An objective of this subproject is to refine the transfer of technology developed through prior experiences and research findings to implementation at the farm level on a permanent basis.

Agricultural technology on the rainfed lands of the region is much less developed. Most evaluations of dryland and rangeland management technologies indicate that there are significant technological gaps. The grain research program at Le Kef has been established to address this inadequacy. Extension services rendered to dryland farming will depend to a certain extent on technological packages developed at Le Kef. Nonetheless, the Missouri report and other assessments (FAO, CNEA) have identified certain methods for improved soil conservation and increased yields from dryland areas which could be tested and adapted to the region.

Since the risks of failure in the dryland area are much higher and income levels are much lower, resistance to change is much greater. Therefore, communication techniques become even more critical. The initial phase of working in dryland agriculture will involve testing new technologies with farmers who also have irrigated land. Work should be undertaken on a limited scale with trial plots. The goal will be to carefully assess the profitability of investing in a new technology before it is introduced in Phase II of the subproject.

Secondary diffusion of new technologies will be attempted whenever possible. Adaptation of new technologies to local conditions will be done with the assistance of the ommda or the family head. This experimentation and

learning reasons for successes and failures will help assure that the farmers will take over when the agent leaves the area. This sort of community learning process is very time-consuming and demands a commitment from both the farmers and the agent.

The communication equipment used in diffusing information to field agents will be simple and easily adaptable for rural use. Field agents will be trained in the use of the equipment through the communications program at Moghrane Institute. Several communication specialists will receive additional training in making slide presentations, designing pictorial publications, recording tapes, etc., through a special training course at Moghrane.

VII. ADMINISTRATIVE FEASIBILITY

The proposed Rural Extension and Outreach Project will be under the auspices of the CTDA. The existing extension unit within the CTDA can provide the foundation for building the Extension Support Services Unit (ESSU) and the Agricultural Extension Service (AES). The present staff of the CTDA extension unit consists of 48 extension workers. Additional extension personnel can be recruited from a variety of institutes of higher agricultural training: INAT (National Institute of Agronomy of Tunisia), Ecole Supérieure de Grande Culture at Le Kef, Ecole Supérieure d'Economie et de Promotion Rurale at Moghrane, Ecole Supérieure d'Horticulture at Chott Meriem, or the Agricultural High School at Sidi Bouzid. These educational institutes provide the student with training relevant to extension needs in central Tunisia.

Additional technical training required for field work can be provided through on-the-job training, short term training courses in Tunisia, or training abroad. Master's level training in the United States will be considered for specialists in the Extension Support Services Unit based on specific needs.

The CTDA field agents have sole responsibility for providing extension services to farmers on the irrigated lands. Through the Dryland Farming Systems Project at Le Kef, a link has been established between grain research and the CTDA extension unit to carry out trial plantings in central Tunisia of new varieties developed at Le Kef. When appropriate, the CTDA extension agents will introduce small farmers to practices identified during trials as conducive to substantial yield increase.

As development projects are undertaken in central Tunisia, the ESSU will act as a coordinating body with other departments within the Ministry of Agriculture to delegate extension responsibilities. Preferably, the implementing agency will always provide the extension agents, but the CTDA extension unit should assist in whatever manner possible; for example, organizing relevant farmer information days. As activity increases and additional needs are defined, the CTDA extension unit will expand accordingly.

In establishing communication support services, all extension personnel can learn the required communication techniques and use of equipment through short courses at Moghrane Institute, which has a well designed and well equipped mass communications program. The equipment needed for the communication program will not be highly sophisticated and will be adaptable for use in rural areas.

VIII. BUDGET

A. TUNISIA BUDGET - GOT (in TD)*

	1	2	3	4	5	TOTAL
TRAINING						
Workshop (2 weeks) 12 days 84 participants		6,500	6,500	6,500	6,500	26,000
Short-term travel		2,500	2,500	2,500	2,500	10,000
M.S. travel	2,000	1,000	1,000			4,000
						40,000
HOUSING						
Extension Agents on land (20) 4000 TD/House	40,000	20,000	20,000			80,000
OFFICE EQUIPMENT & SUPPLIES						
Equipment	20,000	2,000	2,000	2,000	2,000	28,000
Supplies	5,000	6,000	7,000	8,000	9,000	35,000
Operations (util., rent, maint.)	9,000	11,000	13,000	16,000	18,000	67,000
						130,000
MAINTENANCE OPERATION						
5 cars	30,000	35,000	40,000	45,000	50,000	200,000
6 cars	7,000	9,000	11,000	13,000	16,000	56,000
Minibus	5,000	6,000	7,000	8,000	10,000	36,000
Truck	5,000	6,000	7,000	8,000	10,000	36,000
Tractors	15,000	19,000	23,000	27,000	28,000	112,000
						440,000
Vehicle Replacement (deficiencies)	14,000	19,000	24,000	29,000	34,000	120,000

TUNISIA BUDGET - GOT (in TD) (Cont.)

	1	2	3	4	5	TOTAL
STAFF SALARY ESSU (5) AES (58) Support Services (30	145,000	155,000	160,000	165,000	170,000	795,000
EXPERIMENTAL RESEARCH STATION Irrigation works Infrastructure		22,000				22,000
					TOTAL	1,627,000 TD

*The GOT budget is still subject to final review by CTDA and MOA.

B. U.S. BUDGET ($)

	1	2	3	4	5	TOTAL
TRAINING						
In-country ($300 month/person) 180 months	16,000	16,000	14,000	14,000		60,000
Abroad						
Short-term (12 staff $6,000/person)		20,000	20,000	20,000	20,000	80,000
Masters (4 staff)	40,000	60,000	100,000	50,000	25,000	275,000
	56,000	76,000	134,000	84,000	45,000	415,000
SUPPORT SERVICES						
2 secretaries	10,000	10,000	10,000	10,000	10,000	50,000
1 translator						
TRANSPORTATION						
Small cars (15)	135,000					
Large cars (4)	60,000					
Minibus (2)	30,000					
Mobylettes (30)	22,500					
Land Rover (2)	60,000					
	307,500					307,500
DEMONSTRATION PLOTS						
AGRICULTURAL INPUTS						
Seeds, fertilizers, small hand tools, insecticides $400/ha.	40,000	80,000	160,000	160,000		440,000
AGRICULTURAL EQUIPMENT						
8 tractors	116,000					116,000
4 trucks	80,000					80,000
Animal traction units w/equipment (100)	75,000					75,000
	271,000					271,000
NURSERIES						
8 vegetable crop nurseries	40,000	30,000	30,000	30,000	30,000	160,000
1 arboriculture nursery	15,000	10,000	10,000	10,000	10,000	55,000
	55,000	40,000	40,000	40,000	40,000	215,000

U.S. BUDGET ($) (Cont.)

	1	2	3	4	5	TOTAL
FARMER INFORMATION DAYS	6,000	30,000	30,000	30,000	30,000	126,000
EXPERIMENTAL RESEARCH STATION (15 ha)						
Seeds, fertilizers, insecticides		40,000	30,000	25,000	25,000	120,000
25 animal traction units						
Hand tools, small equipment						
ESSU & COMMUNICATION SUPPORT UNIT	80,000	10,000	10,000	10,000	10,000	120,000
(Documents, audio-visual and photographic equipment, etc.)						
FOREIGN PERSONNEL						
6 man-years resident (2)	160,000	170,000	180,000			510,000
24 PM short-term	20,000	20,000	20,000	35,000	35,000	130,000
	180,000	190,000	200,000	35,000	35,000	640,000
Project Evaluation Seminars			16,550		16,550	33,100
Young Farmers Club	500	500	500	500	500	2,500
						$2,746,100

IX. IMPLEMENTATION PLAN

	YEAR I				YEAR II				YEAR III				YEAR IV				YEAR V			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
TUNISIAN STAFF																				
ESSU (5)	2			4		5														
AES (58)	46			48			51			54			56			58				
Chauffeurs (30)	10				20			30												
Secretary (2)				2																
Translator (1)				1																
FOREIGN STAFF																				
Resident Advisor (1) ESSU			----	----	----	----	----	----	----	----	----	----	----	----						
Resident Advisor (2) AES				----	----	----	----	----	----	----	----	----	----	----	----					
Short-term 24 PM			3PM		2PM			2PM		1PM	3PM		2PM			3PM	3PM	3PM	3PM	3PM
TRAINING																				
In Tunisia (6 month) [22]		----	4---		----	4----			----	4----	----	3----	----	6----	----	1----				
Short-term abroad (1 month) [12]						3				3				3				3		
Master - USA (3 years) [4]	1	----	----	----	----	----	----	----	----	----	----	----								
	2	----	----	----	----	----	----	----	----	----	----	----								
					----	----	----	----	3	----	----	----	----	----	----	----				
									4	----	----	----	----	----	----	----	----	----	----	----
Workshop (12 days)								--				--				--				
HOUSING CONSTRUCTION																				
AES Residences (20)			10				15				20									
PURCHASE OF TRANSPORT VEHICLES																				
Small cars (15)			15																	
Large cars (4)			2	4																
Minibus (2)			2																	
Land Rover (2)				2																
AGRICULTURAL INTERVENTIONS																				
Irrigated Agriculture																				
Demonstration Plots (1100)		100				200				400				400						
Farm Visits	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
DRYLAND AGRICULTURE																				
Trial Plots	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Technical Packages to Farmers									----	----	----	----	----	----	----	----	----	----	----	----

	YEAR I				YEAR II				YEAR III				YEAR IV				YEAR V			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
LIVESTOCK																				
Dairy cattle (PPI only)	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Goat and Sheep	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
NURSERIES																				
Sbeitla (2)			---i(Veg.)	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
					---2 trees	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Sbiba (1)			----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Thala (1)			----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Foussana (1)			----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Djedlianne (1)			----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Makthar and Kesra (1)			----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Rohia (1)			----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Djilma (1)			----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
EXPERIMENTAL RESEARCH STATION																				
Infrastructure					----------	----------	----------	----------	----------											
Planting of Resource Material									----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
PURCHASE OF EQUIPMENT																				
Tractors (8)		8																		
Trucks (4)		4																		
Animal traction units (125)		100					25													
Seeds, insecticides, fertilizers	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Hand tools	----------	----------	----------																	
FARMER INFORMATION DAYS		8	8	8	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

	YEAR I				YEAR II				YEAR III				YEAR IV				YEAR V			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
COMMUNICATION UNIT																				
Building Construction	Workroom Conference room, storage area																			
Purchase of equipment	T.V. and photographic																			
Daily supplies and maintenance	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Development of documents and information for general rural needs	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
OFFICE EQUIPMENT AND SUPPLIES																				
Purchase Equipment	----																			
Replace equipment					----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Supplies	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Operating, Util., Maint., Rent	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
PROJECT EVALUATION SEMINARS								Oct.												Oct.
YOUNG FARMERS CLUB			----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------

ANNEX 1

ECONOMIC ANALYSIS

The economic feasibility of establishing an extension unit within the CTDA can be assessed on the basis of four prime factors:

1. The ability to augment the income level of the characteristically small, mixed farmer in Central Tunisia, thereby raising the quality of life for a large majority of the inhabitants.

2. The ability of the extension program to recognize profitable investment undertakings which will yield tangible benefits in the short-run, entailing minimal risks. A crucial aspect in the diffusion of new production techniques at the farm level will depend upon the confidence which the individual farmer has in the extension agent. The producer must be convinced that the extension agent has remunerative farming recommendations to offer. The diffusion of new practices and techniques will be most successfully accomplished if the farmers themselves can see and/or benefit personally from the new undertakings. Emphasis should rest with utilizing demonstration plots on the farmers' fields.

3. The effectiveness of the CTDA Extension Service in providing inputs in an integrated package to the farmer. This entails the delivery of information pertaining to new technological findings (improved seed varieties, different cropping patterns, new cultural practices), efficient land and water use (facilitation of land titling and assistance in farm management decisions), credit availability (sources of credit depending upon investment endeavors), and efficient division of family labor. The field agent must be able to communicate this information directly to the farmer in order to eliminate complications entailed in working with a number of different agents. The field agent should play a major role in assisting and advising the producer in his farming decisions and investments.

4. The ability of the CTDA Extension Support Services Unit (ESSU) to provide services which are linked to on-going projects in central Tunisia. This will provide an overall framework with well specified objectives for the extension activities.

These four factors will be addressed through a two-way communication flow among all entities, with the prime objective of integrating production needs at the farm level. The Extension Support Services Unit will act as a coordinating and disseminating mechanism for information pertaining to farmers' needs. The ESSU will be primarily responsible for the dissemination of this information to field agents. The ESSU will also direct and evaluate field work on new crops, varieties, and cultural

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practices, and report results to research institutions. Most of the materials and research undertakings will be obtained from existing institutions. The ESSU will only integrate and distribute materials to the field agents. Farmers will greatly benefit from the consolidation of production information. The farmer will only have to communicate with one agent, thereby reducing the confusion caused when multiple services are offered by a number of credit programs, government service organizations, and rural development organizations. The ESSU will organize farm information days to demonstrate work being carried out by research institutes, training centers, government service organizations, and semi-autonomous agricultural agencies.

When existing materials do not apply to specific regional needs, the ESSU will have responsibility for making slide presentations, documents, and other audio-visual materials. The ESSU must keep the field agent abreast of all production developments in order that the farmer be well informed. The field agent must be able to assess farmers' needs so that the ESSU can provide information and services related to specific problems. The feedback mechanism from the farmer (rural resident) to the field agent to the ESSU to research activities is the last but most important phase of the communication process. This will be the deciding factor in the success or failure of the project.

The basic function of the CTDA extension unit will be to coordinate existing research and agricultural information rather than developing and providing new extension functions. This coordination of materials should be linked directly to development activities in the region. The utilization of existing methods and materials will minimize costs and maximize effectiveness. Increased income levels and improved quality of life will be achieved if the communication service consolidates all relevant information for the extension agent and if the extension agent can work effectively with the farmer in making farm management decisions and isolating problems which need further attention through research activities, credit programs, and marketing interventions.

In central Tunisia, approximately 90 percent of the population is rural and practicing basically mixed agriculture. This mixed farming occupation is an extension of the historical economic livelihood of the people of Central Tunisia. Pastoralism and dryland cultivation have been complemented by the introduction of irrigated gardens for fruits and vegetables in recent years. For most people, an irrigated garden is a way of avoiding the uncertainties of rainfed agriculture and animal husbandry, given the extreme climatic vicissitudes of the region. The irrigated garden is often a part of the larger unit which includes dryland fields and livestock raising. The average size of landholdings (less than 20 hct.) prevents the majority of the population from surviving through the traditional methods of cereal cultivation and pastoralism, due to the necessity to control an area of land far above the average for the area. The threshold of land tenancy viability is calculated at 25 hct. with operations of 40 hct. providing an adequate survival margin (Rapport General and Hababsa Study). Makthar and Rohia are the major cereal producing regions of central Tunisia; 86 percent of the

cultivated land is comprised of land holdings below 20 hct. (Evaluation de la Potential Agricole de la Tunisie Centrale). The most obvious means of reducing dependancy on large land holdings is through the cultivation of irrigated gardens if ground water accessibility exists. The harsh climatic conditions of the region necessitates that the farmer maximizes the diversification of economic undertakings. Most families have numerous sources of income; both agricultural (cereal cultivation, pastoralism, dry-land tree plantations, irrigated farming) and non-agricultural (migrant labor, civil service jobs, and commercial and industrial operations).

In order to minimize losses and introduce more efficient exploitation of the land, the AES and ESSU must provide a package which will yield economic returns in the short-run and improve agricultural practices in areas which are currently somewhat unfamiliar to the agricultural producers of this region. The actual irrigable land area of the target area is a very small percentage of the total arable land area (see Table I, Land Use). The percent of income earned from the irrigated gardens by a small mixed farmer, however, greatly exceeds all other sources of income. As the shift from production of cereals to production of fruits and vegetables occurs, greater numbers of laborers are required and punctual delivery of credit and production inputs is essential. Farm management decisions become more complicated, often requiring outside advice. The initial focus of the CTDA extension unit should rest with agricultural production on irrigated lands for five basic reasons:

1. The CTDA extension service is already working with farmers on the irrigated lands. A communication link has been established between these farmers and the existing extension service.

2. Irrigated agriculture entails new cultural practices from those used in dryland agriculture. These farmers need technical assistance in the adoption of a relatively new agricultural production system.

3. Per capita investment is higher in irrigated agriculture than in dry-land agriculture. Risks are much greater, therefore farmers will be more receptive to outside assistance to minimize losses.

4. Per hectare yields are much greater on irrigated lands. In the short-run, increased production on these lands will have a much greater impact on increasing economic returns. Benefits will be tangible, thereby generating producer confidence in the extension service.

5. Most farmers practicing irrigated agriculture also have plots of land devoted to dryland agriculture. After an initial contact has been established through irrigated agriculture, the extension service can start working in dryland agriculture with these farmers. The most important factor will be the establishment of a certain degree of confidence between the farmer and the extension agent.

The small mixed farmer earns the largest percentage of his income from his intensive cultivation of his irrigated fields. An average farmer cultivating 1-2.5 hct. of land on an irrigated perimeter in Sidi Bouzid

will earn 800 T.D./year of which 562 T.D./year is agricultural income and the remaining 237 T.D./year has been derived from non-agricultural activity. The agricultural income is divided among the following operations.

54 percent from irrigated land
35 percent from dryland
11 percent from livestock

Economic returns on a per hectare basis fluctuate depending upon crops cultivated, but returns on irrigated land tend to be from 3 to 10 times greater than returns on dryland agriculture (FAO/SIDA study, Contribution a l'Amélioration des Plans Culturaux des Perimetres Irrigues du Gouvernorat de Sidi Bouzid).

Extension activities can extend to other sectors after an initial period of success in the irrigated lands. These new services should be linked to ongoing projects, specifically to the rangeland management, dryland farming, and potable water projects. The introduction of new grain varieties must start very slowly in the dryland areas with the agent working on trial plots on the farmer's land. The increased yields must first be demonstrated in the area of production before being introduced on a wider scale basis.

