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SCIENCE & TECHNOLOGY DEVELOPMENT PROJECT

Evaluation of Phase I

Prepared for

U. S. A. I. D. Mission to Tunisia

by

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INTRODUCTION

Objective of the Program

The objective of the Science and Technology Project is to further Tunisian national goals by the transfer of a certain mix of American technologies appropriate to Tunisian conditions. A.I.D.'s project paper dated August 1977 states that "In order to accomplish new five-year goals most effectively, the Tunisians wish to try adapting advanced U.S. scientific, technological and related managerial methods to their own use..." The 1974 DAP indicates, "Tunisia's financial position is much improved but is now at a stage where there is probably an even greater need than in the past for external technical assistance and technology transfer, precisely in those areas where the U.S. enjoys a lead." Again from the project paper, "Tunisians see A.I.D.'s role as that of a catalyst, setting in motion U.S. Tunisian cooperation which will continue after official assistance has ceased... The most important contribution of technology to development... is the ability of modern technology to provide planners and managers with up-to-date information they need for decision making."

The project was designed as a two-year effort to begin to effect a transfer of technology in five selected disciplines, moving towards a second phase of three additional years. It was planned that additional suitable fields for similar assistance would be identified during the first two-year effort. Phase I of the program, begun in 1977, experienced implementation delays which resulted in an extension of the first phase for another two years. Additional delays have been experienced during the extended period of Phase I, but A.I.D. has chosen to evaluate the project at this time with a view to its programming plans for Fiscal Year 1981.

Objective of the Evaluation

In a meeting on November 17, 1980 with the Director of USAID/Tunis and his program staff, it was explained that the Mission is aware to a large extent of the progress (or lack thereof) made by the respective sub-projects during Phase I. Although an objective measurement of the current situation is required, detailed input/output analysis of the sub-projects is not of as much interest at this time as a study of the problems which have caused the breakdowns and delays of certain activities during the course of Phase I, and the issues relating to the designing of a possible Phase II.

In a meeting with representatives of the Ministry of Planning and the Ministry of Foreign Affairs on November 19, interest was expressed in getting the positive and practical results of these projects adapted to assist the Tunisians in their attempts to achieve their development goals, and in the design of a workable, well-managed Phase II of the program.

Rather than incorporate input/output statistics of Phase I into the narrative, they will be summarized and included in annexes attached to the report.

Criteria for Evaluation and Issues Relating to Phase II

The major factors and criteria used to judge the progress and accomplishments of the on-going project were:

- A. Clarity of concept, sense of purpose and relevance to Tunisian development.
- B. Effectiveness of organization and the management of resources and problems.
- C. Appropriateness of the institutional settings to scientific development and technology transfer.
- D. Quality and effectiveness of training, technical assistance, and commodities supplied.
- E. Qualitative and quantitative progress to date as compared with the project design.

Issues to be addressed within the design of Phase II include:

- A. The need for, extent and content of Phase II.
- B. The proper focus of Phase II, including possible continuation of the program as presently designed.
- C. Determining if the strategy should be to support institutional development for a larger, more diffuse and widespread effort or to limit support to more narrowly targeted demonstrations and training.
- D. Determination of appropriate mechanisms to support GOT projects with planned duration beyond the life of the AID project.
- E. Assess the institutional capabilities to implement the project with particular emphasis on the availability of qualified human resources.

SUB-PROJECTS

Systems Analysis/Operations Research

Sponsored and organized by the Board on Science and Technology of the National Academy of Sciences, this sub-project was to place a team of four persons in the Office of the Prime Minister to address the problems of over centralization in the structure of the Government and excessive delays. A workshop was conducted by IAS to introduce the concept and to define the outline of a program. Approximately two years later the A.I.D. Mission was informed by a letter from the Ministry of Foreign Affairs that as a result of a study of the proposed program they had decided to cancel the activity because of a lack of means ("...faute de moyens.").

The decision to cancel the sub-project was evidently influenced by certain routine changes which took place in the Office of the Prime Minister during the two-year interim. Any introduction of proposals for structural changes made at the level of the Office of the Prime Minister would certainly have highly political implications.

