

**PROJECT ASSISTANCE COMPLETION REPORT (PACR)
AGRICULTURAL TECHNOLOGY TRANSFER PROJECT
PROJECT NO. 664-0304**

I. INTRODUCTION

This Project Assistance Completion Report for Agricultural Technology Transfer relies heavily on archived subject files and discussions with Mission employees. This reports covers the period August 31, 1978 through December 31, 1990 and describes the completed activities initiated by a grant agreement between the Republic of Tunisia and the United States of America, acting through the Agency for International Development.

II. PROJECT DATA

- A. Project Title and Number: Agricultural Technology Transfer Project
Project No. 664-0304
- B. Grant Agreement Date: August 31, 1978
Evaluation: Mid-Project Evaluation 10/83
- C. Project Assistance Completion Date: December 31, 1990
- D. Funding: \$8,745,000
Expenditures \$8,542,371
GOT Contribution: \$4,041,800
- E. Implementation/Organization: Government of Tunisia through the Ministry of Agriculture (MOA) and a host country contract with Title XII Institutions (Mid America International Agricultural Consortium (MIAC)
- F. Project Status: Project is completed

III. EXECUTIVE SUMMARY

On August 31, 1978 the U.S. Government represented by its A.I.D. Mission in Tunisia and the Government of Tunisia (GOT) signed a grant agreement to implement the Agricultural Technology Transfer Project (ATT). The project was initially authorized in August 1978 at the sum of \$4.5 million. When initiated, the ATT Project was designed to train a cadre of agricultural scientists to fill positions in the teaching and research institutions within the Ministry of Agriculture. Through the years the Project changed through five amendments to expand and include several components that were not originally included in the design of the project. A linkage program evolved with Amendment No. 2 (December 80) to facilitate returning long-term participants in the initiation of research programs and to enhance the overall research capabilities of the Tunisian institutions. Amendment No. 3 (June, 1981)

increased funding by \$1.3 million to a new total of \$5.8 million and emphasis was added to train personnel for the service arms of the Ministry. Amendment No. 4 (August, 1985) extended the PACD by four years to December 31, 1990 and added an additional \$2.7 million bringing project total to \$8.5 million.

Other amendments increased funding to support on-going long-term training, short-term training, consultant support, and the establishment of a computer center and the purchase of commodities to support a diversity of needs such as books and laboratory and field equipment.

IV. PROJECT DESCRIPTION

A. Background

Agricultural development in Tunisia had been severely limited by the shortage of well-trained personnel to plan, organize, implement, and manage the many kinds of activities necessary to produce a modern agriculture sector. Although the problem had been concealed for some time after independence by the availability of foreign experts to serve in Tunisia under both bilateral and multi-lateral aid programs, there continued to be a general shortage of personnel with specialized training in agriculture, and in areas related to agriculture.

In the late 1970's modest improvements had occurred with fertilizer production and distribution. Provisions of credit to farmers had expanded. Human capital had been enhanced through formal and informal education programs at all levels. In spite of progress, small farmers in semi-arid and arid regions (approximately three-fourths of Tunisia) were facing problems approaching crisis due to deterioration of the land resources from erosion and grazing practices. Agricultural practices had to change. The agricultural institutional structures in Tunisia lacked the capability for assisting with these changes. Relatively rapid changes were possible when the institutional structures could provide the necessary information (technology) base for guiding decisions, demonstrating viable alternatives and helping farmers adopt and benefit from the new technologies. Necessary institutional development required a greatly expanded number of highly trained agricultural scientists to plan and carry out various research and development programs that would reach small farmers effectively and give Tunisia the ability to train more of its own people to the levels required to hasten institutional development. Thus, the ATT Project was designed to assist the GOT in developing an agricultural cadre to identify, select, and manage the future agricultural technology of the country with emphasis on development of a needed information base to small farmers in the semi-arid regions.

B. Project Purpose and Goal

Goal

To increase agricultural production and rural incomes through more efficient management of production systems and utilization of agricultural resources.

Purpose

To enable a trained nucleus of the agricultural cadre to identify, select and manage the future agricultural technology of Tunisia, and to introduce appropriate technological innovations which can be applied in the delivery of service and support to the agriculture sector.

C. Project Implementation

The project was implemented by the Government of Tunisia through the Ministry of Agricultural (MOA) and a host country contract with the MidAmerica International Agricultural Consortium (MIAC) which provided the vast majority of technical support.

D. Project Activities

a) **Technical Support**

(i) Technical Assistance

Technical assistance to the project was provided through a long-term resident advisor from MIAC to the MOA and short-term assistance in the form of quick response to problems encountered by different agencies and offices within the MOA. Technical support to the project was to help promote the broader goals of institution building and linkage between institutions.

MIAC worked with the MOA for two years and provided a long-term resident advisor for the overall project and short-term TA advisors to address specific problems within the MOA offices and agencies.

A primary objective of the technical support component of the project was to provide support for a participant training program to assist the GOT in the development of agricultural scientists that would be able to identify, select and manage the future agricultural technology of the country and to assist with the establishment of linkages between Tunisian agricultural institutions and universities within the MICA consortium.

