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PROJECT ASSISTANCE COMPLETION REPORT (PACR)  
TECHNOLOGY TRANSFER  
PROJECT NO. 664-0315

I. INTRODUCTION

This Project Assistance Completion Report covering the period August 31, 1981 through September 30, 1992 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: Technology Transfer Project  
Project No. 664-0315

B. Grant Agreement Date: August 31, 1981.

Amended: 8/30/83, 4/27/84, 12/26/84, 8/30/85,  
6/26/86, 9/30/86, 4/23/87, 3/28/88, 9/21/88,  
5/10/89, 3/29/90, 9/28/90, 6/18/91

Interim Evaluation Dates: 12/85  
12/90

End of Project Evaluation: Impact Evaluation Planned  
8/95 under MTPS Project

C. Project Assistance Completion Date: September 30, 1992

D. Funding: A.I.D. \$45,000,000.00

Expenditures: \$42,499,630  
GOT Contribution: \$20,774,000

E. Implementaticn/Organization: Ministry of Higher Education and Scientific Research (MHESR), Mission Universitaire et Scientifique de Tunisie (MUST), AMIDEAST (for assistance in test administration; re-entry support and job placement to returned students in Tunisia), various U.S. colleges and universities (for research and faculty exchange) and the Academy for Educational Development (for provision of technical assistance at MUST in Washington, D.C. and to the Ministry of Education)

### III. EXECUTIVE SUMMARY

The Technology Transfer Project (TT) was designed and funded by the United States Agency for International Development, Special Mission for Economic and Technical Cooperation in Tunisia to support the Tunisian Government with strengthen manpower planning, educational institution development and student placement assistance. The eleven-year project was signed on August 30, 1981 with an original obligation of \$1.45 million in DA funds. The project was implemented through a host country contract with the Academy for Educational Development (AED).

Simultaneous with the initial obligation, the GOT began its' scholarship program by sending 209 students to the U.S. for the 1981/82 school year. The GOT financed all scholarship costs and managed all aspects of the program through its University Mission (MUST) in Washington, D.C. The GOT continued its scholarship program in the 1982/83 school year and increased the number of students studying to 250.

During FY 82 the GOT's then nascent foreign exchange problems made it clear that it would be difficult to continue the scholarship program at the expected size and pace and the GOT requested that A.I.D. finance direct contributions to scholarship costs. USAID obligated \$2 million in Project Amendment No. 1 in FY 83 to provide partial scholarship support. USAID subsequently added eight more amendments over FYs 84-88 to add additional funds to finance the direct costs of the scholarship program, extend the PACD, and expand the degree fields studied. Up to Amendment 7 project funding was increased to \$25.15 million and the PACD extended to August 31, 1989.

During the development of the above amendments, several program design changes were made. The original focus on training engineering and science graduate students was enlarged to cover undergraduate study in science fields. Degree studies were expanded to cover management and economics. Amendment No. 8 initiated a number of program design/implementation changes related to the size and scope of the program and authorized an additional \$19.850 million in ESF grant funds bringing total LOP funding to \$45 million and extended the PACD to September 1992.

Since the original signing the project has had two interim evaluations, two studies and two audits.

At PACD there still remained 80 students studying in the U.S. that are now being funded under a new project Management Training for the Private Sector (MTPS).

#### IV. PROJECT DESCRIPTION

##### A. Background

During the early 80's Tunisia was not benefiting sufficiently from technological advances and its technical training system while having progressed substantially in the past twenty years, was not keeping pace with demands of advances in science and technology. There were three principal obstacles to efficient acquisition and development of technology in Tunisia; (1) lack of linkages with U.S. institutions which would provide continuing awareness of the most appropriate available technology, (2) lack of effective manpower planning to guide placement of students by field and to direct growth of Tunisian technical institutions; and (3) outdated curricula and pedagogical methods which limit the benefit students derive from technical training in Tunisia.