Extension efforts related to dryland agriculture should address the problem of overgrazed lands. The introduction and increased cultivation of forage crops could serve a two fold purpose: (1) reduce soil erosion, and (2) increase livestock feeds. Improvements in livestock production could touch a large proportion of the population as practically all farm families have either sheep or goats and many have some cattle and poultry. Improved feeds will increase the rate of fattening of animals, thereby reducing the period between birth and slaughter of the animals.

Increased apiculture and aviculture production should be encouraged through the use of demonstration stations in rural areas and farmer information days. Both of these activities entail minimal investment and yield immediate economic returns. These are the kind of extension activities which can solidify close communication between the farmer and the extension agent.

Initially, health and nutrition problems can be addressed through the information service of ESSU, by utilizing audiovisual materials and pictorial documents. Health seminars pertaining to child care, home economics, and family nutrition should be organized on market days in the delegations and the sectors of the target region. The market centers attract a large grouping of women from the surrounding rural areas. With the establishment of the Potable Water Project, a health extension component should be linked to the provision of new water sources in the preliminary stages. The CTDA Extension Service should provide the materials, information, and personnel for the task of sanitary education.

TABLE I LAND USE

DELEGATIONS	TOTAL LAND AREAS (Ha)	ARABLE LAND AREA (Ha)	IRRIGABLE LAND AREA (Ha)	LAND AREA CEREALS (Ha)	SOFT WHEAT (Ha)	HARD WHEAT (Ha)	BARLEY (Ha)	TOTAL # OF TREES (OLIVE, FRUIT & NUTS)	TOTAL # OF OLIVE TREES
(1) Djedlianne	89778	51800	1992	22400	1400	16000	5000	117,207	106,347
(3) Foussana	83265	57000	7917	14430	400	7530	6500	92,063	61,438
(5) Sbeitla	108400	44150	562	19500	700	11800	700	541,076	221,847
(6) Sbiba	49377	39443	2067	18500	1600	9900	7000	274,224	93,450
(7) Thala	77982	70572	2940	35700	2200	20500	13000	254,046	186,488
(8) Makthar	82440	39450	240	42660	5460	30660	6540	505,587	327,587
(9) Rohia	61860	30500	1560						
(11) Djilma	94400	50495	1170	15000	-	5000	10000		

Source: CRDA, 1978
FAO-SIDA reports
CTDA
Ministre du Plan, 1979
Projet de Developpement Rurale Integre de la Tunisie Centrale, Aug., 1978
Donnees Agro-Economique de Base sur la Tunisie Centrale, April, 1978

KASSERINE (GOUVERNORAT)

Location	Land Area with Irrigation Access
Sbeitla (PPI)	215
Charaya (PPI-Sbeitla)	60
Garat Ennaam (PPI)	60
Feriana (PPI)	300
Djedlianne (Surface Wells)	295
Sbiba (PPI)	1667
Foussana (PPI and Surface Wells)	345
Thala (PPI and Surface Wells)	330
Total	3272

SILIANA (GOUVERNORAT)

Location	Land Area with Irrigation Access
Rohia (Surface Wells)	200
Makthar (Surface Wells)	340
Total	540
GRAND TOTAL	3812

SIDI BOUZID

Land Area with Irrigation Access

Name of PPI	Land Area
Hajeb 7 (Djilma)	235
Hajeb 8 (Djilma)	250
Ouled Askar (Djilma)	300
Oum Laddam (Djilma)	142
Zaafra	80
Mliket	110
M'Zara	116
Sidi Sayen I	193
Sidi Sayen II	284
Bir Badra	90
Ben M'rad	70
F. 59	150
F. 37	150
Ouled Mhamed	100
Shallow Wells in FAO Project	
Touila (Sidi Bouzid)	905
Sadaguia (Sidi Bouzid)	1000
Kordhef (Maknassy)	481
Shallow Wells Outside of FAO Project	
M'liket	1000
Hamama	471
Jelma	155
Draa-Rmilia	780
Sendouz	750
TOTAL	7812

ANNEX 2

SOCIAL ANALYSIS

General Characteristics

The main characteristics of the project area include geographical variability, a high degree of population dispersion over the landscape, and a varied base of survival strategies of rural families. Geographically, the area encompasses plains suitable for cereal culture in the northern part of the region--in the area of Makthar, Rohia, and Thala; forested hills in the central part--Djedlianne; irrigated perimeters in Sbiba, Ferizna, Djelma, and Sbeitla; and steppe areas around Sbeitla and Djelma. Variations in sociocultural organizations are based on separate nomadic heritage: the two major tribal groupings of the Majeur and the Freshish confederacies. These tribal identities no longer retain any major sociopolitical significance, but they do remain important variables for social distinction particularly among the older people of the region. Aside from the tribal heritage, the most important social institutions are, and will continue to be, the kinship groups, the nuclear family, the extended family, and the local descent group (Arsh).

The dispersion of the population over the landscape has been caused by the gradual settlement of the nomadic populations over the past fifty years and by the segmentary nature of the lineage system of the tribal confederacies. The result has been the scattering of isolated kinship groups on different regions of the old tribal homeland. Since today no real basis for common action exists among those people, most find themselves in situations of relative isolation, with minimal interaction with their neighbors or the urban population. Their integration into the region will surely be one of the most challenging tasks in the development of the region. The high rate of dispersion is perhaps best illustrated in Table 1 which gives the population size, density and area in sq. km for the nine delegations presently under the jurisdiction of Central Tunisia Development Authority. (Kasserine and Feriana are also included.) Providing services and technology for these groups will be a difficult and slow task, given problems of accessibility, interaction and communication.

To obtain a better grasp of the intricacies of the situation, we need to take a close look at the subsistence strategies of the inhabitants of the region in order to ascertain the areas where intervention could be applied most successfully and where it has the chance of affecting the widest possible segment of the population.

Survival Strategies

Traditional survival strategies in the region were oriented primarily around pastoral activity combining animal husbandry with some cereal

TABLE 1

POPULATION DENSITY IN 10 DELEGATIONS IN THE PROJECT REGION

GOV. OF SILIANA

Delegation of Makthar	Den/Sq. km.	Res. Pop.	Area/Sq. km.
Commune of Makthar	1214	6068	5
Sector Beni Hazim	54	2050	38
Baz	54	4723	88
El Foudhoul	33	1620	46
Garr'a	40	2510	63
El Karia	33	2243	68
Keara	43	3895	90
El Louza	32	2231	70
El Mansoura	43	4131	95
Ras el Oued	72	1805	25
Sayar	74	3691	50
Sedin	53	2286	43
Soualem	39	3132	80
Delegation of Rohia			
Commune of Rohia	1181	1181	1
Sector Haria	37	2398	65
Hababsa	29	4465	169
Msalha	16	1033	65
Rohia	38	3411	90
Es Smirat	26	2444	95
Jmeilatt	13	1608	126

GOV. OF KASSERINE

Delegation of Kasserine	Den/Sq. km.	Res. Pop.	Area/Sq. km.
Commune of Kasserine	1412	22594	16
Sector l'aoudja	18	3680	205
Boulhayjat	15	2336	160
Bouziggam	65	5486	84
Dagira	20	2325	115
Hassi el Ferid	11	2739	240
El Hekim	12	1631	136
Kamour	10	2964	290
Khanqat el Jazlya	16	3823	232
Megdoudesh	11	3068	274
Oued ed Derb	30	2477	82
Sidi Hareth	15	1349	90
Delegation of Thala			
Commune of Thala	2900	8700	3
Sector Ain Jedida	58	2617	40
Lajred	13	1226	·95
Barmajna	32	1899	60
Boulehnash	30	3485	110
Haidara	19	4172	200
Ech Chefrai	18	1510	80
Hmad	18	1926	100
Oueljet edhil	52	3146	60
Dashra	33	2797	85
Jaou	19	1827	95
Thala East	26	77	3
Thala West	42	126	4

Sector Tbaka	23	1397	60
el Mkimeu	21	1552	74
Oued Rachah	42	3101	73
Zelfane	45	2295	51
Delegation of Sbeitla			
Commune Sbeitla	2680	8039	3
Sector El Athar	34	4298	128
Ech Shraa	27	2408	90
El Doudlab	19	2201	114
Qalaa Hamra	56	3898	70
El Rahmat	32	1456	46
El Gouna	27	2388	90
El Khadra	35	2837	80
Mashrek ech Shams	26	3178	120
El Mzarra	24	2403	100
El Oussaya	20	2883	146
Senmana	18	2062	115
Delegation of Feriana			
Feriana Commune	4019	8037	2
Sector Bouchebka	14	1803	130
Bouhaya	11	1888	170
Feriana	7	846	118
Thelepte	9	289	31
Garat el enaam	30	3150	105
Majel Bel Abbas	22	4498	200
Oum el Aksab	12	4206	350

Es Skhirat	17	4831	290
Ên Nadhour	12	3187	270
Oum Ali	19	2358	123
Delegation of Foussana			
Sector Afrane	25	2146	90
Boudriass	13	2336	187
El Hazza	24	2185	93
Foussana	52	3912	80
El Adhira	32	2082	70
El Brika	24	2407	108
Kamouda	50	4292	90
El Mzira	34	2535	80
Ouled Mahfoudh	38	3204	85
Delegation of Sbiba			
Commune of Sbiba	1944	1944	1
Sector el Ahouaz	47	3862	82
Ain Zayan	28	1673	60
Ain el Khamasiya	57	3704	65
Ibrahim Zahar	57	3462	61
Oued el Hattab	50	2487	50
Sbiba	59	2947	50
Thamad	25	2005	81
Delegation of Djedlianne			
Ain el Hamadna	35	2813	80
Ain oum Jdour	20	2553	129
El Bonajer	26	1687	65

El Brik	32	1489	46
El Hamaima	41	1639	40
El Krine	38	2275	60
Djedlianne	76	3441	45
Ramada	28	1793	65
Terbah	28	1848	67
Toucha	18	2309	130
GOV. OF SIDI BOUZID			
Delegation of Djelma			
Sector el Abiadh	39	3306	85
El Amrah	37	2387	65
Batni Ighazal	25	2834	113
M'ghilla	19	4948	256
Ghedir el Zaytoona	57	2406	42
Jilma	75	4449	59
Selta	25	4049	164
Es Sebala	59	1822	31
Es Sid	41	2674	65

cultivation. With the gradual sedentarization of the nomadic population came a gradual ecological transformation of the region. The introduction of irrigated agriculture and the decline of pastoral activity created a situation characterized by an increasingly varied resource base. The reasons for this expansion are attributed first and foremost to the old pastoral way of life which emphasized variability, given the harshness and the unpredictability of the environment. In order to guarantee survival, the pastoralists had to diversify as much as possible given the limitations of the natural environment. This tendency towards diversification was guided by a basic economic orientation characteristic of pastoralism and carried on to the settled, essentially agricultural way of life. The strategy

is simply to lower the risk-taking as much as possible in order to guarantee survival and continuity. Lower risks, of course, mean lower gains; so long as the risks are perceived as major, the pastoralist will opt for minimizing them regardless what the possible but unlikely gains may be.

This low risk/low gain strategy discussed in detail by Hopkins (1978) continued after the pastoralists became dryland farmers. If the object of an extension program, or any other development program, is to induce the farmer to innovate, meaning an increased risk situation, then the farmer needs to be initiated very gradually with ample demonstration along the way that increased risk will not mean total collapse and devastation.

Keeping in mind these two variables - varied resource base and the low risk/low gain strategy, both of which characterize most farmers in the region, we can then proceed and analyze the different survival strategies that are found in the region today. They include both agricultural/pastoral and non-agricultural strategies. The following have been isolated:

A. Agricultural/Pastoral

1. Dryland Farming
   a. Cereal Culture
   b. Arboriculture (Olives, Almonds, Figs, etc.)
   c. Cactus

2. Pastoralism
   a. Sheep
   b. Goats
   c. Cattle, Camels (very few)

3. Irrigated Farming
   a. Surface Well Irrigation
   b. Irrigated Perimeters

B. Non-agricultural

1. Migrant Labor (National and International)

2. Salaried Work

3. Occasional/Seasonal Employment

4. Commercial Activity

5. Rent of Buildings, Equipment, etc.

6. Weaving (Women)

7. Misc. Others

The optimum strategy that a family could follow would be a combination of as many of the above as possible. Since this is usually unlikely, the next possible strategy would be to secure an agricultural as well as a non-agricultural source of income. The FAO study for the governorat of Sidi Bouzid gives an average of approximately 70% income derived from agriculture (54% of which comes from irrigated agriculture) and 30% income derived from non-agricultural activity. These figures do not really reflect the realities of Kasserine region, which has fewer irrigated parcels, and where more farmers are engaged in dryland farming/ pastoralism. Furthermore, Frankel (1978) has maintained that in the northern regions many of the small farms are not operating farm units because the owners derive most of their income from non-agricultural activity.

It should be borne in mind that these strategies are not mere abstractions but do in fact represent real choices and manipulations on the part of the farmer and his family. Farmers are, as the Missouri Team pointed out, rational economic entrepreneurs who are receptive to adopting new techniques and improved farming systems, if they are convinced that such changes lead to higher incomes, better living, and security for their families. To illustrate let us take a hypothetical family of six children (4 males, 2 females), living on a ten hectare parcel of land and practicing dryland farming (or perhaps surface well farming). It is in the interest of the family as a unit that the children seek diverse employment options to augment the family income. The head of the family can count on the aid of his wife and two daughters and perhaps one of his sons. That leaves the other three sons to seek non-agricultural work. The family may invest heavily in the education of the most promising of the sons, so that he can get a good job and help the family in the future. Of the other two, one may be encouraged to migrate and seek wage labour either in Tunis or the Sahel or preferably move to France, Germany, or Italy (Libya being somewhat doubtful now). The remaining son will probably seek salaried work, occasional employment (construction for example) or perhaps commercial activity in the region itself and help on the farm during peak labor periods. By thus doing, the family could have balanced diverse sources of income to guarantee its survival and prosperity. It is the family structure itself which then lends support to the migration patterns of some of its members.

It is this same strategy of manipulation of the services of the household members which frequently has important ramifications for the land tenure system by weeding out potential inheritors of the land. It is unlikely that all of the sons will return to claim their share of the land upon the death of the father. Given the Islamic system of inheritance, the land would, under normal circumstances be divided equally among all the male heirs. If some of the male heirs are successful in non-agricultural work they are not likely to return to the agricultural way of life. Fragmentation of the land upon the death of the father could then be alleviated, and instead of dividing the land up

among the four sons, it may be divided between only two (or perhaps all if it reverts to only one son) with special provisions for the other sons.

This essentially is a method of manipulating the labor of the family members which achieves a wide resource base and guarantees diverse and adequate incomes to sustain the whole family. It is a strategy that is best suited for a family dependent on dryland farming. The success of this strategy is dependent on variables beyond the control of the family (i.e., availability of non-agricultural work and feasibility of migration). These variables are not insured for the future and are tied to economic and political issues outside of the region. Consequently it is a potentially hazardous situation (in the long term at least). Since the government of Tunisia has expressed a deep interest in limiting the migration of people from the region to other areas in Tunisia or overseas, it becomes important then to think in terms of the development of new options for agricultural development in the region itself. It seems that the best way is to initially concentrate on labor -intensive farming methods (such as irrigated agriculture) in order to absorb the working force of the region. It is important to act soon given the fact that many migrant workers are returning to the region (and other regions in the country) particularly from Libya.

Successful Farming in Central Tunisia

In his social soundness analysis of the Drylands and Irrigation components of the Central Tunisia Development Program, Hopkins (1978) isolated five variables which he felt were most crucial for the establishment of successful farming in the region. These variables are land, labor capital, water, and technology. To these must also be added a sixth factor, that of marketing.

Land is readily available. Of course the agricultural potential of the land varies from one part of the region to another, with some suitable for irrigated agriculture, other for dryland farming, and still other suitable for pasture lands. Data on the types of soils in the region is scant and we do concur with the recommendation of the Missouri Team that soil fertility facilities must be established either at Le Kef or Ousseltia, or both. They could perhaps serve as centers for such research activities and could collaborate with institutions in the region (such as the CTDA) and in other parts of the country. The single most crucial factor with respect to land is the complicated issue of land tenure. Attention should be directed toward facilitating the acquisition of titles to lands, a very important issue for obtaining loans and credit from the bank. It appears that the practice of renting land is not very common in the Central Tunisia area and consequently Frankel's analysis of the credit situation in the north does not really apply here. Neither is the issue of absentee ownership significant in the region. Contracts of share-cropping do exist but since cereal production is relatively marginal in the area, they tend to be at a minimum.

Labor's role in the establishment of successful farming is of course crucial. As explained earlier, the family survival strategy has been to promote migration and the pursuit by certain children of non-agricultural activity. Migration, as was pointed out in the FAO and Hopkins' reports does not really create a shortage of manpower. It simply skims off extra labour that is readily available. However, with the potential and inevitable return of many migrant workers, channels must be established to create labor-intensive work strategies, hence the recommendation for intensifying irrigated agriculture.

Capital remains a problem. Many farm families rely on the money sent home by migrant workers to create sufficient capital in order to purchase technology to improve agricultural production. The inflow of capital, however, is not always used for improvement of agricultural production. In fact, the capital is used first and foremost for building or improving a house. It could then be used for the purchase of a pick-up truck, a television set, and for the improvement of health and dietary conditions. If water is known to be available on the farm, pumps and small machinery may be purchased. The decision of how to invest the money is made by the head of the household and the contributing son, in consultation with the rest of the members of the family. It is safe to assume that money will be spent first on house building and improvement, and then on the technology necessary for efficient exploitation of the water resources.