The purchase of laboratory equipment and other commodities was a major part of the project. Commodities were furnished to various institutions within the Ministry of Agriculture. Equipment was also purchased for individual research that occurred during study towards an advanced degree.

(ii) Linkages Component

Linkages to support scientific and research activities were critical in keeping trained professionals at state of the art levels. Establishing continuing linkages was essential to the accomplishment of the broad purposes of the GOT and the U.S. Government. Tunisian officials often articulate the goal of incorporating the best of U.S. technologies and systems into the Tunisian system, and institutional linkages was one means of accomplishing this.

Linkages under this project were envisioned in three ways; individual linkages, institutional linkages ("Sister University") and sabbaticals.

Individual linkages between former student and major professors were envisioned to maintain the "former student/professor" relationship and facilitate its transition into a "collegial" relationship between researchers.

Institutional linkages were envisioned to establish a type of "Sister University" concept. This would stimulate the free flow of information between Tunisian and American schools.

Sabbatical leaves were established to respond to needs of the mature programs -- facilitating a Tunisian researcher to work for several months in the laboratory in the U.S. and vice versa. Even though the sabbatical leave only lasts a relatively short period it was hoped that the relationship between scientists would endure longer.

There were serious problems with the linkages component. Even though linkages were considered an important part of the project the long term advisor spent much of the time on this component explaining the objectives of this activity and how to go about developing a workable program. Most Tunisians looked at the linkage component exclusively as research grants for Tunisian. They placed little or no importance on the establishment and/or maintenance of professional ties. It was seen as an easy way to obtain equipment and supplies. In addition, the prevailing attitude was that MIAC would work out all the communication, including identifying an American partner.

Individual Linkages:

There was never a logical procedure for choosing proposals for individual linkages. This greatly hindered the number and types of linkage proposals funded. The time lag from submission of a project proposal to informing those who projects were accepted was one year or more. Such a lag was seen as rejection to most of the proposal writers; therefore, many never received any feedback as to the quality of their proposal. One clear factor affecting the success of the linkage component was the relationship of the partners prior to submitting a proposal. In cases where they had not worked together, the proposal was quite superficial. It was impossible, for all practical purposes, to "create" a viable linkage between an American scientist and a Tunisian who had not worked in the American's laboratory. In cases where the partners had worked together on more than a thesis problem, their linkage was more apt to succeed. Another observation about developing linkages was that linkages between Ph.D.'s appeared to have a much higher probability of success than when the Tunisian was only trained to the M.S. level. This was mainly due to the fact that the relationship between the American scientist and the Tunisian Ph.D. scientist was one that had developed over a longer period of time (normally during the period of study for the Tunisian). In the case of the M.S. scientist the American scientist generally had not worked with the individual over an extended period of time. Fifteen individual linkage programs were financed.

Institutional Linkages:

The concept of Sister Universities was extremely difficult to use in the context of linkages in Tunisia. One of the main reasons was that this concept was used on a completely different type activity with several European schools. These were generally open ended projects for the general exchange of teachers and students, administered at a government to government level rather than as an activity within a project.

Another difficulty with the sister university concept was related to size of a department in an American university. It became difficult to think of a University of 50,000 students directly linked with a school of 500 students. It was even difficult to see how to link a Tunisian agricultural school with a College of Agriculture in an American university. For these reasons the concept of sister university was not followed rigidly. The concept of group (or team) research effort was much more easily conceived and put into place. Three institutional linkages between Tunisian and American universities occurred. The linkages between INAT, INRAT and ESA-Kef and Oregon State University (A Multi-Disciplinary Approach for Cereal Enhancement in the Semi-Arid Region of Tunisia) and ESIA, INAT and ESH and Kansas State University (Food Preservation Using Solar Energy) were expansions of the concepts of

individual linkages. These linkages had minimal accomplishment. The principal one was that of getting a group of individuals together and mapping out a way to attack a common problem. The third linkage project between the Direction de la Formation and MIAC (Agricultural Training) was much more general in nature. It was designed to assist with the improvement of administration of the Tunisian agricultural schools.

Sabbaticals:

Another linkage project activity included the sponsorship of Tunisian scientists for sabbatical leaves in the U.S and vice versa. Most Tunisian laboratories were not organized to host sabbatical leaves for Americans. Normally these leaves should produce several publications in a relatively short period of time. Consequently it was difficult to generate interest among Americans or Tunisians for this linkage activities. Three Tunisian scientists participated in sabbatical leaves in the U.S.