Among the matters receiving priority attention were education and employment. Education was seen as the vital link to modernization. The GOT annually allocated one-fourth of its national budget to education, making Tunisia's percent of budget invested in education one of the highest in the world. In spite of this commitment the GOT had difficulty in relating the products of the educational system to the needs of the general economy. Chronic unemployment and underemployment, not exclusively confined to the uneducated, existed while at the same time there was a critical shortage of manpower in many highly skilled technology areas.

As the GOT was completing development of the Sixth Plan it was seeking new ways to address education and employment for high school and college graduates alike. At the college level, the GOT recognized the need to produce significantly more engineers and related technicians in the next five years. It further recognized that its access to U.S. scientific and technological expertise through its higher education and research communities was limited. The problem for the GOT was how best to absorb and adapt U.S. technology to meet its own educational and employment needs, a concern that implied a radical departure from established and traditional patterns of technology transfer, primarily those with France.

## B. Project History

### I. EARLY YEARS 1981-1983

#### 1. Project Purpose and Goal

##### Goal

The goal of the project is the long-term transfer of technology appropriate to national economic development from the United States to Tunisia, and the dissemination and utilization of that technology for economic development and increased national welfare in Tunisia.

##### Purpose

The purpose of the project is to assist Tunisia's higher education and research community to increase their access to U.S. scientific and technological expertise, especially in engineering and related fields, and to assist the Tunisian technical higher education system to increase its efficiency and effectiveness in acquisition and dissemination of technology skills.

#### 2. Project Implementation

The project was implemented by the Ministry of Higher Education and Scientific Research and a host-country contract with the Academy for Educational Development (AED). Limited placement services was provided by AMIDEAST/Tunis through an agreement with the GOT.

#### 3. Project Description

The project's aim was to provide technical, material and financial support to Tunisia's Ministry of Higher Education and Scientific Research: (1) to develop a manpower planning capability to estimate and plan future human resource needs; (2) provide U.S. professors, to assist Tunisian educational institution, upgrade curricula and pedagogic methods, organize research and teach selected courses; and (3) support the training of selected Tunisian students in the U.S. in fields of high development priority. In carrying out these activities, emphasis was to establish lasting professional linkages between Tunisian and U.S. institutions.

#### 4. Project Activities

##### **TECHNICAL ASSISTANCE**

The technical assistance contract with AED constituted nearly all of A.I.D.'s contribution to the project during this time period.

##### Manpower Planning

Technical assistance for the establishment of an in-country manpower planning committee with the assistance of a U.S. manpower planning expert to conduct analysis and projection of technical manpower requirements and supply in Tunis.

##### Student Placement

Technical assistance for the support of one short-term and one long-term student placement specialist. The short-term specialist was tasked to work with the Ministry of Education in Tunisia to establish a system for selecting and placing students in U.S. universities. The long-term placement specialist served as a member of the staff in the Tunisian's Scientific Mission (MUST) in Washington, D.C. to provide support with placement and monitoring of Tunisian students at U.S. universities. Computer equipment and software was provided to both offices.

##### Institutional Strengthening

Technical assistance was provided for the exchange of U.S. and Tunisian deans from engineering schools for short-term study, research, lecturing, curricula development and upgrading of teaching methods and approach. USAID partially funded this activity.

##### **TRAINING**

Short-term study tours for Tunisian higher education administrators and academics. The purpose of these tours were to provide key officials with exposure to contemporary technology training methods in the U.S. and the opportunity to establish long-term personal and institutional ties with the U.S. technology and higher education community.

### 5. Outputs:

- Manpower planning committee established
- Micro-computer equipment procured for Tunisian Ministry of Education

## II. THE MIDDLE YEARS 1983 - 1987

### 1. Project Purpose and Goal

Project Purpose and Goal did not change.

### 2. Project Implementation

The project was implemented by the Ministry of Higher Education and Scientific Research, Mission Universitaire et Scientifique de Tunisie (MUST), AMIDEAST/Tunis for institutional surveys, AMIDEAST/Washington for placement services, and a host-country contract with the Academy for Educational Development (AED) for technical assistance.

### 3. Project Description

During this period, the student training program developed into the largest and most important activity of the project. Given continuing foreign exchange problem, steadily eroding balance of payments situation, steadily increasing cost of education in the U.S., and a steadily increasing program size USAID funding steadily increased for scholarship support for undergraduate and graduated students.