For those farmers lacking the capital generated by migrant labor the situation is somewhat different. They must rely on loans and credits offered by the bank or other institutions. For investments entailing a long maturation period, a farmer must have title to the land (hence the priority and importance of the land tenure issue). Many farmers are hesitant about obtaining loans from banks and other institutions, fearing the red tape and not wanting to be indebted to anyone, let alone the bank or the government. They are aware of the commitments that loans could impose on them and the risks involved in the failure to repay. Their economic strategy is essentially one of "balanced reciprocity". Working through the banks and through interest is perceived as a form of "negative reciprocity" which is antithetical to their system of values. Furthermore, a commitment to a bank indebts not only the farmer but his family as well-- his children and perhaps his children's children. Consequently it is preferable to continue in the low risk/low benefit strategy. It is this particular point which makes it imperative that the extension agent be equipped with the knowledge of the credit situation so he could better explain the potential benefits and perhaps encourage some farmers to pursue this option.

A final crucial factor in the discussion of capital is the form which the capital takes. Many of the farmers in the area own livestock which they regard as a form of capital. Livestock has been and will continue to be a major form of a "savings account" which could be converted very quickly into other forms of capital, notably cash. Given the attachment of the farmer to his livestock, it is unrealistic to expect him to

abandon this form of capital in favor of the others. A sound extension program should, therefore, address the issue of livestock management, thereby accommodating the desires of the farmers. One last note about the forms of capital concerns land as capital. The uncertainty of ownership and the tendency toward the preponderance of "collective lands" and "lands of extreme indivision" makes land less attractive as a source of capital. Only privately owned titled land and irrigated land is seen as capital. The value of privately owned land often lies less with its agricultural potential than with its potential use as a house site.

Water is perhaps the most significant of all of these six variables. For a population that has been dependent on rainfall for hundreds of years, the availability of water is extremely crucial. In fact, if water is readily available then farmers would probably have already devised strategies for the establishment of successful farming. Problems over water rights and water distribution are frequent, and the availability of water could often determine which farmer has a good year and which one does not. Given the natural limit on the availability of water, however, the central issue becomes one of equitable distribution of water so that the largest number of farmers could benefit from it. A good extension program should be ready to address these issues.

Water without the technology necessary to exploit and utilize it efficiently is not enough, hence the next variable that must be addressed; technology. The most desired and sought after technology is usually high technology, i.e., tractors, pumps, etc. For those farmers that have the capital, they would be in a position to use it for water exploitation (digging and equipping wells), or for technological input (new crops, machinery etc.). Since high technology is beyond the reach of most farmers, efforts should be made to facilitate the acquisition of low level technology (hand pumps, etc.). An extension program should address the role of low level technology, how to use it and how to profit from it.

The final variable is marketing. If the farmer is expected to increase his production of irrigated crops (vegetables for example), then he must be assured of a market for his produce. Marketing facilities need to be reorganized in such a fashion as to assure maximum local marketing and consumption. This was essentially the recommendation of both the Missouri Team and Hopkins. Marketing is especially crucial for farmers who rely on surface walls. If efficient irrigation methods are to be directed to those farmers, they must be guaranteed a local outlet for the surplus which they will hopefully produce. Otherwise they are not going to be convinced that increased production is going to result in increased income and a higher standard of living.

What we have tried to show so far is that farmers have sound strategies that are oriented toward survival and continuity. It is important to

have a full understanding of these strategies as any planned intervention must work through the general framework of the economics of the farmer if it is to have any measure of success. The farmers are attuned to the realities of their lives and at the same time willing to accept new ideas and techniques if they can see tangible positive results (hence demonstration plots are suggested as a way of showing the farmers'potential gains). Increased production should not be overstressed since many farmers are not really interested in substantial increases in production, if that production cannot be profitably marketed. The prestige element should perhaps be stressed more than the material benefits of increased production. An extension program should therefore take cognizance of the socioeconomic conditions of the region, especially those variables which influence the decision-making process at the household level.

The Dynamics of Information Flow in the Family

It was mentioned earlier that the farm family operates as a basic unit of production and consumption. It should be emphasized that there are definite patterns of interaction amongst the family members which shape the major decisions. The father is typically the person who ultimately controls the capital and who has the final word on ways of allocating resources. The influence of the sons in the decision-making process is determined by their economic contribution to the household. The higher the contribution, the more influence the son has. It is therefore important to work closely with the head of the household while at the same time assessing the roles and contributions of the rest of the members of the family.

In terms of the roles of the females of the household, the issue is more complicated. It is apparent that the labor contribution of the females is immense (that applies for all the survival strategies). Unfortunately, the contributions of women do not translate into a net gain of status in terms of the decision-making process (as has been suggested by some anthropologists). So long as the control of female production rests with males, the former are unlikely to register any gain in status. It is unrealistic at the present to suggest that women exercise any direct significant control over their production activities (given the cultural values pertaining to sexual segregation and division of labor). It is important though that females participate in and benefit from the extension activities planned for the region. One option for addressing the female participation is to work through the traditional information flow networks, i.e., through the males. This however is unpredictable and could be very slow. If the information is to reach the women directly then new ways must be devised to address them within the proper sociocultural context. Two possible ways are suggested here:

1. Working through the areas of health and nutrition. Health and family planning clinics are areas where a sizable number of rural women aggregate. Women usually have little hesitation about talking to men so long as the interaction is conducted within the context of health related activities.

2. Organize information dissemination activities during market days (particularly the weekly markets held in different parts of the region). Market days bring together a large segment of both the male and the female population for exchange and trading purposes. Many women frequent these markets to buy clothing, shoes, spices, sugar, etc., and also to socialize (perhaps even arrange marriages). The market, therefore, is an extremely crucial place for communication flow. It is an institution that could probably be utilized effectively for reaching the widest possible audience, both male and female.

These two channels could insure information to as many rural women as possible, particularly when they are applied in conjunction with the traditional patterns of information flow within the family. It is unrealistic and inadvisable to expect the extension agents to establish a rapport with the women. Consequently the two methods mentioned above are probably the most effective at this stage to insure the participation of the female segment of the population.

Summary and Conclusion

Based on the foregoing analysis, it seems most efficient at the moment for the project to address the issue of irrigated agriculture, particularly the surface well farmer. This is the area where the fastest and most assured success is likely to occur. Despite the fact that irrigation is the domain of a small segment of the population, it nevertheless is the avenue where a measure of success is almost guaranteed. This is important because a new project must validate itself in the shortest possible time so that the farmers in the region can have faith in the goals and methods of the project. At the same time it is also important to initiate projects directed toward farmers with other subsistence strategies. This can be done through increased emphasis on the proper handling of livestock management (through the improvement of grazing conditions, and perhaps introducing new varieties of sheep and goats, and maybe cattle as well), and through the pursuit of health and nutrition activities, particularly in the area of potable water use. Improvements in arboriculture and cereal production (which incidently seems to be declining) need to be undertaken, and finally an increased emphasis on increased production activities and reorganization of the market structure.

ANNEX 3

EDUCATIONAL SYSTEM

The Tunisian System of Education (With Special Reference to Agriculture)

The Tunisian System of Education in pre-protectorate times consisted of religious education in religious schools (Kuttabs), where students between the ages of 5 and 16 memorized the Koran and studied reading and writing. A few of these students went on to higher education, continuing their basically religious studies at the Zitouna Mosque University. In 1875 the Sadiqi College was established in order to combine religious training with scientific and technical studies. Mathematics, science, and geography were introduced in addition to religion and philosophy.

During the French Protectorate period (1881-1956), schools were built for the education of children of foreign settlers. These schools were fashioned along the French educational system lines; some, however, offered courses in Arabic and Islamic religious principles. The Islamic religious schools continued to exist alongside the French school; most expanded their curriculum to incorporate scientific and technical courses. Despite this expansion, a small percentage of Tunisian children were attending school. By 1955, for example, only 26% of all primary school age children, and 3% of all secondary school age children were attending school.

One of the first concerns of the newly-independent nation of Tunisia was the creation of a good educational system that could reach all the Tunisian population. In 1956, the National Ministry of Education took over responsibility for all of the public schools in the country including some 200 kuttabs. All agricultural schools became the responsibility of the Ministry of Agriculture; it was not until well into the 1970s that most of these schools reverted to the Ministry of Education. Only the National Agronomy Institute in Tunis and a few other centres stayed under the jurisdiction of the Ministry of Agriculture. The tremendous emphasis that the government is putting on education is perhaps best manifested in the fact that 30% of the national budget goes to education.

The Education Reform Law of 1958 unified the diverse educational institutes in one body. Education was free for all; the government financed the cost of school supplies, clothing, and meals for the needy. Scholarships and assistance programs were offered for the pursual of higher education.

A major problem encountered by the Ministry of Education was the question of the language of instruction. Arabic was established as the main language in the primary years of schooling, while both Arabic and French were used in secondary education. The government is continuing its efforts to Arabize the curriculum for secondary schools.

The grading system is modeled after the French and is based on a scale of 0 to 20, with 10 indicating a minimum passing grade. In order to pass from one class to the next, students take yearly examinations. If a student should fail to obtain a grade of 10 or above on the final exam in June, he may retake the examination in the following October. The academic year runs from October 1 to June 30.

Rates of literacy in Tunisia are still relatively low despite the recent advances-- 45% for those over 15 years of age. In the younger age brackets, however, substantial progress has been made from the approximately 8% enrollment rates for children between 5 and 14 at the time of independence to over 70% today.

Despite substantial progress, problems still plague the educational system. Restricted facilities at the secondary and post-secondary levels and employment needs have forced many students to discontinue their studies after primary school. A somewhat dated study conducted in 1972 showed that out of every 1000 students who began primary school prior to 1972, only 228 continued to the secondary level. In recent years agricultural schools have also faced declining enrollment, primarily because of the lack of employment for their graduates. The government has attempted to provide vocational training at the post-primary level for those students who cannot go on to secondary school, or who drop out of secondary school. There are 28 centres for vocational training (Centre de Formation Professionelle Agricole) in the country; two are for women and the rest for men.

An additional problem is the difficulties which rural families have in getting their children, particularly the girls, to school. The percentage of adult females who are literate in the three rural gouvernorats of the central region is substantially below the already low national average of 32%. The percent of girls in primary school in these areas is also below the national average of 39%. Table I presents a breakdown of literacy rates in the 3 gouvernorats of the central region. It is clear from the Table that despite the impressive achievements of the system as a whole, those achievements have not been uniform and do not really reflect the realities of the rural areas. Another example of regional disparities comes from the FAO/SIDA study of the educational situation in the Sidi Bouzid gouvernorat. In a study of 605 families on the irrigated perimeters of Sidi Bouzid in 1977, and of 36 families with private water sources, it was found that interregional disparities were rather high. Table 2 summarizes these findings. The illiteracy rates for the head of the household are quite high and the wives of these farmers are all illiterate but one. Figures in the next generation reflect the consolidation of the educational system in post-independence days. The sons beyond school age are more than twice as likely to be literate as their fathers. The daughters in the same age bracket are only slightly more literate than their mothers. The percentage of children of school age who are actually in school is low -

40% in the irrigated perimeters and 38% in the families with private wells. These rates are lower than the 46% rate for the gouvernorat of Sidi Bouzid as a whole.

TABLE 1

Percentage	Gouvernorats			Entire Country
	Siliana	Kasserine	Sidi Bouzid	
Literate Adult Males	48	50	48	58
Literate Adult Females	21	16	13	32
Entire Adult Literate Population	35	33	31	45
Primary School - Girls	34	29	22	39
Population 5-14 in Prim. & Secondary Schools	56	52	46	71

Source - Population Census 1975

TABLE 2

Illiteracy Rates in Sidi Bouzid

	Public Irrig. Perimeter		Private Well Families	
	N	%	N	%
Older generation				
Farmer	459	77.1	18	52.7
Wives	574	99.7	37	100
Older Children				
Sons	416	34.8	15	18.5
Daughters	717	73.6	45	62.5
School Age Children				
Sons	14	10.3	0	0
Daughters	.33	30.3	1	12.5
Total	2213	61.8	131	51.2

The study of 110 farm families in the Hababsa sector of the Rohia delegation (Gouv. of Siliana) gave similar results. Only 57% of school age boys were actually enrolled and a very low 18% of the girls.

These relatively low rates of involvement in schooling in rural areas are caused by a number of factors, most notable of which is the high rate of population dispersion, making the aggregation of students quite difficult. In the Hababsa study for example, it was found that the average distance a child has to walk to get to school is 5 km. An additional problem is the lack of adequate facilities. Again from the Hababsa survey, it was found that 225 students were taught by 6 instructors in a 4-room school house. A third factor which discourages attendance is the farm family's situational preference. The low attendance rate of older boys and girls reflects a strategy on the part of the family to utilize the children's labor. For boys the strategy is to send all for a few years, and then only the oldest or the most promising to upper grades of primary school and to secondary school. The percentage of students going on to secondary school is, however, low; this is largely due to the need for generating income. In some cases children work on the farm, but in the majority of cases, they look for work in the neighboring towns or move to the urban centers. In this sense, even the slight education that farm children get is invariably used to get a non-farming job. Children who stay on the farm generally have less education than their siblings who move to the cities. Extension activities in the region should address this issue in so far as the future farmers of the region seem to lack not only technical knowledge but in many instances basic knowledge acquired from primary school education.

The success students have in moving through the educational system is a product of many factors, including their motivation, the needs their families have for them to move into the labor force, and the available resources for continuing study. The demand for various types of skills in the economy also helps shape the resources which are available. In an attempt to respond to the complex needs of a modernizing economy, the Tunisian educational system is itself complex, blending vocational, technical, commercial, literature, and arts along with law and religious courses of study. The chart in Figure 1 summarizes the educational system, with special emphasis on showing how technical agricultural education is built into the system. Individuals with some certification of achievement and with varying levels of technical knowledge and skills are prepared by various types of schools. The primary school certificate is undoubtedly the most numerous and certain efforts have been made in recent years to increase the amount of instructional time and to introduce courses into the primary school curriculum with some immediate agricultural technical relevance. The gradual replacement of French language with Arabic may help increase learning motivation, although some loss of access to technical materials in French might occur.

Once through the primary school with sufficiently high grades, the student enters the secondary system, which is comprised of a three year cycle, corresponding to grades 7, 8, and 9. During this "lower" secondary period the student can choose to enter one of three paths: (1) the vocational training centers, (2) the agricultural training centers (Centre de Formation Professionel Agricole), or (3) one of several academic high schools. The graduates of the vocational and agricultural schools emerge into the work force with a diploma documenting their achievements. Those who graduate from the academic high school with an average of 12 or more can enter into the upper secondary schools, which are of three types: (1) the four year general academic high schools, whose graduates emerge with a baccalaureate after 13 years of formal schooling, (2) the three year technical, commercial, and industrial high schools, or (3) the agricultural high schools. The agricultural high school is itself comprised of two paths. The first path is a three year sequence. The first year addresses fairly general agricultural and scientific issues; the following two years focus on specific topics, such as cereal crops, rural engineering, forages or forestry. If the student passes the examination at the end of the third year, he can go on to a fourth year.The student who does not get sufficiently high marks terminates his formal classroom training after three years and works, under guidance, in some practical job, usually with a government agency for one year. He then receives a certificate as an adjoint technique.

Students who gain entrance into the final year of agricultural high school are sent to the Ecole Superieure d'Economie et de Promotion Rural at Moghrane, in the Zaghouan region. Students who pass this college preparatory year of agricultural high school are then eligible to enter into the various higher, post-secondary educational institutions. In 1980 at Moghrane, some 148 students have been enrolled in this final year preparatory course. It is estimated that of these 148 students approximately 70 will continue at the Ecole Superieure at Moghrane, while the others will continue their studies at other post secondary agricultural institutions. There are three types of post secondary agricultural institutions. The first is the two year Ecole Superieure. The second type of post secondary school is the four year institute. The third type is the six year Institute National Agronomie de Tunis.

It appears that many of the lower level agricultural schools are operating well below capacity, given number of buildings and laboratories. The apparent reason is the lack of jobs available for the graduates from these institutes.

More intensive use of the school facilities and faculties in off hours or during the summer for short courses for farmers could be incorporated into an area information program. The technical expertise of the faculty at such schools could be encouraged to help with communication programs and with keeping the extension agents of governmental agencies up to date on new techniques.