There is no questioning the fact that the Government of Tunisia could use an infusion of competent assistance. If the sub-project had been introduced at another level, and concerned itself at least in part with the management problems of the science and technology sector, it might have caught on, and could possibly have served to create an entity on the Tunisian side to better manage the other sub-projects of the Science and Technology Development Program.

Computer Technology

The computer center managed by the Centre National de l'Informatique (CNI) is an important and growing segment of the Tunisian Government which will no doubt be used, eventually, to support all sectors of the nation's scientific and technical efforts. Demands on the Center's Honeywell Bull 6605 computer by various ministries, in particular the Ministry of Finance, have resulted in a decision to transform the current model into a HB 6620 model, in effect quadrupling its capacity.

CNI originally "...requested technical assistance from USAID in establishing its operational base, in managing a computer service center, in recycling and retraining personnel...and in formulating a national policy for computer applications." From the outset, the sub-project was frustrated by delays on the part of A.I.D. in determining the proper vehicle for assistance--whether PASA arrangement, contractor firm, personal services contract, etc.. Details of the delays are to be found in the project evaluation performed by USAID/T during June 1979.

During the time it took for AID/Washington to finally arrange for contract services, the basic nature of the assistance required by CNI had altered. The details of this important piece of information apparently never reached AID/Washington. If they did, then there was evidently a misinterpretation of CNI's new requirements. The new problem was and remains what should Tunisia do in the way of teleprocessing on a national scale, on establishing a data base sharing network among computer facilities in Tunisia.

Neither of the two advisors provided at successive intervals by the firm, Louis Berger International, were equipped to provide the services required by CHI. According to John Romagna of AID/Washington, there was a misperception of the problem on the part of both of the advisors. This was confirmed by senior officials of CHI who believed the mismatching of the advisors and the problem was caused by a failure of communication between USAID and CHI. Thus, after three years from the date of the signing of the project agreement, there has been no actual transfer of technology of any kind on this sub-project.

Jean Bologna, was visited Tunis in May 1980 at the mission's request to review CHI requirements, and devised a plan which will hopefully get this sub-project on the ground. His report (1) recommends obtaining the services of an I C or personal services contractor to assist in the process of finding the (tele-processing) technical consultant most suitable for this assignment. The technical consultant will assist CHI in

1. setting the desired level of tele-processing,
2. technical design of a tele-processing network,
3. phased implementation (including training and maintenance).

If the three steps recommended in the report are carried out successfully, no further advisory assistance would appear to be required on this sub-project.

An eventual step to be taken by CHI should be the tying of the Tunisian computer system into an international computer hook-up. This would provide connections to widely distributed public and commercial

(1) Some Quick and Cautious Observations on Teleprocessing Problems in Tunisia, John R. Romagna, Ph.D., Social Science Advisor, May 23, 1980

data banks throughout the world. TITNET, for example, interconnects with over 250 U.S. and non-U.S. metropolitan centers and outlying areas with access via telex or telephone. The introduction and initial costs of such a hook-up might be considered for funding under the Science and Technology project title at that time.

N. B. John Romagna's report is dated May 23, 1950. As of this writing, the I.C. consultant has not yet arrived in Tunis.

Remote Sensing

The objective of this sub-project "...is to develop a capability for interpretation and use of remotely sensed data derived from Landsat satellites. The project grant agreement calls for application of the most recent processing and interpreting techniques in a new remote sensing laboratory in the Soils and Water Directorate of the Ministry of Agriculture." (DRES).

In terms of U.S. input, Phase I of the sub-project--planned laboratory installation, upgrading and strengthening production capacity, participant training--has been completed. Details of the technical accomplishments of the effort to date are contained in a report prepared by the U.S. Geological Survey, the U.S. Advisor Institution:

Project Evaluation Summary, Tunisia, Sub-project 3, Remote Sensing,
dated September, 1980. The report also notes that, "Four active projects centered on interpretation of Landsat imagery were identified in July 1980:

- " Team of Geomorphologists working to produce erosion maps
- " Soils team mapping southern Tunisia at 1:200,000 scale
- " Hydrological investigations around Chott Djerid, by scientists headquartered in Sfax and Gafsa.
- " Geological interpretation for mineral prospecting, by a university team."