By 1983 implementation roles and responsibilities were rapidly evolving. In 1981, the GOT started, financed and managed the scholarship program through MUST and the Ministry of Higher Education and Scientific Research. By the end of 1987, USAID was financing approximately 90% of all scholarship cost and was heavily involved in program management with MUST. The Ministry of Higher Education in Tunisia no longer had any role in the project except for the selection of students.

#### 4. Project Activities

##### a) **TECHNICAL ASSISTANCE**

###### (i) Manpower planning

The committee for manpower planning envisioned as part of the project was established and functioning composed of Ministry of Higher Education officials, representatives of academic institutions and of the Ministry of National Economy and Plan. Two manpower studies were conducted, one under the auspices of the Academy for Educational Development in 1983 and a second by TvT Associates Inc. in October 1987 for a study of market demand and placement services needs for Technology Transfer program graduates.

###### (ii) Student Placement

The GOT established its' Tunisia office in Washington, D.C. (MUST) during the beginning of this project to handle the placement and supervision of students studying in the U.S. By October 1987, a total of 697 participants had been enrolled in a wide range of U.S. institutions of higher education.

USAID assisted MUST through funding an Academic Advisor and by provision of computer hardware and software for record keeping. The short-term in-country student placement specialist was eliminated. The GOT had established a system to recruit, track and place students.

AMIDEAST/Tunis under a host country contract with the Ministry of Higher Education had prepared institutional profiles of Tunisian schools. AMIDEAST/Washington provided technical assistance for arranging visits to U.S. university campuses, and provided consultative services to MUST.

###### (iii) Institutional Strengthening

The aim of this activity was to strengthen Tunisia's advanced technological institutions through introduction of U.S. curricula and modern teaching methods. The means were through bi-lateral short-term visits, faculty exchanges and professional and institutional linkages. Under the contract with the Academy for Educational Development, 40 U.S. study tours were undertaken by Tunisian officials and faculty members to become acquainted with the system of U.S. higher education and to develop professional linkages. Thirty U.S. professors visited Tunisian schools to give seminars and lectures, advice students and to have interchange with faculty members on research topics and other matters. No formal institutional linkages developed, but numerous individual and professional ties were established.

## b) TRAINING

The student training program had developed into the largest component of the Project. Under the original project, this component was entirely funded by the GOT until 1983 when scholarship assistance was first provided for graduate level training by USAID under Project Amendment No. 1 and broadened to include undergraduate training in 1984 under Amendment No. 2. Subsequent amendments 3 through 7 added funding to cover agreed-upon annual scholarship costs. A total of 697 students were 90% financed by A.I.D. by 1987 (including books, maintenance expenses, tuition, transportation within the U.S., health insurance and other expenses normally paid for A.I.D. participants). Fields of study included management computer sciences engineering, architecture, food processing, physics.

5. Outputs:

- 38 students completed degree work and returned to Tunisia
- 40 Tunisian administrators and faculty members participated in faculty exchange between Tunisian and American Universities
- 30 U.S. faculty exchange visits made to Tunisia
- Human Resource Planning Commission established in Ministry of Higher Education and Scientific Research
- Micro-computer for student tracking and data processing installed and operating in MUST Office in Washington, D.C.
- Library specialist examined National Technical Library and ISG library, material acquisition made and delivered.
- Actions to establish five long-term institutional links between Tunisian and U.S. engineering schools initiated.
- Seminar on U.S. higher Education held in Tunis March 85 and attended by GOT higher education professors, educational administrators
- Contract executed between AMIDEAST and MHESR for student placement services
- Two major studies complete: Labor Demands and Placement Services and English Language Training Assessment

### III. THE LATER YEARS 1988 - 1992

#### 1. Project Goal and Purpose

##### Goal

To increase Tunisia's long term capacity to apply new technology to support a market economy

##### Purpose

To develop the trained manpower with the skills and attitudes needed to support a competitive market economy.

#### 2. Project Implementation

The GOT through the MUST office in Washington, D.C. became completely responsible for project implementation.