FIGURE 1: Structure of Education in Tunisia, with special Reference to Agriculture

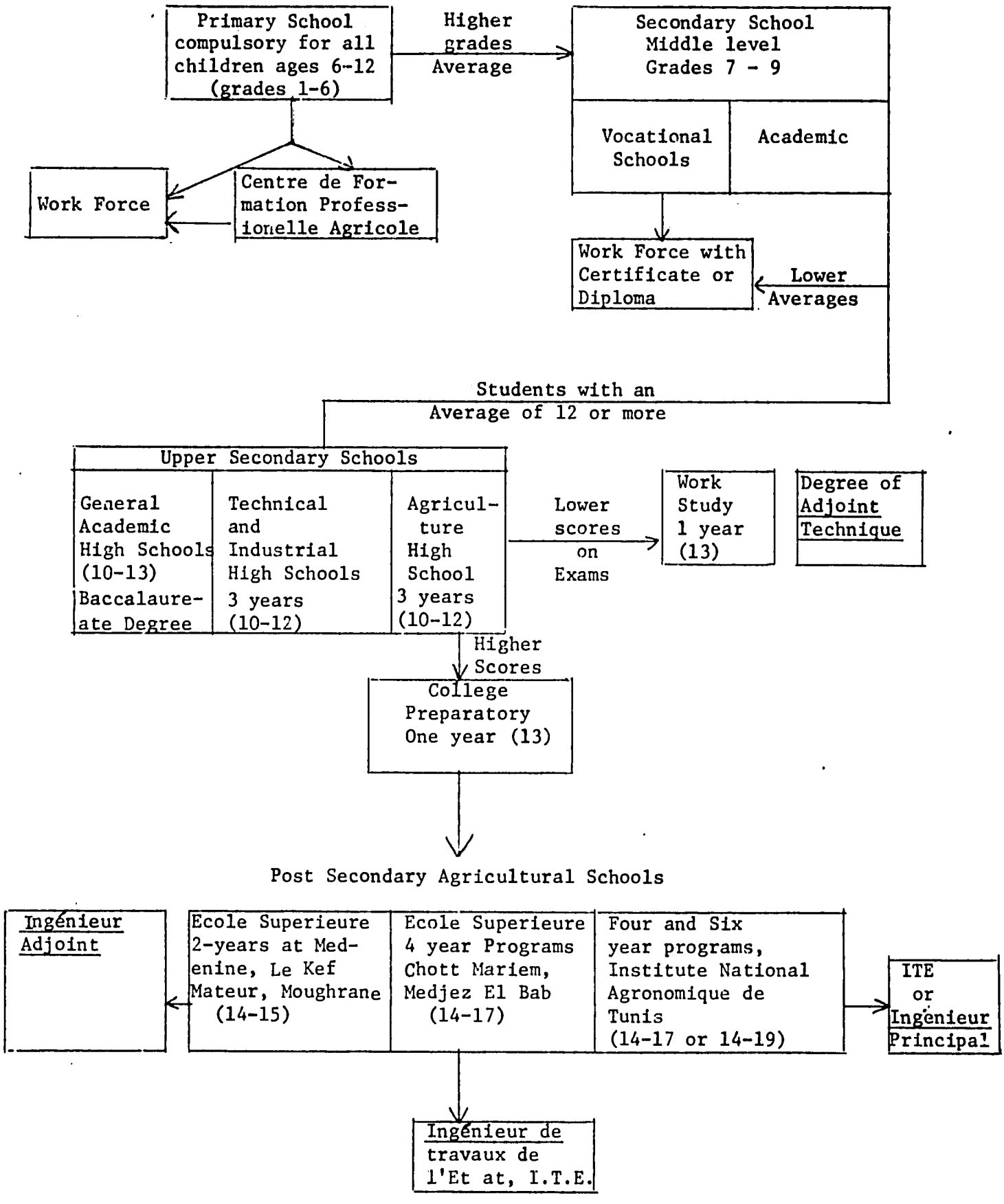


TABLE 3

Location of Post Secondary Schools

School	Type	Years	Specialization
Medenine	Ecole Superieure	2	Arid Land Management
Le Kef	Ecole Superieure	2	Field Crops
Mateur	Ecole Superieure	2	Livestock
Moghrane	Ecole Superieure	2	Rural Development and Extension
Medjez el Bab	Ecole Superieure	4	Agricultural Engineering
Chott Mariem	Ecole Superieure	4	Horticulture
Tunis	Institute National Agronomie de Tunisie	6	General Agriculture

ANNEX 4

THE ROLE OF GOVERNMENT ORGANIZATIONS, RESEARCH INSTITUTIONS, AND EDUCATIONAL INSTITUTIONS IN EXTENSION

Most of the local extension information programs of the various agricultural agencies rely mainly on farm visits, demonstration plots, and field days. Particularly in the irrigated areas, the new technology is quite complicated and represents a radical change from prior farming methods. This situation requires individual attention on a regular basis, and generally such attention is being received, at least by some farmers.

The use of various communication media is limited. A few simple, though effective, communication aids such as posters, slides, and newsletters are locally produced. However, most agricultural publications, audio-visual aids, and materials for the mass media are produced in Tunis.

With the exception of radio, the possibilities for using mass media to reach farmers are extremely limited. There are no newspapers published in Tunisia other than those printed in Tunis. There is one television station, and that is in Tunis. Few farmers have electricity and fewer still have television. Most farmers, however, do have transistor radios. There are two radio stations in Tunis (one in Arabic and one in French). Other radio stations are in Monastir and Sfax. The Sfax station is listened to widely in the central area.

CRDA

The CRDA has 24 local offices in the gouvernorat of Kasserine. Ten of these are currently in full operation, the other 14 should be shortly. Each has three or four agents. The main extension information method is the use of demonstration plots. CRDA apparently has some linkage with the INRAT experiment stations.

The CRDA also receives bulletins from DERV in Tunis. The agents are the main users of these bulletins, although some are given to farmers who can read. The local CRDA also produces a newsletter for agents and the better farmers. The bulletins and newsletters mainly contain how-to-do-it information on agricultural production.

The local CRDA makes some limited use of slides and films produced in Tunis. The office has slide and film projectors as well as batteries and generators to use these where electricity does not exist. A typical farmer response to the slides and films is to say, "That's fine, but I'm not able to do it on my farm." The agent is always available to say how the farmer should proceed.

The Kasserine office of CRDA also gives training sessions to young farmers or sons of farmers. Many participants commute to these short courses which last one to two months. An exam is given at the end of the course and those not passing get individual attention from specialists in the area in which they are weak.

DPV

DPV is divided into 4 sections: grains, tree crops, vegetables, and crop protection. The two basic functions of DPV activities consist of: (1) programming harvests for each agricultural season and (2) providing technical packages to field extension agents.

DPV has recently revamped the structure of its extension program. It has divided the country into 400-425 CTV's (territorial units for extension). Eventually one agent will be assigned to each CTV. This agent will have full responsibility for delivery of extension services. The agent will be lodged on the land and will be a generalist by training. Specific problems can be addressed by deferring to the specialized sections within DPV. In 1979, 100 extension agents were settled on a CTV and an additional 100 will be settled in 1980. It is expected that all agents will be working on their respective CTV's by the end of 1982. At present, most of the DPV extension agents working on a CTV are concentrated in the north of Tunisia.

OEP

OEP activities are most heavily concentrated in northern Tunisia. It does have a very active extension program associated with its Project Integre d'Elevage. In 1978, its activities included over 3500 demonstration plots, 45 field days and 35,000 farm visits. Extension services in central Tunisia are quite limited. Several small programs to introduce pure bred cattle and promote poultry production in some of the irrigated perimeters have been undertaken. OEP experience in pasture improvement and feed production is limited to the more humid areas of northern Tunisia.

DERV

DERV is the Ministry of Agriculture organization officially charged with producing mass media materials for extension. Its central office in Tunis has four sections:

- Radio and press
- Television and film
- Slides and sound recordings
- Video tapes

Each September the regional offices of CRDA submit requests to DERV for information materials. Those requested most are produced. At times the content may be regionalized. This adaptation apparently does not happen very often, however.

Publications. DERV has writing, editing, graphics, and printing services and facilities. It produces about 15 to 20 publications per year, most of which are in Arabic. It has offset printing facilities and has plans to acquire photo-composition equipment. Apparently it currently uses typewriter and varitype equipment to set copy.

Most publications are semi-technical and are used mainly by extension agents. Some, however, go to farmers.

DERV also publishes a magazine which includes a monthly work calendar of farming activities and general articles on farming techniques.

Radio. DERV has a seven-minute agricultural program broadcast at 6:33 a.m. seven days a week. This is on agricultural production techniques and includes interviews with specialists plus information taken from agricultural publications.

It also has a half-hour program on Wednesday afternoons. This includes questions and remarks by farmers, advice presented by technicians, and information from the National Farmer's Union.

Films. It has a film library of over 125 films and produces about two films of its own each year. Most films pertain to grain and livestock production and are directed toward northern Tunisia. Films are sent on request to agricultural agencies and schools throughout Tunisia. Film use does not appear to be very great.

Video tapes. DERV has produced over 60 video tape programs. These tapes are used on television and are also shown to farmers. DERV has 10 cars or vans - one in each of the 10 northern gouvernorats - which transport chairs, video playback units, and slide projectors for use at farmer meetings. These vans go to meetings at the request of CRDA agents. Technical and repair problems of the video equipment has greatly limited its use.

Television. DERV used to produce a weekly agricultural television program broadcast on Friday evenings. In 1978, it produced 37 such programs totaling nearly 16 hours. But this activity apparently ended at the end of 1978.

Slides and film strips. DERV has about 30 different slide sets and another 30 film strips available to CRDA units on request. These have a printed script and, in some cases, a synchronized recorded tape that goes along with them.

The unit also has cameras and its own dark room. Colored slides are sent to France for processing. The unit also organizes national and even some international seminars on various agricultural topics.

GIAF - GID - GIL

These are semi-autonomous organizations under the Ministry of Agriculture which provides about half of their budgets. GIAF deals with fruit tree products, GID with dates, and GIL with vegetables. GIAF is apparently the most active of the three. It provides fruit seedlings to farmers at low cost. It also has an active information program. It co-sponsors some bulletins with the Ministry of Agriculture. It also produces slide sets

and information sheets for agents and farmers. These are often used at farmer information days.

INRAT

INRAT produces a publication for extension agencies which gives recommendations based on its research. It is not a publication for researchers, but instead reports results and recommendations stemming from its research. Apparently these publications are not widely circulated. The CTDA office in Kasserine receives only one copy.

Agricultural High School - Sidi Bouzid

This agricultural high school has cut back on its enrollment in recent years because of the decreased number of job openings for new extension agents. To utilize its excess teaching capacity, the school started last year to produce information packages for CRDA and CTDA. These packages consist of all of the information and support materials needed to put on a farmer information day program.

Staff from the school, in conjunction with student participation, prepare and conduct the first three farmer information programs. Extension agents from CRDA then take the materials and present subsequent programs.

Some of the slides used are prepared by DERV or GIAF in Tunis. Others are prepared by the school. The school also uses some DERV and GIAF printed material to supplement similar material it produces. For each farmer day presentation, a record is kept of the material presented, who presented it, what audio-visual and demonstration aids were used, what techniques worked best, and who attended. Farmers who can read and write fill out an evaluation form. All of this information is carefully summarized and evaluated.

The school is currently considering using the radio station in Sfax to reach farmers. The present plan is to record the questions farmers ask at farmer days as well as the answers given by extension agents. In this way, program content is controlled to a large extent by farmers. Furthermore, the credibility of agents is enhanced because it is demonstrated that they can adequately answer farmers' questions.

Ecole Superieure de Grandes Cultures - Le Kef

This post secondary institute was established in January, 1977 with the following objectives:

1. Training of technicians for specialization in field crop production (wheat, barley, corn and forest species) at the level of ingénieur adjoint.

2. Conduct research on a variety of cultural practices: improved varieties, land preparation, soil tillage, rotation of crops, seeding rates, fertilizer use and weed control.

3. Adult education aimed at improving the technical knowledge of farmers and extension agents through the use of seminars and information days.

Sixty students are presently enrolled in the Institute and 26 diplomas were granted in 1978 and 22 in 1979. The teaching staff consists of 4 full-time professors (1 Tunisian, 1 Canadian, and 2 French) and 19 part-time professors who work full-time as specialists and technicians with government agencies or institutes.

The Institute manages a farm, including 440 hectares in wheat and barley production, 180 hectares in olive trees, 290 hectares in forages, and 690 hectares of uncultivated land. The Tunisian Government provides 60 percent of the Institute's funding while farm proceeds of the Institute cover the remaining 40 percent. The budget has grown steadily over the past 3 years: 1977, 60,000 TD; 1978, 125,000 TD; and 1979, 144,000 TD.

The director of this school, Mr. Daaloul, feels strongly that more applied research needs to be conducted to provide technological packages for dryland farmers and that extension programs need to be integrated so that farmers do not receive conflicting information from various agencies. Current plans and efforts in this direction are impressive considering the school's very limited staff and facilities. A program will soon be established in cooperation with a U.S. university to expand the plant breeding research program. A number of exchanges have been carried out with ICARDA (International Center for Agricultural Research in Dry Areas), located in Aleppo, Syria, in order to acquire some new barley and wheat varieties.

The Institute has a barley and wheat breeding program underway and plans to develop four kinds of trials or plots -- all of which would be on farmer's lands.

(1) Breeding trials: Plant varieties of bread wheat, durum wheat, and barley on farmer's fields in each of the 9 delegations. These varieties are presently being tested on the Institute's farm. These trial plots are planted in the delegations with the assistance of the research personnel to compare lines on different farmer's fields and serve as demonstrations to farmers as to on-going research activities. A decision will be made to release certain varieties in specific areas of the 9 delegations on a wider basis. This introduction and adaptation process will terminate with the release of the seeds to the market and to the government organizations which deal with wheat and barley productions.

(2) Agronomy trials: Fertilization rates, seeding rates and depth of seeding will be conducted on the Institute's farm and farmer's fields beginning in 1981.

(3) Demonstration Plots: The results of the agronomy trials will be demonstrated to the farmers in each delegation on two or three larger plots. Local extension agents would be responsible for these plots as well as organizing farmers' field days.

(4) Pilot Plots: These will be developed on the land of 2 to 3 good farmers in each delegation to test the entire package of techniques developed for the new varieties of wheat and barley, beginning in 1983 and 1984.

CTDA is going to have its extension agents work with the Institute in conducting the applied research and the trial plot work. The Institute plans to conduct training sessions for other extension agents, and eventually would like to produce bulletins and circulars for technical staff and extension agent use.

The Institute is presently confronting a variety of problems. Recruitment of full-time personnel is difficult, due to the salary differentials between teaching positions and research and extension positions for people with Master's or Ph.D. degrees. The pay scales tend to isolate some of the country's most highly trained and capable people in teaching jobs where they cannot address the immediate problems facing the agricultural sector. A second problem rests with the training of technicians and engineers at the more advanced agricultural institutes in French rather than Arabic. Much time must be spent by the technicians in learning the spoken language of the farmers and translating materials and information packages from French into Arabic. Efforts should be made to assemble available material for instruction from other Arab countries.

Ecole Superieure d'Economie et de Promotion Rurale-Moghrane

This Institute provides the seventh year of the secondary education for students coming from agricultural high schools. After completing the 7th year preparatory course, students can proceed into the 2 year college program which qualifies them to become ingénieur adjoint at the end of the program. The entering students select one of three areas of specialization: (1) farm management; (2) documentation; or (3) accounting.

The accounting curriculum focuses on methods of accounting and management of financial activities for different types of enterprises. The program in documentation teaches students skills in the techniques of library science, document storage and retrieval, and the preparation of abstracts and bibliographies.

The farm management program has particular relevance to the CTDA extension program. During the first year, general techniques of farm management, record keeping, cost-benefit analysis and decision-making are taught. Students select one of two sub-specializations during the second year: (1) management of cooperatives and agro-combinats or (2) extension and communication techniques. The extension-communication program was only introduced this academic year with 10 students being enrolled. The extension curriculum includes 53 hours of theoretical and 78 hours of practical training in the use of various communication techniques and equipment. The preparation of slide shows and film strips, the use of various types of projectors, the preparation of audio material to accompany the visual presentation, and the imaginative use of the flip chart, posters, murals, and 16 mm film are taught, during this second year.

As part of the training, students work with various agricultural agencies and prepare a communication package on a selected agricultural topic. This practical training takes place during the final 3 months of the 2-year program. On-the-job training with a government agency or a development project serves 2 functions: (1) familiarize the student with applied work and (2) provide the student with an introduction into an organization with the hopes of permanent recruitment. This second function should facilitate CTDA's recruitment of a communications specialist.

The staff at this Institute consists of 11 full-time professors who teach courses in the seventh year college preparatory section. There are 145 students presently enrolled in the 7th year program. The 2-year college program is staffed by 6 full-time professors and several part-time instructors. Sixty-eight students are enrolled in the first year and approximately fifty students in the second year.

The Institute gives short courses to train extension agents in communication techniques. It also trains reference and technical librarians in methods to collect and abstract technical journal articles.

Other Educational Institutions

1. INAT: Trains highly qualified technicians. 4-year program, Ingénieur de Travaux de l'Etat; 6-year program, Ingénieur Principale.

2. Ecole Superieure d'Horticulture-- Chott Mariem: Provides technical training in vegetable crop production.
   2 year program
   4 year program

3. Ecole Superieure d'Elevage-- Mateur: Trains technicians in livestock production with special emphasis on cattle.

4. Ecole Superieure de Pastoralisme-- Medenine: Trains technicians in arid agricultural production and livestock production (sheep and goats).

5. Ecole Nationale de Medecin Veterinaire.

6. Ecole Superieure d'Ingenieurs et d'Equipment Rural-Medjez el Bab.

7. Institut de Sylvo-Pastoral - Tabarka.

The seven above mentioned agricultural training centers would provide technicians with expertise in areas related to needs of central Tunisia. In recruiting new technicians for the CTDA extension program, graduates from these institutes should be carefully considered.

Suggested Ways to Improve Communication Links in the Extension Service

The following list of ideas should be considered in developing a responsive extension system which incorporates all participants.

Extension Agency to Farmer

1. Direct agent contact with farmer and demonstrations certainly are most important and must continue.

2. Agents need to be generalists. If their agency does not have the answers, they need to get them elsewhere.

3. Agents need to know about the economics of particular farming methods. Many extension programs in central Tunisia are heavily subsidized. Farmers seem more concerned with how to get more government aid than with the economics of what they are doing.

4. Field days, farmer days, possible meetings of farmers' cooperatives and organizations are all good ways to multiply the effectiveness of an agent.

5. Posters might be used to create awareness of new practices. These could be posted in public buildings, community wells and local open markets. Health information posters might be effective at community wells.

6. Signs can be posted at demonstration plots, attracting attention to the practices and giving information about the results.

7. Printed bulletins and newsletters could supplement other means of communication. Apparently these are not very popular with farmers, but they do have some advantages. Many practices are complicated and require exact amounts of chemicals, etc. It is difficult for a farmer to remember these if he only hears them. Through bulletins the farmer can store information for later use. Illiteracy should not present an insurmountable problem. In nearly all families there is at least one person who can read. This "dependent literacy" has been shown to be effective in many countries. Bulletins can extend extension information beyond the small percent of farmers reached directly by agents. Bulletins must be carefully prepared and written in the farmer's language. Furthermore, agencies must avoid the temptation to see who can put out the best looking publications. It is content, not packaging that is important.

8. Information bulletins might be distributed with farm supplies. That is, when a farmer buys supplies, or receives credit in kind, he would receive a bulletin telling how best to use that supply.