Further details of progress to date, although not in so precise a presentation, are contained in an August 1980 report issued by DRES. According to DRES, all participants have returned to functions in the Government where their training will be of value in terms of the remote sensing effort, with one exception who has returned to the U.S. for a Ph.D..

The A.I.D. project paper as well as the DRES report envisions the use of remote sensing by a broad spectrum of government agencies in addition to the various departments of the Ministry of Agriculture for purposes such as determining census patterns, marine pollution studies, archaeology, mining and oil prospection, etc.. The DRES report refers to plans, seminars, and actual work started in cooperation with other government and private agencies. However, it is not too clear to what extent progress is being made in this direction. The unit is new, and naturally subject to physical limitations.

It would appear that if the DRES laboratory is to emerge as Tunisia's principal remote sensing unit, an arrangement should be made with the Ministry of Higher Education and Scientific Research or similar "neutral" agency to assure effective across-the-board coordination with all users of this important service, assure that the laboratory is performing in accordance with national priorities, and to preclude any duplicative remote sensing efforts from arising elsewhere in the Government. USGS proposal for Phase II recommends the creation of a national commission, presumably for these reasons.

The U.S. input appears to have been well organized and implemented by USGS. There has been a certain lack of financial control resulting in USGS having spent around \$ 65,000 for services instead of the equipment for which it was budgeted. In addition, the sum was spent from USGS sources before having been committed by A.I.D.. Also, there has been a series of delays and misunderstandings due to communication breakdowns among DRES, AID/Tunis, AID/Washington, and USGS. For example, AID/Tunis has failed to keep AID/Washington informed on certain transactions made

directly with USGS, resulting in duplication of effort and confusion. Some of these difficulties have been caused by no one having been assigned responsibility for the project in AID/Washington for a lengthy period.

Use of AID/Tunis . by USGS as its agent in dealing with operational matters with DRES--such as whether or not to hire Bill Graham-- involves AID in day-to-day (which become month-to-month) problems which bogs the project down. Operational intercourse should be conducted directly between USGS and DRES to the greatest extent possible. DRES should be allowed to share some control of the technical assistance budget, allowing it some leverage in dealing with USGS. Disputes of a serious nature could be mediated by AID/Tunis.

USGS has made a proposal for a Phase II activity under this rubric. Having come this far, A.I.D. should support this worthwhile and functioning segment of the S&T program through Phase II. In consulting with Joseph Morgan of USGS, he stated that the Phase II budget totalled \$ 280,000 at that sitting, but if necessary the total could be reduced to \$ 150,000. Mr. Morgan referred to the desire of DRES to obtain equipment for digital image processing as a part of the Phase II effort. Charles Withington of DS/ST, AID/Washington (formerly of USGS) advised that equipment for an operation of this scale should be kept to a minimum and simple. It would appear from all this that should A.I.D. move ahead with Phase II, careful and objective consideration should be given to the selection of any significant equipment items for the project.

There remains the important question of continued U.S. contact after Phase II. The Committee on Remote Sensing for Development of the National Research Council recommended "...the establishment of a remote sensing

center at a U.S. university to create a significant U.S. capability in remote sensing oriented to the needs of developing countries, including the provision of advanced training." Remote sensing centers exist in a number of U.S. universities, such as the unit in the College of Marine Studies of the University of Delaware which has worked in a number of developing countries. USAID/Tunis should help establish a relationship between the DRES laboratory and one of these teaching units during the course of Phase II.

Petroleum Technology

Entreprise Tunisienne d'Activites Petrolieres (ETAP) carries out exploration, export/import of petroleum, advises the Government on, and coordinates petroleum activities in Tunisia. The sub-project was designed to increase the expertise of a selected group of ETAP engineers to more effectively perform their functions. The objectives of this sub-project are clear and valid. Tunisia has limited reserves of oil and gas. To develop and husband these reserves effectively, the services of skilled professionals are required. Specialized training in this field is widely available in the United States.