AMIDEAST/Tunis for re-entry assistance and to implement the Entrepreneurs International Promotion and Management Project.

#### 3. Project Description

Up to this point approximately 700 Tunisian students were placed in 65 U.S. universities at the graduate and undergraduate levels. Procedures for expeditious preparation of student academic dossiers for placement in the U.S. were developed. MUST and GOT Ministry staff were trained in placement procedures. Selected Tunisian higher institutions of technical training were assisted in enhancing curricula and teaching methods through faculty exchanges, short-term consultants and visiting U.S. professors.

At the beginning of 1988 two significant events happened that caused the project to change focus and direction; (1) After an informal evaluation of project components by the GOT and USAID it was decided that the project had met some of its' original intentions with regards to institutional linkages, manpower planning and student placement services (within the Ministry in Tunis), as a result these components were no longer funded, and (2) an IG audit of the Project recommended that the USAID Mission redesign the project.

In 1988 with Project Amendment No 8, several project modifications occurred:

The project rationale and justification was revised. The revised project goal reflected the need for Tunisia to increase its capacity to use technology to develop a market-based economy. The more narrowly focused purpose concentrated on developing the trained manpower needed to achieve this goal. EOPs were simplified and included: (1) 800 degree graduates, (2) 80% return rate of graduates to Tunisia, and (3) short-term U.S. training for Tunisians in market skills. Project outputs were simplified to three (1) graduates with degrees in business related fields, (2) market-useful short-term training and (3) a functioning system for program management.

Other Modifications included:

- gradual reduction in student pipeline to 200 by 1992
- project would emphasize graduate degree training with new undergraduate training starts on an exception basis
- to accelerate the pace of student degrees, project financing would cover the summer semester
- degree continuation would be limited to one degree
- funding increases under the FAR procedure would reflect HB10
- GOT would provide increased and regularized reporting on project implementation to USAID and A.I.D./W on student progress and degree output.
- GOT would add additional academic advisory staff to MUST in Washington to improve program management and reporting
- increase number of students studying disciplines other than engineering to meet the manpower needs of the emerging Tunisian market economy
- coverage of U.S. tax liability for students
- the GOT would institute a five-year bonding contract for all new project-financed students
- short-term training component was added to the project

#### 4. Project Activities

##### **TECHNICAL ASSISTANCE**

Funds provided for one Academic Advisor and one support staff at the MUST office in Washington, D.C. and one training assistant in the USAID office in Tunis. The purchase and maintenance of computers and other office equipment at the MUST office and funds provided to MUST for campus visits to monitor student's performance.

In 1989 a grant was given to AMIDEAST/Tunis that principle objective was to integrate U.S. trained Tunisians back into the Tunisian job market. Support services were to include career counselling, placement services, management of databases containing

critical information on returnees and potential employers, a regular newsletter, electronic communications with TT scholarship recipients nearing completion of their studies in the U.S., and a seminar series.

In 1991 AMIDEAST/Tunis received an additional grant to implement the Mission's Entrepreneurs International Promotion and Management Project (EI). Under this grant AMIDEAST identified and refined criteria of EI participant selection, established an EI advisory committee, promoted the EI program in the business community and the media, conducted briefings for potential beneficiaries, facilitated the EI selection process, worked with nominee and the Office of International Training (OIT) to develop training-trade goals, conducted pre-departure orientation sessions and developed and implemented appropriate follow-on activities.

## **TRAINING**

### Long-Term Training in the U.S.

A total of 450 students were 90% financed by A.I.D. (including books, maintenance expenses, tuition, transportation within the U.S., health insurance and other expenses normally paid for A.I.D. participants). Fields of study included management, computer sciences, engineering, architecture, food processing, physics.

### Short-Term Training in the U.S.

A total of 148 persons attended short-term training programs in the U.S. USAID funded cost of course, per diem and travel in the U.S. Under the EI program 12 businessmen attended observation/study tours in the U.S. with similar business to promote a transfer of business technology and trade opportunities.