9. Slides are a cheap and effective way of communicating. It is better to produce these locally than in Tunis.

10. Of all the mass media, radio has the most potential here. Apparently most farmers have transistor radios. For much of the central region the station in Sfax would be the best outlet. Recording farmer questions and agent anxwers (as suggested by Albert Rollard, Lycee Agricole) would be an excellent idea. This would no doubt give recording quality below broadcast standards, but at least the notion of letting farmers determine the subject matter content of the program is an excellent idea. It is a way of using the mass media as a feedback mechanism -- something almost never done. This will provide farmers a chance to tell agents, radio programmers, and government agencies what problems they have and how they might like to see them solved. Other content could include presentations by agents, weather, descriptions of government programs, questions from listeners and possibly markets. It is quite likely that market situations are so local in nature that regional market information is not of much value. Producers of the program should keep farmers, not colleagues in mind, emphasizing content, not the slickness of the presentation. Nearly all of the material can be taped for the program. The station at Sfax could include weather and possibly current agricultural information live. After details are worked out, no one from this area should have to go to the station. Perhaps the program could be once a week -- produced by the Lycee Agricole. If others outside the immediate area wish to do similar programming, these areas could be featured on other days. The program format, however, could remain the same.

11. Films. DERV is already producing films in Tunis and there seems to be some interest to produce films here. Films are extremely expensive to produce. As a result, they tend to be used many years beyond the usefulness of the information they contain and in a much wider geographic area than that for which they have relevance. The lack of electricity in most rural areas necessitates the use of a generator. If produced, they should be filmed locally with local farmers. That is, they should show a local farmer carrying out practices correctly, not a researcher from Tunis giving recommendations and showing what works well on the experiment farm. Mexico has done some excellent filming of this type.

Extension - Education

1. The CTDA should encourage and fund field trials using technologies taught in the schools in order to test for potential adaptability in central Tunisia.

Interaction between teaching staff, students, extension personnel, and farmers would provide practical focus to course material and would reveal the actual complexities of farm production in central Tunisia.

2. The CTDA should sponsor selected teaching staff to travel to other Arab countries to assemble teaching materials in Arabic. Teaching technical subjects to students in Arabic will facilitate the communication process between extension agents and farmers.

3. The CTDA should sponsor workshops at agricultural institutes. The Institute would be responsible for preparing a short course on a prespecified theme based on technical needs of extension personnel. CTDA sponsorship of such workshops would give the institutes additional financial resources and would orient teachers and students to think about real problems which farmers, technicians, and program administrators confront.

4. A 6 to 8 week training course in the use of communication techniques should be given for all extension personnel at the Ecole Superieure in Moghrane. This Institute has the staff and the facilities to train extension agents in the use of a variety of communication techniques. Supplemental training should be offered to address broader ranging technical needs. Both in-country and out-of-country training courses should be available for the extension personnel. In-country training should consist of short courses or workshops at Le Kef, INRAT, Saiida Center, etc., while training abroad should be directed toward the International Agricultural Center of Wageningen in the Netherlands, or at agricultural institutes in Morocco, Syria, or the U.S. The International Agricultural Center in the Netherlands is recommended due to its special curriculum designed for technicians from developing countries, its course presentation in French, and its geographical proximity to Tunisia.

Extension - Research

1. Extension agents need to know what research is being done and how it applies in their area. This includes all agricultural research, not just that dealing with the specific crop or subject matter of their agency.

2. Every extension agent should have access to research results and recommendations in bulletin or newsletter form.

3. It would be desirable to have extension agents participate in applied research or at least know how it is conducted. They need to have some notion of the scientific process to know to what extent the research might be useful in their area. This information is also needed if agents are to set up local test plots.

4. Researchers need regular interaction with extension agents to know what farm problems need researching.

Inter-Agency Communication

This is a difficult problem, and yet the most critical communication task in the area. Each agency has its own programs and priorities. Agencies are often reluctant to cooperate with another agency because they have their own agenda. Furthermore, all agencies compete for the same scarce national budget funds each year. This too leads to competition. Facilitating the flow among agencies is probably the area in which the CTDA can do the most good.

1. Keep the bureaucracy under control as much as possible. Delegate authority; do not have all decisions made centrally.

2. See to it that agents in all agencies have information about recommended practices and the programs of various agencies.

3. Keep up informal contacts between various agencies.

4. Organize regional seminars on the problems of rural development with the participation of technicians from all relevant agencies.

ANNEX 5

LAND TENURE

In considering the fundamental problems facing the CTDA in improving the standard of living of the rural population of central Tunisia, the question of land tenure is of prime significance. Inheritance patterns and the long-term government policy of settling nomads have raised a series of difficulties for rural development programs. There are varying degrees of rights to land, ranging from outright ownership of a well-defined parcel of land, to vague use-rights governed by kin and clan traditions. Many of the users of the land have "holdings" which are so fragmented that many of the available technologies for making the land more productive are difficult to apply (for example, terracing, machinery, wells, water use, etc.). Other holdings have such vague or nonexistent titles that credit from the bank is difficult to obtain. This is especially true for medium and long-term loans.

In an attempt to encourage better utilization of the land, the government embarked on an extensive program to issue titles and establish private ownership to what was once collective or communal land managed by a kin group. This strong emphasis on the establishment of private property probably emerged after the failure of the cooperative movement in the late 1960's. In an effort to protect the rights of individuals to land, the government may in fact be hurting many farmers currently practicing agriculture and pastoralism. The country's long-standing procedure governing communal grazing areas and family and clan operations should be constantly evaluated instead of being eliminated altogether. Careful analysis of the role of "titling" in the pattern of land use and exploitation needs to be undertaken before a final general push toward titling is made. In some instances the land title can actually be the means of freezing out the rights of the small-scale farmer. In other cases it may encourage over-utilization of the land, thereby jeopardizing the fertility of the soil. It is probably a good idea to keep in mind that the system of "rights to use of land" could be envisaged as a pragmatic mixture of private property and public control for the long-term benefit of the whole population.

In order to gain a better perspective on the land tenure issue, we need to take a close look at the categories of land tenure in the region.

There are seven such categories:

1. Collective land. This category includes all communally owned lands whose use was confined to segments of the tribal populations. These lands have been subject to numerous governmental legislation beginning in 1901 and continuing until the present. The law maintains that a person must be living on the land and farming it in order to obtain a title. Some titles are given to groups for communal pasture purposes. Of the roughly 826,000 hct. in the governorat of Kasserine, 385,000 hct.

are classified as collective lands. 94,000 hct. have been liquidated and titles granted to individuals (or in some instances groups). 72,000 hct. are currently in the process of being liquidated, while 219,000 hct. remain in the collective category. The lands that have been liquidated and the ones currently in the process of liquidation (total 166,000 hct.) are benefiting 4500 families. 15% of the titles granted went to groups (most typically brothers who opt for collective ownership).

In pre-independence days, the collective lands were public grazing lands, alfa land, and lands where occasional cereal cultivation was practiced. The Beylical decree of 1901 gave these lands their legalistic nature. The administration of collective lands at the local level was the responsibility of members of the Arsh (the local descent group). In the region, the collective lands were divided into sixteen groupings, each administered by an arsh. These groupings were given civil boundaries and became administrative units which evaluated and recommended the titling procedure. A "Conseil de Gestion" operated within each unit; its members were elected by the local population from among clan notables, and each served a five-year term. The Conseil de Gestion evaluates the criteria for making title changes and makes recommendations on the applications presented to it. The application and the recommendation is then sent to the "Conseil de Tutelle Regional" which is chaired by the governor. Other members of this "Conseil" include representatives from the Farmers Union, the Ministry of Justice, the Ministry of Agriculture, the Délégue and a representative from the local branch of the Destour party. If approved, the application is then sent to the Ministry of Agriculture in Tunis for final approval. The governor would then be in a position to issue the title to the farmer. It is the policy of the government, and the governor, that each farmer obtain a title to his land.

2. State Lands (Terre Domaniale). This category is comprised mainly of land that was formerly owned by foreigners (colons) before it was nationalized and made into government farms in 1962. A smaller percentage of state lands was acquired from private landowners who failed to improve the lands as defined in earlier contractual agreements.

These state farms are operated by a staff of professionals and workers/farmers, some of whom had worked on the farm since colon days. There are two state farms (known as agro-combinats) in the governorat of Kasserine. "El Khadra" is in the delegation of Sbeitla and covers a surface area of 17,400 hct. out of which 60 hct. is irrigated, and most of the rest devoted to cereal cultivation, arboriculture and forage. The farm adjacent to the city of Kasserine is called "Oued Derb" and it covers 2664 hct. mostly irrigated with some arboriculture (olives, almonds, apricots, pears), cereal cultivation, and forages. In addition, there is a large dairy operation with 86 milking cows.

An additional 2400 hct. of state lands exist in the governorat of Kasserine. Most of this land has been rented to farmers with the intention of selling it to them in the future. Finally, there are approximately 32,000 hct. of state lands in the form of forests.

3. Rural Parcels (Lotissements Ruraux). This category includes 12,778 hct. of formerly State lands which was incorporated in the large cooperatives in the sixties. Of these, 10,778 hct. have been given or returned to private ownership and 2000 hct. are in the process of final liquidation.

4. Forest Lands. This is essentially rough mountainous terrain little used by the population. 149,000 hct. of forest land exist in the governorat of Kasserine and they are managed by the Forestry Department.

5. Private Property. The lands under issue here are of two types:

a. Lands of Extreme Indivision (Terre d'Extreme Indivision): These lands have no previous history of established titles, and are characterized by the multiplicity of claimants or potential beneficiaries. In 1974, a procedure was established whereby a claimant could obtain a "certificate of possession" in lieu of a title, when he so requested. Once a request for such a certificate is made, it would then be advertised, inviting any countering claims to the land. If there were any counter-claims, the courts would adjudicate.

This procedure soon proved too slow and inconclusive and did not lead to clearly fixed boundaries. As a result, the law was changed in 1977 so that the same procedure used in liquidating collective lands could be applied to lands of extreme indivision.

The land titles office (Service Foncier) was given the responsibility to make any evaluation of the request for titles and recommend initial action. Before making final recommendations, the office conducts studies in the technical and social aspects of the land situation, thereby insuring that their recommendations are based on thorough study of all aspects of the tenure situation.

In its charter, the CTDA was given the responsibility for making these studies and recommendations on the land tenure issue (Article No. 3 of law 78 - 44). To date, however, the CRDA Land Titles office is continuing to make the studies awaiting its transfer to CTDA.

b. The second type of private property consists of lands held in the private custody of families for a number of generations. Such lands usually have what is known as an "Arab Title." These lands

are characterized by multiplicity of owners with undefined and ill-understood boundaries. Most of these lands are concentrated in the northern delegations of the governorat of Kasserine.

6. Public Irrigated Perimeters (PPI). These are lands which benefited from the government's program of deep well drilling and water channel construction, started in the sixties. These lands are in various stages of titling, and they are used mainly for vegetable growing and some arboriculture.

7. "Terres Incultes." These are essentially unused and unuseable lands, similar in nature to forest lands but not under the jurisdiction of the Forestry Service.

The attached Table gives the amount of land in each category discussed, divided by delegation for the governorats of Kasserine, Sidi Bouzid, Siliana, Gafsa, and Kairouan (prepared by the Planning Cell of CTDA and based on data obtained from the CRDA). The figures are approximations. It is obvious from the above discussion that the land tenure situation in the region could best be described as "historically undefined." Problems of "ownership" vs. "use" abound; these issues need to be resolved or at least addressed early on to insure maximum success for rural development efforts in the region. The main issue is how the system of land tenure could affect the potential for better utilization of the land in order to insure improved income for the rural farmer. Social aspects of land tenure are to be addressed and understood. The dynamics of extended family rights vs. nuclear family rights must be evaluated. It appears that in cases of conflict, every attempt is made to resolve the conflict locally with courts being the last and least desirable resort.

State policy to title land should be carefully implemented, but only after the land- and water-use studies, in conjunction with an assessment of the effectiveness of existing clan regulatory mechanisms. It is recommended that resources of the extension support unit be utilized to this end.

GOUVERNORAT OF GAFSA

Type of Land / Delegation	Gafsa Nord	Sened	El Guettar
Collective Land.....	81.182	32.916	81.182
Terres Incultes.....	30.000	30.000	30.000
State Land.....	N.A.	N.A.	N.A.
Rural Parcels.....			
Private & Extreme Ind....			
Public Irrig. Perimeters.			
Forests.....			

GOUVERNORAT OF SILIANA

Type of Land / Delegation	Makthar	Rohia
Forests.....	26.760	14.280
Terres Incultes.....	7.210	16.720

GOUVERNORAT OF SIDI BOUZID

Type of Land / Delegation	Sidi Bouzid	Ouled Haffouz	Maknassy	Mezzouna	Regeub	Ben Aoun	Djelma
Collective Land.....	30.550		72.828		91.194		
State Land.....	21.023		42.273	16.000	7.562		
Private & Extreme Ind....	70.927		39.763				
Public Irrig. Perimeters.	867.640						968
Forests.....	40.500		32.000	16.000	7.500		

GOUVERNORAT OF KAIROUAN

Type of Land / Delegation	Haffouz El Ala	Kairouan Nord	Bouhajla
Collective Land.....			7.000
State Land.....	2.763		5.005
Forests.....	20.000		
Terres Incultes.....	11.500	12.700	8.000

GOUVERNORAT OF KASSERINE

Type of Land / Delegation	Kasserine	Feriana	Foussana	Thala	Djedlianne	Sbiba	Sbeitla	Total hct.
Collective Land.....								385,000
State Land.....	2664			1.012	500	110	17.400	
Rural Parcels.....								
Private & Extreme Ind....	2317	65.470	60.700	63.707	55.500	28.151	75.500	
Public Irrig. Perimeters.		370	212	175		1.667	532	
Forest.....		15.754	32.090	28.830	23.000	12.959	32.900	
Terres Incultes.....			3.700			8.176	23.300	

ANNEX 6

CREDIT

Credit is often a key element in the implementation of new farming practices. Not only can it remove a financial constraint, but it may provide the incentive to adopt new technologies that would otherwise be accepted more slowly. No amount of credit, however, can guarantee an increase in farmer productivity or an augmentation of rural incomes. Other factors must be considered simultaneously, including the availability of complementary inputs and extension services, sound credit policies, well managed institutions and appropriate delivery and marketing channels.

Agricultural credit in central Tunisia can be obtained from a variety of different sources: The National Bank of Tunisia (BNT), Central Tunisia Development Authority (CTDA), Government Assistance Funds, and World Food Program (PAM). The BNT provides short-term, medium-term, and long-term credit. Short-term credit is supplied at 6 percent rate of interest for the duration of the crop year. Credit can be obtained from one of two funds: the BNT Fund or through the Societe de Caution Mutuelle (SCM). The majority of dryland agricultural producers obtain credit through the SCM. To obtain short-term credit for the purchase of seedlings and other agricultural inputs used in the production of cereals and vegetable crops, a farmer does not have to furnish legal title to his property as long as the ommda will verify the amount of land the man cultivates. He must cultivate, however, at least ten hectares of land. Farmers join the SCM in order to provide a guarantee for the loan. Most SCM's are comprised of 200 members or less and each member must pay dues of at least 5 TD. An SCM is formed once a fund of 1,000.000 TD has been obtained. Within the Gouvernorat of Kasserine, 34 SCM's operate, in addition to the SCM's in Kairouan, Gafsa, and Sidi Bouzid.

The delivery mechanism for short-term credit can be briefly summarized as follows:

1. The farmer must get verification from the ommda that he is actually cultivating the land. This written verification is approved at the delegation headquarters and then at the UNA. It is then delivered to the BNT.

2. With the assistance of an agricultural extension agent from the CRDA the loan application is submitted to the BNT.

3. The BNT has the application reviewed by the technical service of the CRDA (Regional Office of Ministry of Agriculture).

4. Then the loan application is reviewed by a local committee comprised of six members. The six members are representatives from the

BNT, Ministry of Finance, Ministry of Agriculture, President of the SCM, Cereals Office, and National Farmers' Union (UNA).

5. The loan application normally takes 45 days to be processed.

In 1979, only 2 percent of the short-term loan applications were rejected. Credit is normally extended in kind, but some cash credit is extended to pay agricultural laborers. The default rates tend to be very high, often 30 percent or more. If a farmer defaults 2 consecutive years on a loan, he will be refused a loan the third year.

Medium-term and long-term credit can be obtained through special funds administered by the BNT but financed by the Ministry of Agriculture. These public agricultural credit funds consist of the following: FOSDA - Special Fund for Agricultural Development, FAPI - Special Fund for Development of Irrigated Perimeters; BIRD - International Bank for Reconstruction and Development; FAI - Special Fund for Irrigation Projects; FSA; PDR - Program for Rural Development.

Approximately 80 percent of the medium and long-term credit is provided by FOSDA. The FOSDA fund was established in 1963 to assist small and medium-sized farmers. The government lends its own funds to the B.N.T. which, in turn, relends the funds to small farmers. FOSDA credit is available for a variety of agricultural activities - livestock, machinery, irrigation equipment, planting tree crops, soil and water conservation, rural buildings, and fisheries. Medium-term credit is available for 2 to 7 years while long-term credit is available for 10 to 20 years, both with a 6 percent rate of interest. Longer term credit is available for investments which will not materialize immediately, such as planting of tree crops and soil and water conservation. The main condition for access to long-term credit is land title. FOSDA credit is granted with subsidies ranging from 10 to 20 percent, depending on the nature of the investment. Self-financing ranges from 10 to 20 percent.

The delivery mechanism for FOSDA funds is as follows:

1. The farmer contacts the closest branch of the BNT for his area and expresses his needs on a six-copy request for credit delivered by the bank office.

2. The BNT informs the CRDA which sends one technical agent to the farm to evaluate the real needs of the farm.

3. The BNT informs the CRDA as to the credit worthiness of the farmer.

4. The CRDA gives the BNT a technical evaluation of the investment under consideration for the particular farmer.

5. The Credit Committee meets weekly to approve or disapprove loan applications. The Credit Committee is comprised of members from the following institutions: BNT , Ministry of Plan, a representative of each technical department of the Ministry of Agriculture, UNA.