The sub-project has provided short-term specialized technical training in the U.S. for eleven engineers, now completed. Two additional engineers are currently in the process of obtaining master degrees at the Institute for Energy Research (Stony Brook, N.Y.) and the University of South Carolina.

During the course of the training program, Hassen Hedda, ETAP Project Director, visited the University of Oklahoma where five of his engineers were studying, and met one of their professors, Dr. Djebbar Tiab. Mr. Hedda considered Dr. Tiab's contribution so important that arrangements were made to bring him to Tunisia for a period of five weeks to carry out a series of seminars for ETAP engineers. The high value placed on the results of these seminars was expressed in a letter from the President Director General of ETAP to A.I.D. dated July 31, 1980. In terms of implementation and impact, the Petroleum Technology sub-project appears to be the most effective activity of the Science and Technology program to date. All trainees have returned to ETAP and are functioning in responsible positions.

A problem area cited by ETAP is the complexity of programming and scheduling--resulting in long waiting periods and loss of time--required to get trainees to their point of training in the United States. Rather than working through AID/Tunis and AID/Washington as currently set up, ETAP would prefer a method used with the French of receiving from them a schedule of actual training possibilities available and working out a program with a more direct line of communication with the training organizations.

ETAP is currently preparing a request for the training of additional personnel in reservoir engineering, drilling, and management functions for submission in connection with Phase II of the Science and Technology program. If A.I.D. proceeds with a Phase II, the Petroleum Technology activity should be continued.

In order to simplify A.I.D.'s management role, and at the same time involve the Tunisians more directly with the American petroleum industry for the long run, A.I.D. should consider the practicality of allowing ETAP to explore training possibilities directly through industry points of contact, such as the Society of Petroleum Engineers of AIME; the American Institute of Mining, Metallurgical and Petroleum Engineers; the National Petroleum Council; or the American Petroleum Institute. Direct industry contacts such as these could possibly lead to the development of permanent relationships which hopefully would ensure beyond the A.I.D. presence in Tunisia.

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- Society of Petroleum Engineers of AIME
6200 North Central Expressway, Dallas, Texas 75206
 - American Institute of Mining, Metallurgical and Petroleum Engineers
345 East 47th Street, New York, N.Y. 10017
 - National Petroleum Council, 1625 K Street N.W., Washington, D.C. 20006
 - American Petroleum Institute, 1801 I Street N.W., Washington, D.C. 20006

Pollution Research

This sub-project was designed to assist the Laboratoire Central in establishing a model pollution control laboratory in Gabes. The U.S. Phase I contribution--provision of short-term consultants, short-term training of four Tunisian technicians in the United States, and the provision of some specialized equipment--has, for all practical purposes, been completed.

Almost coincidentally with the preparation of this paper, several reports on various aspects of the sub-project were issued by the U.S. technical advisers. (1) These reports sum up a series of documented complaints which have built up during the course of the sub-project and which point to serious deficiencies in the management of the Gabes laboratory by Laboratoire Central.

U.S. trained Tunisian personnel have not been assigned to the Gabes facility as was planned. Local personnel at Gabes are not capable of carrying out an effective pollution control program. Much of the costly advice provided by the highly qualified principal advisor, Dr. A.F. Bartsch, and his technical support team, has been disregarded. In his draft final report of November 10, 1960, Dr. Bartsch states: "By usual standards the laboratory is not today an effectively functioning facility." He goes on to describe six problem areas dealing with management failures on the part of Laboratoire Central, which, if not corrected, will continue to prevent the effective functioning of the activity.

- (1) Memo of Nov. 10, 1960, Draft final report, by Dr. A.F. Bartsch
Memo of Nov. 10, 1960, Technical Assistance on USAID Project, by D.C. Kravczyk
Memo of Nov. 10, 1960, Trip Report, Pollution Research Sub-Project, by D.C. Kravczyk
Trip Report dated Oct. 1960: Survey of Pollution from Industries Chikhaouen Laghrebines Plant, by William Yoke

In a discussion with the Director of Laboratoire Central, Dr. Bartsch acknowledged the competence and valuable contributions of the U.S. technical advisers. He also cited a number of criticisms of the consultant team's activities none of which had any bearing on the deep-seated problems which have caused the project to bog down.