## 5. Outputs

- 645 students received degrees: 105 B.S., 336 M.S., 158 Ph.D.  
46 MBAs
- 80 students partially completed degrees
- 376 students are reported back in Tunisia with an overall return rate of 60%.
- 65% of the returnees are employed mainly with the private sector
- 148 persons attended short-term training programs in the U.S. Training addressed management, privatization policy, development economics, and topics having an impact on private sector development (labor negotiations, law and regulations).
- 12 owners or employees from small private enterprises went to the U.S. for observational/study tours under Entrepreneurs International Program
- Efficient GOT system for program management

## V. END OF PROJECT STATUS

The Transfer of Technology Project has achieved its purpose of providing an education for students in the U.S. in fields of advanced technology. Since many students have continued to study on their own in the U.S. it is somewhat premature to measure overall project impact. Primary indication is that the project has a positive impact on the economic activity, in particular on the private sector.

The Project has been driven by the Tunisian Government's need for assistance with the financing of long and short-term training in the U.S. to meet the emerging needs of a market driven economy. Through training, it has assisted in increasing the available pool of highly technological skilled individuals that can assist with the development of a competitive market economy.

With the changes in attitudes toward U.S. degrees the Tunisian business community has found that U.S. graduates possess important leadership qualities and the potential to hold key positions as managers and directors. This is in contrast to reports as recently as 1989 that a U.S. degree was considered a handicap in finding a job in Tunisia.

During the later years of the project, dialogue between the private sector and USAID became an essential ingredient in directing students studying long-term abroad in fields that were compatible with ever increasing needs. Dialogue with the public sector became essential in directing public sector employees and budding entrepreneurs to appropriate short-term training programs to address issues for managing and competing in a market oriented economy. This short-term training was perceived by participants and GOT as successful and appropriate.

Due to the low return rate the Project has had some impact on GOT thinking of how it manages its financial resources for scholarship programs abroad. As a result, the GOT has instituted various schemes to recover cost for educating students abroad should the student not return and requiring all students currently studying or departing for study abroad to sign a commitment stating that they will return and work for at least 10 years upon completion of their degree.

With respect to early project purpose and goal of having an influence on manpower planning and the strengthening of linkages between the U.S. and Tunisian research and scientific community the project did not succeed. The GOT was never motivated to accurately forecast labor needs in the science and technology sector. Educational efforts produced an oversupply of engineers in some fields, but a deficit in other areas. The GOT continues to lack an updated and comprehensive data base for manpower planning.

Project activities aimed at establishing links between faculties of Tunisian technical institutions and U.S. institution terminated in 1986 when the allotted portion of the budget ran out. With the linkages that did occur curricula were not expanded, and course improvements could not be sustained without institutional linkages. Tunisia remains dependent on overseas education to cover the short-falls in Tunisia curricula.

Degree equivalency especially those at the Ph.D. level has been a continuing problem throughout the life of the project. Even though the GOT has continuously stated that they will resolve the equivalency issue, to date nothing concrete has been done. This issue is a major contributing factor to the non-returnee rate of individuals that have received PhDs.

The USAID experience on returning students to Tunisia has been less than what was anticipated. However, it has been noted that in recent years once the U.S. trained Tunisian has returned, the likelihood of remaining in Tunisia to work after the visa stipulations are met is rather high in contrast to what was happening 12 years ago. Thus, at least in the short-term, the newly acquired skills are directly applied to the GOT development. Undoubtedly those who do not return are a loss. Moreover, as the GOT is quick to point out, the Tunisians working outside of the country have relatives at home who they send money or gifts which contributes to the growth of the economy and they will probably return home eventually to live and work. When they do, it is the thinking of the GOT that they will be even better prepared to assist with the development of Tunisia.

## VI. LESSONS LEARNED

- \* No back-to-back Degrees: It is extremely difficult to reintegrate into Tunisia, students who were absent 8-10 years, having left at age 18.