6. The entire process should not exceed 45 days.

Any loan application exceeding 3,000 TD must be reviewed at the national level by the Ministry of Agriculture and the BNT. From 1970 to 1979 the annual amount of loans used by the FOSDA program increased from 3,700,000 TD to 15,977,000 TD and the number of credit recipients increased from 3,000 to 33,000 (10 percent of all farmers). Repayment rate has been very low; 30 percent for 1978.

The FAPI program is a German fund directed to assist farmers in the irrigated perimeters. Technically, it is operated in the same manner as the FOSDA program. Most credit is supplied to finance well equipment, such as motor-pumps and canals or animal husbandry. For 1979, FAPI extended 235,000 TD in credit to 238 farmers.

The BIRD Fund supplies credit for tree orchards, construction of barns, and mechanization of agricultural production. Generally, 60 percent of the total credit is a loan, 20 percent is subsidized, and the remaining 20 percent must be financed by the farmer. Most BIRD loans are extended for medium-term periods.

The CRDA operates a special credit fund for agricultural producers in central Tunisia. Credit-in-kind is extended for the crop year for seeds, fertilizers, insecticides, forages, irrigation equipment, farm tools, and rental of farm equipment. The credit is directed toward farmers practicing irrigated agriculture. The farmer pays 30 percent of the cost of the inputs initially and repays the remaining 70 percent at the time of harvest.

Approximately 2 to 3 months before the agricultural season begins, the extension agent makes an evaluation of the farmer's needs. The agent makes this evaluation during the months of June and July for the winter season and during the months of October and November for the summer season. The land area to be cultivated is assessed and the input requirements are determined accordingly. Each extension agent sends his evaluations to the Regional Office of the CTDA (one is located in each delegation). The representative of the regional office then aggregates the needs of all producers for the entire delegation. Each representative then sends the completed order form to the Department for Supplies and Credit-In-Kind of the CTDA in Kasserine. The director of this department in Kasserine then requests prices for the required inputs from a variety of different suppliers. After determining the most economical sound purchase plan, the director puts together the

order form according to quantity needed per input, supplier, and price per unit. This order form is submitted to the PDG of the CTDA for his signature and then forwarded to the suppliers. The supplies are sent to the main office and then distributed to the regional offices. The farmer collects his supplies at the regional office. This system eliminates the need for the farmer to visit the main office in Kasserine for submitting his loan applications or collecting his supplies.

CTDA credit is provided to all farmers practicing irrigated agriculture as long as they can prove themselves to be credit-worthy. There is no interest charged on this credit. At each regional office, there is a person responsible for collecting the balance of the credit extended at the end of the agricultural season. If the CTDA credit fund cannot cover all loan needs, a special request for additional funds can be submitted to the Ministry of Plan for an advance.

PAM has a credit loan program designed to reach the poorer dryland farmers. PAM loans (which are partly grants--only 60 percent must be repaid) can be used for several purposes: (1) to increase forage crop production with a five year period of repayment; (2) to introduce tree crop production with a ten year period of repayment; or (3) to diversify livestock production, apiculture, aviculture, rabbits, and sheep. In the Gouvernorat of Kasserine, approximately 90 percent of the farmers belong to PAM cooperatives through which grants and loans are distributed. PAM cooperatives also operates in the Gouvernorats of Kairouan, Siliana, Gafsa, Sidi Bouzid, and Medenine.

There is a common thread running through all of these credit programs. The default rate is very high. In addition, the credit programs supervised by the BNT require that the farmer interact with a number of different actors during the review of his loan application, and this process tends to be very lengthy and time-consuming. Therefore, the delivery of required agricultural inputs often comes too late for effective use in increasing production.

An effective extension service must communicate new technological developments to farmers and also provide a means to finance new investments. The field agent having personal contact with the farmer must be able to inform the farmer of all of his credit alternatives. The extension agent assisting farmers in obtaining credit from the CTDA Fund might provide information and assist in loan applications for medium-term and long-term credit provided by the Special Government Assistance Funds of the BNT. If the agent is working closely with the farmer he should be able to provide the technical evaluation of the loan application which is normally undertaken by a representative of the CRDA. This will eliminate one step in the loan application process and hopefully expedite the delivery of credit. In addition, if the agent furnishes new cultural practices, assists in the procurement of credit, and supervises production methods, high yields are more likely to be realized. This will enhance the farmer's ability to repay the credit extended.

A fund for direct aid might be established at the CTDA. This aid should be directed toward farmers who are undertaking the cultivation of new crops, new varieties, or practicing new agricultural techniques on demonstration plots on their land. It would provide a stimulus to implement research findings and would provide a certain degree of insurance against possible losses. Successful cultivation of the new varieties and/or crops would have a positive demonstration effect on other farmers in the region.

As new agricultural technology is extended to the dryland areas in Phase II of the project, the CTDA fund should extend its services to dryland farmers working with the CTDA extension staff. The credit program would serve farmers in the dryland sector in the same manner as farmers in the irrigated sector. Farm input needs would be assessed by the extension agent, a farm plan would be designed, and then the loan application would be made. The program would continue to operate as a supervised credit system.

ANNEX 7

THE ROLE OF FEMALE EXTENSION AGENTS

The role of women in agricultural extension programs in Tunisia is very limited indeed. Of the twenty-eight centres for agricultural training in the country (Centre de Formation Professionelle Agricole), only two are reserved for women. This is largely due to two factors - (1) the segregation of the sexes in the traditional rural sector and the ideology pertaining to male/female roles and status which underlies this segregation, and (2) the gradual decline in the percentage of people engaged in agriculture and the growing feeling among many rural women that their "emancipation" and increased status will come from their pursual of non-agricultural, income-generating avenues.

The general decline in the population's involvement in agriculture can be seen in the following table which evaluates the Tunisian labor force from 1956 to 1975.

Table 1

Kind of Service	1956	1966	1975
Agriculture	74.7%	45.9%	39.9%
Mining Industries	1.3%	2.5%	2.0%
Food Processing	6.8%	10.6%	17.3%
Construction and Public Work	2.4%	6.0%	10.4%
Electricity, Water & Gas	0.2%	1.3%	0.9%
Commerce, Banking, Real Estate	5.3%	7.5%	9.4%
Transportation	2.2%	3.9%	4.3%
Services	7.1%	21.8%	16.2%

Whereas these figures reflect the employment patterns of the male segment of the population, one could nevertheless extrapolate certain observations concerning the women's participation in the labor force. One main observation is the gradual decrease in involvement in agriculture for both males and females in favor of other jobs. The one notable increase, as far as the females are concerned, is in the area

of food processing industry. It is the industry that is most open to the women, and one where many seek refuge in their attempts to transcend their agricultural heritage -- which brings us to the main issue, i.e., training for female extension agents.

There are some major difficulties in trying to assess what can be done to expand and encourage women to participate in extension activities. Most girls who enroll in the above-mentioned centers do so in the hope of getting some kind of career; some enroll because their families send them, still others go there without really knowing the reason. Consequently, one encounters a varied group of girls in the school with different backgrounds and different interests and prospects. The schools do not take an active part in placing their graduates and according to Madame H. Chabaane of DERV most graduates end up working in food processing plants. A very small percentage make their way back to the farm and apply their knowledge in the rural areas.

The centers for training of women are found in Thibar (Gov. of Beja) and in Sidi Bouzid. The education in these centers consists of three stages lasting for a period of 2 years. These stages are:

(1) General Education--25% time is spent on general education

(2) Social Training (Home Economics)--30% time spent

(3) Technical Training--45%

General Education consists of courses on civil and religious duties. Social Training emphasizes home economics, cooking, child care, nutrition, and public health. Technical training consists of courses and demonstrations on basic subsistence: poultry, vegetable growing, care for animals, use of pesticides, methods of fertilization, and general principles of plant and animal care. Unfortunately most of the girls who graduate after two years fail to take their knowledge to the rural areas where it is needed most.

There is another institute for high-level training of women -- the Center of Sukrra outside of Tunis. Girls who complete this four-year course graduate with an Adjoint Technique certificate. There are currently seven such institutes in the country with Sukrra being the only women's center. The Ecole Superieure at Moghrane trains female extension agents presently and a number of girls are enrolled. It is recommended that the CTDA recruit female extension agents from the institute at Moghrane. Special incentives in the recruitment process may have to be made to encourage those women to work for the CTDA in Kasserine.

Despite the presence of these few centers for the training of women, there is still a general feeling that the role of women in extension

activities is not really, and probably never will be, great. A girl who enrolls in a center to become an extension agent is faced with numerous obstacles, ranging from family needs to use her training in extension for purposes other than agriculture, to social pressures upon her return to her community. Nevertheless, it is important to pursue and encourage the training of women in extension work. The spread of labour-intensive irrigation farming in the region is going to mean more female participation. Increased female participation, in turn, means added need for women extension workers, who can help in information dissemination not only in the house, with domestic chores, but also on the farm, with technical expertise.

ANNEX 8

ISSUES

I. THE PUBLIC IRRIGATED PERIMETERS AND THE CTDA

Evolution of the PPI

In the early sixties, the national government began an ambitious program of investing in deep wells and canals (made of concrete) to transport pumped water around a "perimeter" extending through several hectares of land. The water irrigated the lands of those farmers having gardens within the perimeter. In some of the PPI's, the newly irrigated land has been redistributed to new owners, on a more or less egalitarian basis, while in other PPI's the newly irrigable land has remained in the hands of farmers who originally owned and/or cultivated the area.

The OMVVM (Office de la Mise en Valeur de la Vallée de la Medjerda) initially supervised the irrigation projects in the northern valley of the Medjerda River, but its responsibilities were soon extended to other PPI's throughout the country, including the PPI's in the Governorat of Kasserine and Sidi Bouzid. In 1979, the technical staff, extension agents, equipment, and infrastructure of the OMVVM was transferred to the CTDA At the same time, the CTDA was assigned the responsibility of increasing productivity of lands irrigated by shallow wells.

These new responsibilities have given the CTDA specific functions to carry out in the region. At the same time, by inheriting the functions of the OMVVM, its procedures, and its staff, the CTDA has inherited a peculiar problem: how to work with farmers who were recently dryland farmers and herders, and who have a special relationship and opinion of governmental offices and programs through the PPI. The relationships between the OMVVM and the farmer of the irrigated lands has important implications for the development of an CTDA extension program which will begin with these farmers in the nine target delegations.

Problems and Potentials

The traditional form of pastoral farming coupled with the introduction of sedentary irrigated agriculture through government investment in wells, has produced a series of technical and social problems. On one hand, the farmer, by not being the initiator of the irrigation project, and thereby not understanding its implications, usually does not know the techniques required to practice irrigated agriculture. His reactions may be quite mixed, as in the

case of one farmer interviewed in the FAO study of 605 farmer families on 8 PPI's in 1977: "Je déteste les cultures irriguées à cause de l'eau; on est toujours dépendant de l'eau. Je préfère l'arboriculture en sec; la pastèque en sec." Such a reaction would not likely be found with a farmer who had dug his own well and learned to use the water and think about its capabilities and problems gradually, at his own volition.

In the construction of the PPI, drilling rigs arrived on the semi-desert lands and dug the well; teams built the canals; regulations were announced as to the price of water; and a water allocation system was established. Extension agents began to implement their regulations, to educate the farmers in cultural techniques, and to offer the farmer credit and seeds. In many cases, the farmer developed a love-hate relationship with the OMVVM. He was thankful that he had access to the water, but at the same time, he was resentful of being dependent on the OMVVM for the water and other inputs. As one farmer observed:

> "Si je continue avec la Medjerda, un jour ou l'autre je serais en prison, parce qu'il y a toujours des problèmes: pour l'eau, pour les semences, et avec les voisins qui mettent dans le canal la terre qui, par la suite, vient boucher les siphons dans ma parcelle" (p. 65, FAO).

Certainly, the "Medjerda" introduced itself suddenly and dramatically into the lives of the pastoralists who had been living on this land or around it for generations.

The extension agent had a difficult task to accomplish. He had to try to convince these formerly dryland farmers of the proper way to use water to grow various types of crops. Recognizing these problems, the government gave the agent certain tools with which to work, including grants in aid, credit in kind, and machinery. The agent was, however, the controller of water use, the collection agent for the OMVVM's charges for the use of water, and the collection agent for unpaid loans.

The agents in many cases were also young men, having to deal with strong-willed heads of large extended families, with their own ideas about agriculture, and government agencies. Negative attitudes of governmental bureaucracies and the agent which represented them were often reinforced when the OMVVM did not get the promised seeds, water, tractors, fertilizers to the farmers as scheduled. Farmers incurred losses in income due to poor delivery of inputs which was seen as the fault of the extension agent.

This history of farmer-agent relationships, of course, is not all negative. There are many dedicated, well trained agents who have

managed to develop good working relationships with farmers on the PPI. The FAO study yielded many good opinions of the OMVVM: "Elle encourage les agriculteurs, elle s'occupe de l'eau et des semences" (p. 158).

The efforts of these agents and farmers have helped to dramatically change the land use patterns and the productivity of the PPI. Nonetheless, problems exist and the productivity of the PPI has not been as high as it might be. Agents have had difficulties in working with farmers. Farmers wait for the state to act and do not take the initiative. Technologies are not developed and diffused as rapidly as they might be. These problems are, in part, the reasons for the first phase of the new extension project in the CTDA.

Phase I of the Extension Project

Specific activities are being designed in the first phase of the project to help resolve some of the problems in the PPI.

1. To the extent that productivity is a result of the farmer not having the properly tested and adapted seeds and other inputs, the project is putting great emphasis on critically examining the available technology, testing it, and selecting the most suitable techniques for the central region. This is one purpose of the proposed extension experiment station, the demonstration plots, and the communication service unit.

2. The smoothness of agent-farmer relationships is a function of many factors. Assuming that negative attitudes from the past can be somehow separated from the present, the agent must proceed carefully, with new recommendations. His methods for working with farmers should include contacting farmers who are recognized as community leaders. In the Tunisian context, this does not mean that the agent will be working with larger farmers, but rather that within the group of small farm operators who have access to the PPI in the first phase, he will attempt to use local cooperative communication channels personified in the "agriculteur de liaison."

   The agent will also be trained to attend to problems of the farm family. If the family should have a health problem or a difficulty with housing or electrical installations, the agent will be ready to help the family contact the proper agency or organization.

   The capacity to understand the farmer's problems and to mutually work out a solution should contribute to building a trusting relationship between agent and farmer. By building housing facilities for the agent on the land, the agent will be a permanent part of the community thereby allowing him to develop a closer exchange with the farmers.

3. The definition of the proper role of the state -- as a partner in the production process or as a supplier of limited services to the producer -- has a large effect on farmer initiative. If the farmer waits for his partner (the state) to act, to deliver the seeds, to plow the ground, and if that partner is a centralized bureaucracy with its own organizational problems, both partners will be disappointed, particularly the farmer. In the initial stages, the CTDA should attempt to resolve this problem. One proposal is for the farmer and agent to enter into a specifically defined contractual relationship, where certain inputs will be provided by the state as a way of demonstrating the appropriateness of these inputs or technologies for a one or two year period. At the end of this period, the farmer can work with the agent to get credit or buy the desired technology, but the agent would end his "partnership" role. Also, production inputs should be closer to production areas. This can be done by building a small storage area close to the PPI, which is being planned as part of the structure for housing the extension agent on the land. The purchase of 8 small tractors for the use on demonstration plots is also designed to help solve some of the logistics. But again, these tractors will only be used on a limited basis, with a well defined beginning and end.

Phase II: Dryland Farming Systems and Extension

By beginning with the PPI farmers, the CTDA can take advantage of its staff, their location, knowledge of the communities and infrastructure. However, the main challenge is in dryland farming, in which over 70% of the farm population is engaged. The harsh climate and only slight possibilities of success in farming for already poor families makes the development of rainfed agriculture in the central region a particularly challenging task. The fact that the PPI farmers are also heavily engaged in dryland activities provides an immediate link of dryland concerns with the Phase II of the project. Over 90% of the farmers with irrigated land in the PPI also have dryland plots. On the average for every hectare in a PPI, there are nearly 6 ha. of rainfed land linked to it through the various farming enterprises.

During the latter part of Phase I, the agents will begin to work with farmers concerning technologies related to the productivity of rainfed agriculture. In Phase II of the project, farmers in the area completely dedicated to rainfed agriculture will be incorporated into the extension project.

II. THE SCOPE OF EXTENSION

The term "extension" used by most government service organizations providing extension services in central Tunisia refers primarily to the diffusion of agricultural technology from scientists and technicians to the farmers, often viewed as ignorant and stubborn by the technicians. The objective must be to create and use an extension structure with a more humble style, dedicated to learning on the part of both the farmer and technician, and a willingness on the part of the agent to hear and help with all the problems of the farm family. The project makes this orientation explicit, but its implementation will depend on how committed supervisors and agents are to it and how available resources are to begin to meet non-production needs. At any rate, the style of extension as practiced in this project should be monitored and evaluated periodically.

III. INTER-AGENCY COMMUNICATION

Relationships of the CTDA with the other "line" agencies working with rural development are of critical importance. The CTDA is a new organization which cuts across many administrative and institutional lines and is bound to come into conflict with other agencies. On the other hand, the problems of rural development of the central region are so great that resources will always be in short supply. This can help forge cooperation among agencies, or alternatively, create greater conflict. The project attempts to address this issue by developing a strong service orientation, with the CTDA supporting the ongoing activities of other agencies rather than competing with them. Periodic workshops and seminars with other agency personnel and their involvement in the planning, implementation, and evaluation of CTDA projects would also help reduce inter-agency conflicts.

IV. TECHNICAL COMPETENCE AND DEDICATION AMONGST EXTENSION PERSONNEL

Living and working conditions in central Tunisia are less attractive than in Tunis or along the coasts. It is more difficult to recruit dynamic, competent, and dedicated technicians to work on the project. The project attempts to address this problem by providing the extension personnel with vehicles, production equipment, and formal training to augment their technical expertise, thereby increasing their contribution to society.