It is obvious there have been some deficiencies on all sides. What appears to be the most serious problem is the centralization of the decision making process by the Director of the Laboratoire Central with little delegation on his part either at headquarters or in the field. Until this management difficulty is resolved, decentralization is achieved, and properly trained personnel are assigned to the Gabes Laboratory, further progress will not be made.

The Director of Laboratoire Central complained of difficulties in dealing with A.I.D. personnel. The problems of USAID/T staff becoming over-involved in day-to-day sub-project operations, and recommendations, are discussed elsewhere in this paper. In this case, the concern of Mission personnel with the direction this project was taking, no doubt, accounts for certain strains which may have occurred.

All is far from having been lost on this sub-project. Technicians have received training in the U.S. and have returned to responsible positions at the Laboratoire Central. Consultations, technical advice and support, and studies have been provided, and much remains available in the form of reports. Equipment items have been provided which should not lose their effectiveness even if not fully used for a reasonable length of time. If Tunisia follows the U.S. pattern, these elements will be pressed into effective service by some higher authority when the levels of pollution in the country reach a critical stage.

It is clear, though, that the build-up of frustrations among the groups interested in the success of this enterprise has reached a point where the possibility of further progress under the existing working arrangements is doubtful. Since the U.S. contribution, as committed in the project agreement, has in effect been completed, the sub-project should be terminated with the end of Phase I.

SUMMARY AND COMMENTS ON PHASE I

On a scale of one to ten, and looking at the sub-projects from all points of view, a rating of achievement up to this time would appear to be roughly as follows:

Systems Analysis/Operations Research	0
Computer Technology	0
Remote Sensing	8
Petroleum Technology	9
Pollution Research	4
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Project over all (average)	4.2
Project over all (without SA/OR)	5.2

Reasons for the failure of SA/OR probably include politics (vested interests) and personnel changes at the Prime Ministry as well as the reason given by the Government of Tunisia. The project would appear to have been a wild thrust at the generally recognized need for management help throughout the Government. If the designers of the project believed the Science and Technology sub-projects would obtain some type of direct management support from SA/OR, they erred. SA/OR was introduced on a level far removed from the rest of the program, and its objectives did not relate particularly to either science or technology.

If anything shows through clearly in a review of the sub-projects, it is the need for better management performance in both A.I.D. and the Government of Tunisia. A.I.D. appears to be heavily responsible for the delays in the computer technology activity, and the delays have been purely bureaucratic ones. Phase I of the remote sensing sub-project has been completed but about a year behind schedule. Many of these operational

delays were probably unavoidable because of the nature of the operation of government agencies. Here, too many agencies are involved in a relatively light weight, but nevertheless complex program.

If the recipient Tunisian agency could work more directly with the technical consultant, eliminating A.I.D.'s operational role to the greatest extent possible, results should improve. Example: Hassan Hedda went to Oklahoma, observed teaching program, brought American Professor Djebbar Tiab back to carry out seminars under the only host country contract employed thus far by the Mission in this omnibus project. Results excellent. ETAP wants more of same.

If A.I.D. could put recipient Tunisian agency together with U.S. technical consultant in the manner of the operation of a host country contract, with A.I.D. acting as funding agency, mediator in the event of disputes, and financial controller, and eliminating its day-to-day role in operations, better management should result.

If this route is not possible, A.I.D. must tighten up its control over these operations, keep in closer contact with the sub-projects in order to better anticipate problems and not spend its time "putting out fires or serving as the 'whipping boy' for administrative deficiencies on the part of contractors or Tunisian Government agencies." Also the sub-projects should be covered at all times, both in Tunis and Washington, by responsible personnel. There apparently have been periods, especially in Washington, when no one was at the wheel.