The Technology Transfer Project's relatively low return rate (about 60%) seems to be largely a result of the above lesson. Students were away too long and lost touch. The typical student went overseas to study at 18. When she/he returned 8-10 years later, she/he found that his/her French and Arabic language skills were not competitive with the Tunisian and French trained peers, and that she/he lacked familiarity with Tunisian "system". Nonetheless, there were some interesting patterns that emerged from analysis of returnee/non-returnee and their subsequent unemployment that are valuable guides, such as, those student who went for a shorter time and obtained a business related degree had a higher return rate and were readily employed while those obtaining PhDs had the lowest return rate. This low return rate among PhDs is also directly related to degree equivalency.

- \* Restriction of extensions is imperative to students quick return home.

The longer students are provided security through scholarships, the less likely they are to be prepared to confront the nexus between supply and demand, and private sector market forces. The TT program equipped extremely able students with excellent academic credentials but inhibited the acquisition of competitive skills because of the relative "security" that long tenure as a student developed. Under this project frequent extensions were granted to students to complete their academic programs. The approval process for academic extension needed to be limited to one semester with eligibility requirements clearly defined and enforced.

- \* Liberal policies of allowing students to return home during summer break was costly in three ways:

(1) It extended the time it took students to complete their degree since most universities offer a sufficient number of summer courses to constitute a full academic load that count towards graduation requirements; (2) it prohibited students from participating in short-term courses or internships that could enhance their employment chances upon their return; (3) it diluted the pain of separation from family and friends and weakened the incentive to return to Tunisia promptly after finishing their degree.

- \* Job identification, placement and counseling services have a direct correlation to the number and timely return of students.

The re-entry counseling and job placement services provided by AMIDEAST contributed greatly to the number of students returning and the types of jobs they receive. This service which keeps students abreast through E-mail, of the job market before they return, provides services for resume writing and general counseling around re-entry into the culture, proved to be a vital addition to the project. As a result of this service, several nascent alumni associations have developed.

- \* The method used by USAID to finance the scholarship portion of the Project did not provide an accurate way to measure students length of time to degree completion

Use of the FAR (Fixed Amount Reimbursement) caused the Mission to lose control of the project. Depending on the implementing agency MUST in the U.S. to provide an accurate accounting of the number of students studying and their status at any given time became a management nightmare. Using PIO/Ps to finance students would have been a better management route for project management and accountability.

- \* It is imperative to have a counterpart located in-country to ensure smooth running of the project, accurate communication and up-to-date information.

In 1989 when MUST in Washington, D.C. became the implementing agency the project became even more time consuming and labor intensive. At the same time there was an 18 month gap when there was no identified counterpart in the Ministry in Tunis. Therefore, problems that was identified in project management and implementation could not be readily and easily addressed. After the insistence by USAID that a counterpart be named within the Ministry, that person could make no decision without the clearance from the MUST office. This caused constant delays in the submission of accurate reports on students status due to the fact that the all students files and records were kept at the MUST office in Washington, D.C. Not having such records easily at its' disposal, USAID was at times literally force to reimburse for student studies just to keep the students enrolled.

#### VII. RECOMMENDATIONS

1. The GOT should retain the services of AMIDEAST or another similar organization to provide job placement and re-entry counselling to returnees no matter what country of study.
2. The GOT should explore all reasonable means of increasing the graduate return rate. Steps might include: 1) improve communication with students remaining in the U.S. which stresses Tunisia's investment in each student's education, and the responsibilities which each student has in securing his/her degree and returning to Tunisia to assist in the country's development; 2) enforcement of any contracts (bonding) that may exist with students.
3. An in-depth analysis of the non-returnee issues should be conducted to determine, 1) where non-returnees are currently located (U.S./third country); 2) what the status of non-returnees are (i.e. working/studying) and 3) a reasonable estimate of when that non-returnee will likely return to Tunisia.
4. The GOT should reexamine its' extremely liberal, and generous, policy of not only encouraging but supporting students through as many as three university degrees. This type of scholarship support is disguised welfare distribution. Carried to an extreme, it also creates a set of expectations in students that are antithetical to free market competition. GOT current policies indirectly contribute to the creation of an intellectual cadre who are ill-prepared for the realities of occupational life.

Clearance: Richard Rousseau/Private Sector Officer

James A. Graham, Director, USAID/Tunis