V. INTRA-AGENCY COOPERATION OF THE CTDA

The final issue concerns the coordination, cooperation, and communication among the various divisions and project personnel of

the CTDA. The definition of tasks of the Planning Unit and the Extension Unit are of particular importance. The Planning Unit should provide the technical expertise to help develop new projects, to monitor the progress of ongoing projects, and to conduct socioeconomic, land use and water use studies. This would provide direction to all CTDA programs. The Extension Unit should be a widely used service unit, helping with the design of communication programs for the agricultural and the non-agricultural projects which the CTDA undertakes in the future. The functioning of this intra-agency communication deserves special attention.

ANNEX 9

THE CTDA ORGANIZATION

A brief description of the six departments within the CTDA is included in the following pages. The activities and the staff personnel within each department are outlined. In addition, the existing extension service within the Department of Animal and Plant Production is charted. This organizational chart indicates the location of field offices, number of field agents, and level of training of the agents.

FUNCTIONS OF THE INDIVIDUAL DEPARTMENTS WITHIN THE CTDA

Each department is directed by an agricultural engineer with a degree from an agricultural university equivalent to a B.S. or an economist with a degree equivalent to a B.A. The only exception is the Planning Cell which has no director but a staff of 6 economists. In addition, each department has a staff comprised of agricultural engineers and/or economists, clerks, and a secretary. Each director is directly responsible to M. Bougatef, the Director of the CTDA.

1. Cellule de Planification (Planning Unit)

   The six economists are engaged in designing an information system for central Tunisia. They are collecting data on social, economic, environmental, and institutional variables from secondary sources. This data will be used in identifying regional needs and constraints for the sixth 5-year Plan. At the present, all of the work of the Planning Unit is focusing on preparation for the design of the 5-year Plan for central Tunisia.

2. Service de Production Animale et Végétale (Department of Plant and Animal Production)

   This department is headed by an agricultural engineer from INAT and staffed with 47 agricultural engineers working throughout the initial target area of central Tunisia. This department has taken over the work of the OMVVM on the irrigated perimeters and the FAO-SIDA project in the Gouvernorat of Sidi Bouzid which worked both on the irrigated perimeters and with farmers owning private surface wells. The department provides technical assistance to farmers, access to credit and farm inputs, and advice on annual farm plans. At the present, this department is the most active and oversees the greatest number of activities within the CTDA. Agricultural engineers are working in the following delegations: Djilma, Djedlianne, Makthar, Kesra, Rohia, Sbiba, Sbeitla, Ferianna, Foussana, Thala, and in the southern region of the Gouvernorat of Sidi Bouzid.

3. Service d'Amérlioration des Conditions de Vie (Department for Improving Rural Living Conditions)

   This department is headed by an agricultural engineer who is a graduate of INAT. His staff consists of 2 to 3 agricultural engineers and several clerks. This department is charged with responsibility for supervising activities related to electrification, health, potable water, agricultural roads, and collection centers for agricultural produce within the rural areas.

4. Service des Grands Travaux Hydrauliques (Department for Agricultural Irrigation Systems)

   This department is headed by an agricultural engineer who is a graduate of INAT. His staff consists of several agricultural engineers and several clerks. This service has responsibility for maintenance of the large irrigation systems on the agricultural lands. The technical staff monitors the irrigation systems and repairs any malfunctions in the system. In addition, the technical staff collaborates with DRES to identify potential water sources for spring and well development.

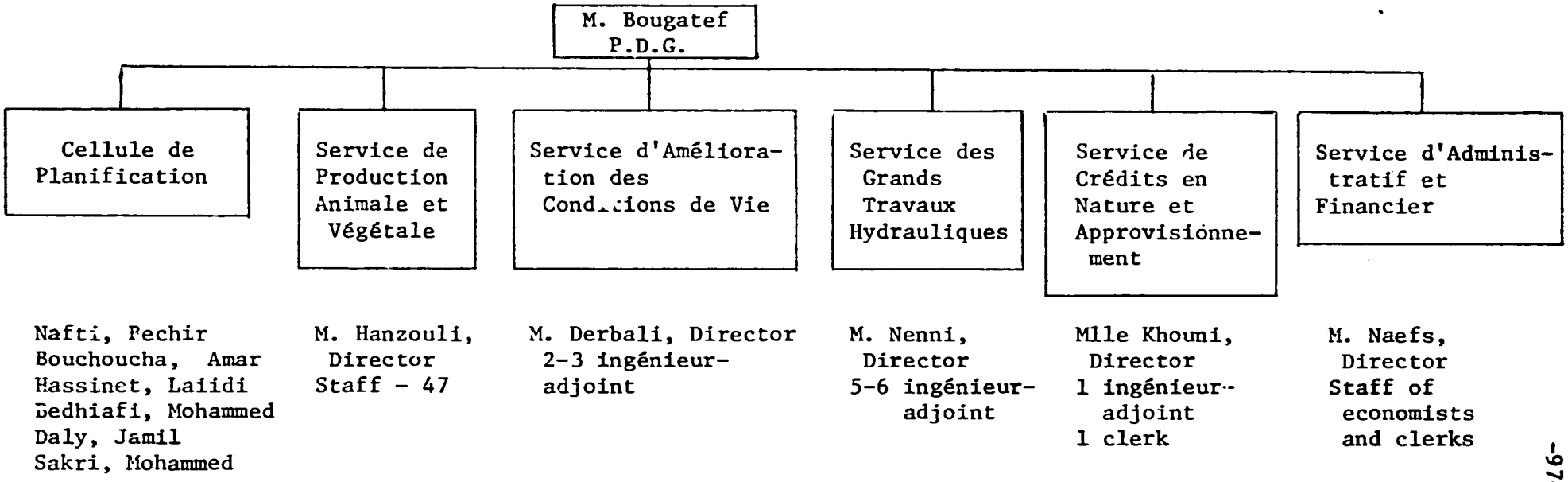
5. Service des Credits en Nature et d'Approvisionnement (Department for Supply of Agricultural Inputs and Credit-in-Kind)

   This department is headed by an economist who is assisted by an agricultural engineer and a clerk. There are regional offices of this department in each of the delegations. The regional offices are responsible for assisting the farmer in making his annual farm plan, determining agricultural input requirements, and facilitating the acquisition of these supplies through the credit-in-kind program operated by the CTDA. Farmer credit demands are made at the regional offices and the farmer collects his credit-in-kind from the regional office. The central office in Kasserine is responsible for purchasing the supplies in bulk quantities and distributing them to the regional offices.

6. Service d'Administratif et Financier (Administrative and Financial Department)

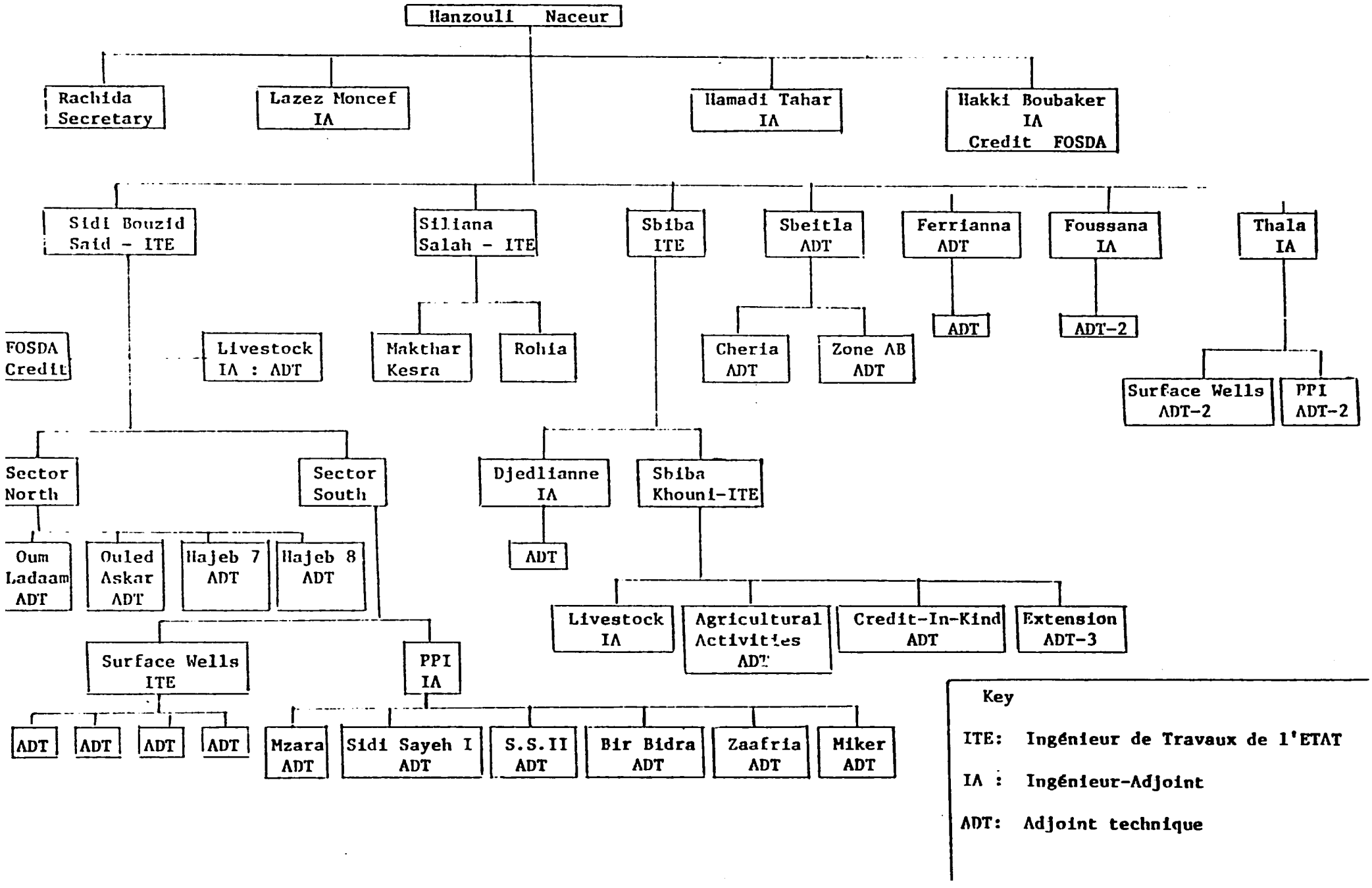
   This department is headed by an economist and staffed with economists and clerks. It is responsible for all administrative operations at the CTDA--personnel, budget, and daily operations.

CTDA ORGANIZATION AND STRUCTURE



ORGANIZATIONAL CHART OF DEPARTMENT OF

PLANT AND ANIMAL PRODUCTION - CTDA



ANNEX 10

DETAILED EXPLANATION OF THE BUDGET

PART I. Tunisia Budget (TD)

Training

A. Workshop (12 days)

One workshop per year starting in Year II
Participants:

1. Personnel from CTDA Extension Service (60)
2. Personnel of Ministry of Agriculture Extension Service (15)
3. Instructors from Agriculture Institutions (5)
4. Research personnel from INRAT, Saiida Center, Le Kef, OEP, GIL, GIAF (4); (Depends on theme of workshop)

75 extension personnel
5 instructors
4 research personnel

Costs:
Extension Personnel (75)
Room and board $25.00 day/person
75 x 25 = $1860 x 12 = $22,320
Instructors and Researchers (9)
Room and board $30.00 day/person
30 x 9 = $270.00 270 x 12 = $3,240.00

Other Expenses:

Materials for workshop:	$5,000
Chauffeurs:	1,000
Extras:	2,000
	$8,000

$22,320	
3,240	
8,000	
$33,560	13,000 TD/year

Due to the collaborative effort with extension personnel from MOA, an arrangement for joint financing between MOA and CTDA will be attempted.

CTDA costs:

Year I	
Year II	6,500
Year III	6,500
Year IV	6,500
Year V	6,500
	26,000 TD

Travel

Short-term (Europe or other Middle Eastern countries)

Year I	
Year II	2,500
Year III	2,500
Year IV	2,500
Year V	2,500
	10,000 TD

M.S. travel

Year I	2,000
Year II	1,000
Year III	1,000
Year IV	
Year V	
	4,000 TD

Housing

20 extension agents will be housed in their working surroundings
3-room house; 1 meeting room, 1 storage room, 1 room for living quarters
4000 TD/House

	Number of Houses	Cost
Year I	10	40,000
Year II	5	20,000
Year III	5	20,000
		80,000 TD

Office Equipment and Supplies

	Equipment	Supplies	Operations (Util., Rent, Maintenance)
Year I	20,000	5,000	9,000
Year II	2,000	6,000	11,000
Year III	2,000	7,000	13,000
Year IV	2,000	8,000	16,000
Year V	2,000	9,000	18,000
	28,000	35,000	67,000

Total: 130,000 TD

Maintenance Operation

Repair transport vehicles and agricultural equipment

Year I	62,000
Year II	75,000
Year III	88,000
Year IV	101,000
Year V	114,000
	440,000 TD

Vehicle Replacement

Year I	14,000
Year II	19,000
Year III	24,000
Year IV	29,000
Year V	34,000
	120,000 TD

Staff Salary

Present Staff

ITE (5)	5 x 3,300 =	16,500
IA (13)	13 x 2,280 =	29,640
AT (31)	31 x 1,920 =	59,520
		105,660

New Recruitments

ITE (3)	3 x 3,300 =	9,900
IA (7)	2 x 2,280 =	15,960
AT (5)	5 x 1,920 =	9,600
		35,460
Chauffeurs (30)	30 x 900 =	27,000
		168,120

Year I	145,000
Year II	155,000
Year III	160,000
Year IV	165,000
Year V	170,000
	795,000 TD

Experimental Research Station

Location: Sbeitla, Agro-combinat
Land area: 15 hectares - 5 hectares irrigated
10 hectares dryland
Irrigation System: 2,000 TD/Hectare
2,000 x 5 = 10,000 TD

Infrastructure: Storage area, barn, workroom
12,000 TD
Year II: 22,000 TD

GOT Total = 1,627,000 TD

PART II. U.S. Budget ($)

Training

In-Country (INRAT, Saiida Center, Institute at Le Kef, Institute at Moghrane)
Training course for field extension agents
30 scholarships, 8 during the first 2 years and 7 scholarships for each of the 2 following years.

Year I	$16,000
Year II	16,000
Year III	14,000
Year IV	14,000
Year V	
	$60,000

Abroad

Short-Term (12 staff) $6,000/person
Wageningen, Morocco, Syria, U.S.

Training course for extension agents with supervisory role in the delegation offices - 12 scholarships, 3 per year starting in Year II

Year I	
Year II	20,000
Year III	20,000
Year IV	20,000
Year V	20,000
	80,000

Masters
Masters level training in the U.S.A. for 4 extension specialists in the U.S.A.
2 starting in Year I
1 starting in Year II
1 starting in Year III
Duration of studies = 3 years per student
1 year per student = $20,000

Year I	$ 40,000
Year II	60,000
Year III	100,000
Year IV	50,000
Year V	25,000
	$275,000

Training Total = $415,000

Support Services

2 secretaries	$ 6,000	=	$200/month
1 trilingual translator	4,000		
	$10,000		

Year I	$10,000
Year II	10,000
Year III	10,000
Year IV	10,000
Year V	10,000
	$50,000

Transportation

Transportation for personnel of the Extension Service at the CTDA
Small cars (15) Regional extension supervisors and certain field agents
15 x 90,000 = $135,000
Large cars (4) Extension specialists of ESSU
4 x 15,000 = $60,000
Minibus (2) Transport farmers to Farmer Information Days
2 x 15,000 = $30,000
Mobylettes (30) field agents
30 x 713 = $22,500
Land Rover (2)
2 x 30,000 = $60,000
Year I = $307,500

Demonstration Plots

Demonstration plots will be located on the farmers' fields, and the farmer will be compensated with proceeds obtained from the harvest. Costs are calculated on the basis of working with 100 farmers in Year I, 200 farmers in Year II, 400 farmers in Year III, and 400 farmers in Year IV. A total of 1100 demonstration plots will be set up during the life of the project at the rate of $400.00/plot if each demonstration plot is 1 hectare in land area.

Agricultural inputs
Seeds, fertilizers, small hand tools, insecticides $400.00/hectare

Year I	$ 40,000
Year II	80,000
Year III	160,000
Year IV	160,000
Year V	
	$440,000

Agricultural Equipment

8 tractors (small models) - Mini-tractors will be purchased (smaller than the Ford 2000) and will be used for work on the demonstration plots. Comparisons will be made between use of tractors and use of animal traction in terms of yield, soil condition, and costs.
8 x 14,500 = $116,000
4 trucks - transport supplies
4 x 20,000 = $80,000
100 animal traction units with equipment
100 x 750 = $75,000
Year I = $271,000

Nurseries

8 vegetable nurseries will be established in central Tunisia, each 1/4 hectare in land area, and an arboriculture nursery will be established in Sbeitla.

Costs entailed in establishing these nurseries will consist of human labor, working of the land with agricultural machinery, seeds, young trees, fertilizer, manure, insecticides, pesticides, irrigation water, small hand tools, and plastic.

The vegetable nurseries will cost approximately $5000.00/1/4 hectare in Year I and slightly less than $4000.00/1/4 hectare to maintain in subsequent years.

Year I	8 x 5,000 =	40,000
Year II	8 x 3,750 =	30,000
Year III	8 x 3,750 =	30,000
Year IV	8 x 3,750 =	30,000
Year V	8 x 3,750 =	30,000
		$160,000

The arboriculture nursery will cost $15,000 to establish in Year I and will average approximately $10,000.00 in subsequent years.

Total Costs:

Year I	55,000
Year II	40,000
Year III	40,000
Year IV	40,000
Year V	40,000
	$215,000

Farmer Information Days

1. Farmer information days will be organized in collaboration with the Agricultural High School at Sidi Bouzid, the Institute at Le Kef, the Institute at Moghrane, and the experimental research station at Ousseltia, 24 days/year.