Outputs:

- 52 consultancies on various agriculture topics
- 15 individual linkages to U.S. institutions
- 3 institution-to institution linkages
- \$307,756 worth of commodities purchased for use by individuals studying and laboratories in Tunisia
- \$100,000 worth of documents for the library facilities at the Institut National de la Recherche Agronomique de Tunisie (INRAT) and the Institut National Agronomique de Tunisie (INAT)
- \$100,000 worth of equipment, materials and furnishings for the development of a soil and plant tissue analysis laboratory at INRAT
- Research laboratories established and functioning
- Drought Study conducted
- 3 Tunisian participate in sabbaticals at U.S. universities

b) **Training**

(i) Long -term Training

This activity accounted for well over half of the budget of the project and had the most far reaching impact on Tunisia agriculture as well as general development. The ATT project was initiated as a training program to help create a cadre of agricultural scientists to fill positions in agricultural research and teaching. In 1985 the focus was somewhat reoriented to train personnel for extension type activities. The initial 79 candidates for long-term training in the U.S. were selected by the Ministry of Agriculture and were to be placed in ten agricultural institutions as teachers

and researchers at the completion of their degrees. In 1985, under Amendment No. 4 additional funds for 20 MS candidates were added. These candidates for long-term training were selected by the Ministry of Agriculture from those offices and agencies charged with implementation of development programs and would return to them after training. Candidates in this group were managerial staff needing advanced training in technical fields related to production problems faced by farmers. A total of 98 degrees (40 Ph.D and 58 M.S.) were awarded to 85 persons.

One of the most evident accomplishment with graduates in this project was the recognition of their degrees. Those individuals who received M.S. and Ph.D. degrees in agricultural sciences from Land Grant Universities in the United States received degree equivalency. The Ph.D. was equated with the "Doctorat d'Etat" and the M.S. with "Doctorat de Troisieme Cycle".

(ii) Short-term Training

The short term training activity included observation visits by teaching and research administrators to learn about the organization and function of American agricultural institutions including the agricultural extension services, university level research and training, cooperatives, farming systems research, water management, plant breeding, remote sensing, etc. Visits to the U.S. by administrative level Tunisians to observe the American Land Grant University in action with triple responsibility for teaching, research and farmer support activities convinced Tunisian leaders that (a) certain features of the American Land Grant university system can be usefully adapted to the Tunisian agricultural scene, and (b) that American graduate level training in the agricultural, and supporting sciences, would be highly appropriate for training Tunisian agricultural specialists. Tunisian agricultural administrators became convinced that the science-based education and mission-focussed research are a different and better approach for training specialists to develop and manage the new technology needs in Tunisian agricultural development programs.

Outputs:

- 85 Tunisians received 98 graduate level degrees (40 Ph.D's, 56 MS, 2 MA) in agriculture related fields
- 9 thesis research activities conducted in Tunisia
- 43 Tunisians received short-term training in U.S.
- 200 Tunisian and American agricultural scientists attended a Tuniso-American Colloquium on Sustainable Agriculture for Tunisia in the 21st Century sponsored by MIAC, MOA, OSU and USAID in Tunis
- 13 agricultural research programs funded for Tunisian institutions

V. END OF PROJECT STATUS

This project had an impact on three major areas. The first was strengthening the Tunisian agricultural institutions responsible for development and delivery of technologies and related services. The second has been with Tunisian administrators, faculty, researchers and technical personnel using the latest in techniques and technologies. The third has been more responsive and effective action oriented agricultural institutions through the use of the most relevant technologies, and appropriate management techniques and philosophies. These changes taken together have led to increased production and increased farm incomes as farmers are provided, through a more effective service delivery system, technology related to fertilizer use, varieties selection and other production problems typically faced by the small farmer.

Since the PACD there are still institution to institution collaborations between Tunisian institutions (ESA-Kef and INAT) and Oregon State University and Montana State University. These arrangements includes the visits by American scientist to Tunisia to collaborate on various research projects.

VI. LESSONS LEARNED

- The high return rate (approximately 95%) can be directly attributed to three factors: (1) all participants who participated in long term academic training were mature individuals, with practical work experience and a formal committment by their respective agency of jobs upon completion of degree and (2) no undergraduate degrees were offered thus cutting down on the time one had to be away to obtain degrees and (3) extensions and second consecutive degrees were offered on an exceptional basis only.
- The number of students who went into research after degree completion was lower than had been expected. It was learned that researchers are paid much less than teachers therefore those who could contribute greatly to agricultural research opted to teach instead. This disparity in pay had a direct effect on the amount and type of agriculture research that has been conducted to date.
- Overall the American graduates, especially at the Ph. D. degree, ranked high in relation to their exposure to the most advanced techniques, their subject matter knowledge, and their ability to identify how their training could be important in Tunisia. American-trained Tunisians however did not rank well in the areas of resolving administrative problems at their respective institutions in Tunisia. Other types of training programs (French and Tunisian) are generally longer and

require more time for the student to work in "the system", learning how to resolve or circumvent administrative road blocks. The American-trained individuals returned to Tunisia and expected to find a work situation similar to their major professors' in the States. They usually went through a period of extreme frustration (sometimes for many years), without accepting their role of developing their own niche in the system.

VII. RECOMMENDATIONS

Future projects with the Ministry of Agriculture in Tunisia should continue to include researchers and faculty from agricultural insititutions for Ph.D. level study to continue established linkages and to keep abreast of the latest technology in agriculture.



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