2. Farmer information days will be organized in collaboration with the CRDA in each of the 9 delegations. Four themes will be developed each year and presented 3 times in each of the 9 delegations for a total of 96 farmer information days per year.

   During the first year, CTDA will use materials prepared by the Agricultural High Schools, the Institutes, and the CRDA, but by the second year the CTDA will have the technical capacity to produce materials for the farmer information days.

Number of information days:		Costs per year
Year I	24	6,000
Year II	120	30,000
Year III	120	30,000
Year IV	120	30,000
Year V	120	30,000
		$126,000

Experimental Research Station

Location: Sbeitla, agro-combinat
Land area: 15 hectares - 5 hectares irrigated
10 hectares dryland
Purpose: Test for regional adaptability of new crops, varieties, and cultural techniques before introduction on farmer's fields.

GOT will finance construction of irrigation system, physical infrastructure, and storage area for materials and equipment.

U.S. will finance agricultural equipment (small hand tools and animal units), seeds, fertilizers, insecticides, labor, and rent of land and agricultural machinery.

Year I		
Year II -	Small hand tools	$ 21,000
	25 animal traction units	19,000
		$ 40,000
Year III	Agricultural inputs	30,000
Year IV	Agricultural inputs	25,000
Year V	Agricultural inputs	25,000
		$120,000

ESSU and Communication Support Unit

Year I:	Building (3 rooms) - Workroom, conference room, storage area	$40,000
	Materials (audio-visual equipment, photography equipment, projectors, screens, tables, chairs, etc.)	$40,000
	Total	$80,000

Year II, III, IV, V: Purchase of daily supplies and expenses entailed in developing photos, slides, etc. 10,000/year

Year I	80,000
Year II	10,000
Year III	10,000
Year IV	10,000
Year V	10,000
	$120,000

Foreign Personnel

2 long-term resident advisors	
1 advisor to director of the ESSU	3 years
1 advisor to director of the AES	3 years
	6 years

6 PY, $80,000 - $100,000/Year

Short-term consultants as needed, 24 PM

	Long-term	Short-term
Year I	160,000	20,000
Year II	170,000	20,000
Year III	180,000	20,000
Year IV		35,000
Year V		35,000
	$510,000	$130,000

Total $640,000

Project Evaluation Seminars

2 seminars will be held during the 5-year life of the project, one in Year III and one in Year V.

19 participants: 10 staff members of the CTDA
5 people working with extension in other organizations in Tunisia.
4 foreigners working with extension

Duration of seminar: 5 days

Costs:

Year III:	Support Services	$ 5,000
	Per diem of outside participants	7,500
	Travel expenses	4,050
		$16,550
Year V		$16,550
	Total	$33,100

Young Farmers Club

Recruitment of young farmers, supplies, prizes
$500.00/year
Total $2,500

U.S. TOTAL: $2,746,100.00

ANNEX 11

Detailed Equipment List

Transportation

15 small cars
30 mobylettes
4 large cars
2 minibuses
2 land rovers

Demonstration Plots

Seeds
Fertilizers
Pesticides
Small hand tools (hoes, rakes, shovels, wheelbarrows, and other needed equipment)
Wage labor
Feed for animals used in animal traction
8 tractors (small models)
4 trucks
100 animal traction units with animals and equipment
Stakes, metal supports
Water cans
Sprayers

Nurseries

Seeds and young plants
Farm manure
Fertilizers - ammonium, potassium sulfate
Pesticides
Small hand tools (hoes,rakes, shovels, and other needed equipment)
Windbreaks (to be planted during first 2 years)
Plastic materials
Watering cans
Wheelbarrows
Stakes
Steel wire
Pliers
Sprayers
Metal supports

Experimental Research Station

Barn or hangar for storage
Infrastructure for irrigation (wells, canals, pumps)
Windbreaks
Plot separations
Fertilizers
Pesticides
Seeds and young plants
25 units of animal traction
Farm manure
Small hand tools (hoes, rakes, shovels, pliers)
Wheelbarrows
Stakes
Water cans
Sprayer
Metal supports

Housing of Extension Agents in their Working Environment

3-room house, including one room for living quarters, one meeting room, and one warehouse
Total of 20 housing units

ESSU and Communication Support Unit

Building for Communication Support Unit: 1 workroom, 1 conference room, and 1 storage room
Equipment:

1. Slide sets complete with synchronized sound tapes
2. Broadcast quality tape recordings
3. Cells for overhead projection
4. Camera-ready copy for offset printing
5. High quality mimeograph machine
6. An electric mimeograph stencil cutter (this speeds up stencil cutting and allows reproductions of heads and line art at acceptable quality)
7. Two typewriters - one for French, one Arabic. These should be electric if possible. The one for French should have variable space letters so the typing approximates printing, definitely not with an italic type face. These would be used to cut stencils and to prepare material for offset printing. Carbon ribbon models are preferred if carbon ribbon is available.
8. Varitype waxing machine
   This machine is simple, foolproof, and greatly simplifies the work of preparing layouts for offset printing. It can also be used for putting lettering, etc., on posters.
9. A copy machine which can also be used for making overhead transparencies

10. 35 mm camera and flash unit
11. Copy stand for shooting slides of pictures and graphic art
12. Three slide projectors for use by agents
13. Three cassette tape recorders to be used with synchronized slide presentations
14. Two overhead projectors
15. One opaque projector - to be used mainly as an aid in producing charts
16. Portable tape recorder - broadcast quality
17. Electric tape recorder - broadcast quality
    To be used for initial recording of tape for slide shows, for making radio recordings, and for editing radio tapes.
18. Miscellaneous: drafting tables, art tools, press-down type, etc.
19. Supplies: Film, poster board, drawing papers, etc.
20. Office equipment for ESSU:
    Desks, file cabinets, chairs, tables, bulletin board, blackboard, etc.
    1 typewriter
21. Office supplies for ESSU:
    Paper materials, pencils, pens, scissors, staplers, tape, trays, file folders, paper clips, envelopes, rubber bands, rulers, small calculators, notebook binders, etc.

Young Farmers Club

Materials for group activities:
Plants
Hand tools
Prizes

ANNEX 12

SCOPE OF WORK FOR RESIDENT ADVISORS

I. ADVISOR TO THE ESSU

The principal advisor to the director of tl ESSU must have previous work experience in extension with particula emphasis on communication and education.

The responsibilities of this advisor must encompass the following activities:

1. Establishing permanent links between the research institutes and the extension specialists of the ESSU and demonstrating the manner in which research findings must be implemented in the field.

2. Instituting a structure for extension specialists to provide technical materials for the design of an effective information program in the communication unit and working closely with the communication specialists to develop a comprehensive and relevant information program for the rural residents.

3. Assessing technical deficiencies of extension specialists and field agents in order to orient in-service training to their needs and to select appropriate in-country training courses and/or short-term training programs abroad. He/she will have a major responsibility for selecting the extension personnel who will participate in training programs and determining the nature of the training.

4. Designing themes of annual workshops based on orientation of extension activities. Organizing and inviting participants to the evaluation seminars which will be held in the third year and the fifth year of the project.

5. Establishing a structure to integrate all extension activities of the various departments of the Ministry of Agriculture operating in central Tunisia.

In undertaking the five above-mentioned activities, the resident advisor will always work in collaboration with the director of the ESSU. By the end of his three year assignment in Kasserine, the director should have assumed all of these responsibilities. This foreign advisor must have an FS3 working knowledge of French, prior work experience in extension activities related to communication, education and agriculture, and the ability to adjust to living conditions in a rural setting.

II. ADVISOR TO THE AES

The principal advisor to the director of the AES must be a specialist in agriculture-related extension activites. He/she will be responsibl for establishing a permanent communication link between the field agen and the farmers. The responsibilities of this advisor must encompass the following activities:

1. Designing the work programs and extension activities of the field agents of the AES.

2. Assisting in the organization of specific farmer groups to work with each field agent and supervising the manner in which these group sessions are conducted.

3. Supervising the establishment of the nine nurseries and the experimental research station. This advisor initially will have responsibility for selecting materials to be planted, the procedure for monitoring growth and evaluating regional adaptability, and providing feedback to the research institutes.

4. Providing feedback to the communications unit on the technical materials needed at the delegation level and relevant themes for farmer information days.

5. Giving guidance to field agents on how to select farmer fields for demonstration plots and the mix of crops to be planted and cultural techniques to be used.

6. Linking credit activities provided by the CTDA Department for Agricultural Inputs and Credit-In-Kind with new agricultural practices introduced by the field agents of the AES. This advisor should play a principal role in developing the capabilities of the field agent to assist the farmer in designing his annual farm plan.

7. Orienting the field agents' work to address farm management and farm accounting procedures.

This advisor will always be working in close collaboration with the director of the AES. By the end of his/her assignment in Kasserine, the director of the AES will have assumed all of the advisor's responsibilities. The person recruited for this position must have an FS3 knowledge of French, knowledge of the technical components of agricultural production, experience in designing communication links between farmer groups and extension agents, and a familiarity with North African culture. An elementary knowledge of Arabic is recommended.

ANNEX 13

EVALUATION PLAN

GOAL

The overall goal of the project is to improve the quality of life and to increase the income level of the rural residents of central Tunisia. Since it is difficult to quantify standard of living and small farmer income, measurement will be based on farmer receptivity to new agricultural practices, increased agricultural production, and rural resident participation in general information sessions.

SUB-GOALS

1. Develop a firm technical foundation among extension personnel at the CTDA.

2. Establish a communication system which facilitates information flow between research institutes, credit programs, and agricultural input suppliers and all field extension agents of the Ministry of Agriculture.

3. Provide a complete technical package to agricultural producers.

4. Develop the capacity of the Extension Service to respond to general rural needs.

5. Institute a scientifically sound procedure for adapting research findings to farm utilization.

Project evaluation must assess the extent to which the goals and the sub-goals of the extension project have been realized. Information on the following factors must be collected and analyzed periodically:

1. Project Inputs. Financial inputs and activities necessary to create project outputs, e.g., acquisition of agricultural equipment and recruitment of extension personnel.

2. Projects Outputs. Physical outcome of project activities, e.g., number of demonstration plots established.

3. Project Effects. Outcome of increased use of project outputs, e.g., adoption of new cultural practices on a permanent basis.

4. Project Impact. Change in the standard of living or the increased capacity for self-sustained development of a group of beneficiaries or communities resulting from project effects. These changes can be measured from increased income, increased agricultural yields on a per hectare basis, improved diets, etc.

The Evaluation Plan will consist of two types of evaluations:

1. On-going evaluation or monitoring to focus on key implementation issues.
2. Ex-post evaluation after completion of project implementation to assess overall impact on the region.

The data requirements for the evaluation exercise can be broken down into three main areas:

1. Baseline Data. Accurate baseline data on the agro-socio-economic status of the area will be necessary to measure the effects and/or the impact of the project on the target population.

Much of this data can be obtained from the CRDA (MOA), MOH, CNEA, and National Office of Family Planning. More detailed data can be obtained by requesting the Direction de la Planification, des Statistiques, et des Analyses Economiques (MOA) to incorporate delegation-level data gathering into their annual agricultural survey of the country.

2. Continuous or Monitoring Data. This type of data includes financial expenditures, project acquisitions (material and human), and physical outputs of the project. Financial data will be obtained from the project accounting unit on a regular basis (quarterly) and will be compared with planned expenditures and planned execution in the project budget and implementation plan. Information on physical inputs, outputs, and some of the immediate effects will be obtained through a monitoring information system. The director of the AES will have responsibility for organizing and supervising the monitoring information system through the field extension agents. 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.

3. Survey Data. These will include:

a. Agricultural production, hectares cultivated, yield per hectare
b. Income level
c. Living conditions (infrastructure)
d. Land use
e. Rural resident receptivity to general information sessions
f. Local adaptation of agricultural research findings
g. Employment of family members.

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 extension project will help identify problems at an early stage and allow for corrective action to be taken during the life of the project. There are long-term aspects of

the project which will not be measured in the short run; e.g., the initiation of effective feedback from the farmers to the research institutes after research findings have been implemented at the farm level. Nonetheless, established communication links can be examined.

EXECUTION OF THE EVALUATION PLAN

As previously stated, the two components constituting the Evaluation Plan will be continuous project monitoring and ex-post evaluation at a specific point in time. Responsibility for the evaluation will rest with the director of the AES, but he/she will be assisted by a technical staff member of the planning unit. The director of the AES will submit an annual report based on project monitoring which will be carried out on a continual basis by Extension Service staff. Each staff member will have a well defined area of responsibility. Two ex-post project evaluations will be conducted to coincide with the Evaluation Seminars in Year III and Year V of the project. Baseline data, monitoring data, and survey data will be used in the ex-post evaluation in order to assess project effects and project impacts. Evaluation participants will consist of the director of AES, a technical staff member of the planning cell, two representatives of MOA working in the field of extension, and a representative of the project implementing organization.

Project monitoring will be undertaken by the entire staff of the Extension Service. The following chart indicates the general monitoring responsibilities of the individual staff members. As the project advances into different phases and assumes new activities the monitoring will be adjusted accordingly. The monitoring information will flow to the director of the AES who will be responsible for information analysis and evaluation in coordination with a technical staff member of the planning unit.

In conducting the two ex-post evaluations. the evaluating team will use baseline data, monitoring information, and survey data. The evaluation must attempt to answer a wide variety of questions. Preliminary concentration should rest with the following areas:

1. Field agent to farmer communication
   a. Effectiveness of working through farmer groups
      i. Farmer receptivity
      ii. Duration of the farmer group after the initial year
   b. Effectiveness of farmer information days
   c. Effectiveness of training given by extension agents to farmers in helping them to increase production levels and income levels and to adopt new agricultural practices
   d. Effectiveness of farm plans developed with the assistance of the extension agent in increasing output and improving family diets

PROJECT MONITORING--INFORMATION FLOW

DIRECTOR OF THE AES

FINANCIAL ACCOUNTING

Director of ESSU

1. Acquisition of transport vehicles
2. Acquisition of agricultural machinery
3. Acquisition of communication equipment
4. Recruitment of staff personnel - ESSU and AES
5. Extension staff participating in technical training

   Number and duration
6. AES housing units constructed
7. Project expenditures

(Reported on a quarterly basis)

PROJECT INPUTS AND OUTPUTS

Communication Unit

1. Number of farmer information days per delegation
   a. Number of participants
   b. Theme
   c. General assessment
   d. Collaborators
2. Number of general information days
   a. Location
   b. Number of participants
   c. Theme
   d. General assessment
   e. Collaborators
3. Number of publications
4. Number of slide shows
5. Other outputs

(Reported on a quarterly basis)

ESSU

1. Demonstration plots
   a. Number
   b. Land area
   c. Location
   d. Crops cultivated
2. Trial plots-dryland
   a. Number
   b. Land area
   c. Location
   d. Crops cultivated
3. Number of dairy cattle purchased by farmer and by location

AES-each field agent

1. Number of farm visitations
2. Data on each farm
   a. Land use
   b. Crops cultivated by area
   c. Fertilizers used
   d. Labor input for each farm activity
   e. Agricultural machinery used (by hour) for each farm activity
   f. Yield per hectare for each crop
   g. Percent of output marketed
   h. Annual income
      i. agriculture
      ii. non-agriculture
   i. Family size
3. Number of farm groups established and farmer participation by number
4. Information days attended
5. General assessment of work and problems encountered

(Reported on an annual basis)

AES-field agent at experimental research station

1. Date of infrastructure construction
2. Acquisition of agricultural equipment
3. Acquisition of plant materials
4. Crops planted
   a. Seeding density
   b. Area cultivated
   c. Lodging
   d. Growth patterns
   e. Yield
   f. Labor requirements
   g. Cropping patterns
5. General evaluation
6. Feedback to research institutes

(Reported on an annual basis)

AES-field agents at nurseries

1. Date of infrastructure construction
2. Acquisition of agricultural equipment
3. Acquisition of plant materials
4. Crops planted
5. Yield per crop
6. Labor costs per crop
7. Farmer demand for new seedlings on a crop basis
8. General evaluation

(Reported on an annual basis)

AES-regional director for each delegation

1. Total number of farmers receiving assistance
2. Amount of credit provided and number of recipients
3. PFI (for each PFI)
   a. Land area
   b. Number of farmers
   c. Land use
   d. Crops cultivated
   e. Laborers used per field
   f. Agricultural equipment
   g. Yield per crop
   h. Annual income
      i. agriculture
      ii. non-agriculture
   i. Farm products marketing
   j. Water used per field for each crop
4. Surface well farmers (same as above)
5. Dryland farmers (same as above)
6. General evaluation

(Reported on an annual basis)

e. Effectiveness of demonstration plots in instituting new agricultural practices and increasing income levels
f. Effectiveness of extension agents in convincing farmers to:
   i. Use credit
   ii. Implement simple cost accounting system
   iii. Seek out assistance when needed
   iiii. Provide feedback

2. Two-way link between research findings and implementation at the farm level
   a. ESSU ability to make appropriate recommendations for extension packages based on research findings
   b. Effectiveness of trial plots and demonstration plots in convincing farmers of applicability of new farming techniques
   c. Degree of local adaptibility of research findings
   d. Extent of feedback after farmer utilization of new techniques to the research institutes responsible for the recommendation

3. Coordination of extension services within central Tunisia
   a. Extent of collaboration between government service organizations, specialized agencies, and development projects providing extension services
   b. Effect of ESSU communication unit in aggregating and disseminating relevant information to all field agents in central Tunisia
   c. Extent of collaboration outside of the field of agriculture, e.g., health, home economics, etc.

4. Potential for the Extension Service to address rural needs, aside from agriculture

5. Impact of improving communication linkages between research findings of institutes and farmers' agricultural production techniques on increasing income levels and improving the quality of life for the rural resident

By exploring these areas, project effects and impacts should be revealed. This will indicate socio-agro-economic changes resulting from project interventions. An overall evaluation of the project then can be derived.