On the Tunisian side, management difficulties are most clearly revealed in the recent reports of the U.S. technicians regarding pollution research. In addition to weaknesses in the management structure,

which should better evaluate and call into question the practices of the Laboratoire Central, for example, there is no apparent focal point for the coordination of science and technical projects as they relate to the whole range of Tunisian development goals. Positive developments in computer technology, remote sensing, and pollution research could make valuable contributions in many sectors. Efforts in these fields should be centralized in specialised agencies and the results disseminated throughout the public and private sectors avoiding duplication of equipment and personnel performing similar functions at lower levels of efficiency in other agencies. The focal point is also needed to make clear the priorities in the technical and scientific sectors. It would also serve as a point for the determination of where management assistance is required in the science and technology sectors, and a point of departure for the provision of management assistance.

A final thought: the most effective sub-project--petroleum technology--emphasizes training in the United States. The least advanced (of those started)--pollution control--emphasizes technical assistance brought to Tunisia. This may be a case for greater emphasis on "bourse" type training as favored by the Minister of Planning, and as being successfully carried out under the Mission's Agricultural Technology Transfer Project.

OBSERVATIONS ON PHASE II

Early in the conceptual or planning stage of the project, one of the stated objectives which emerged on the U.S. side was that the project should, "...foster recognition of the need for a national science and technology policy and assignment of an effective centralized responsibility for science and technology programs within the Government of Tunisia."

(1) Among other benefits to national development, this would establish a focal point for the determination of criteria to most effectively allocate resources, and assure equitable distribution of the benefits of a science and technology program. This objective has not yet been achieved.

The Ministry of Higher Education and Scientific Research (HE&SR) has indicated that it has the decision making authority in determining research priorities on a national basis according to a law of July 12, 1976. However, it does not appear to exercise this authority at least in the case of any of the disciplines involved in the S&T Project.

The Ministry of HE&SR has stated that it is in the process of creating a national committee for scientific research which will recommend priorities to the Minister of HE&SR. All Ministries will be represented on the committee. However, the Ministry of HE&SR expects no action on the establishment of this high level policy mechanism for at least another six months.

The problem as it affects USAID/Tunisia is not only the establishment of priorities, but locating a focal point in the operational level of the Government which would provide coordination, evaluation, and, ideally, share an important measure of project management functions with USAID/Tunisia.

(1) Near East Advisory Committee Statement per telegram 13394, dated January 20, 1977.

In view of results to date, the Mission should not proceed with a Phase II, as the project is currently structured, until this focal point in the Government has been identified and agreed upon.

In order to convey a measure of management responsibility to the Tunisian side, there appear to be several alternative directions for USAID/Tunisia to explore if it were to decide to continue the program along its present lines. (A) Consider limiting new sub-projects to the energy sector and propose to run the project through the Office of Energy of the Ministry of National Economy, taking advantage of the current political strength of that office, and turning over priority, coordinating, evaluating, management and functions to the Ministry. (B) Request the Ministry of HEESR to produce a prioritized list of activities from which USAID/Tunisia could select and negotiate a program for centralizing in that Ministry. National Science Foundation has recently proposed to the Government that it work out an agreement for scientific and technical cooperation with the Ministry of HEESR. (1) If this arrangement jells, NSF could be requested to assist the Ministry of HEESR with policy and management functions of the sub-project. (C) A similar arrangement could be considered, working with a unit of the Ministry of Plan and Finance, a neutral, more centralized agency with greater sensitivity to the Government's basic needs and limitations.

Hazards exist along each of these routes: (A) The Office of Energy is heavily overburdened with responsibilities at present. Even if it were to agree to shepherd a new group of sub-projects under Phase II, the likelihood of their receiving attention equal to the larger tasks being pursued by that office is doubtful. The S&T project could get lost in the shuffle.

(1) Letter 503518 from the Ministry of Foreign Affairs to U.S. Embassy dated November 12, 1980.

(B) The ability and willingness of the Ministry of HE&SR to concern itself with coordination, evaluation and management of the sub-projects is questionable. Also, NSF has been involved in sponsoring two scientific projects in Tunisia for several years: a geological study performed by the University of North Carolina, and the establishment of a soils laboratory at ENIT. According to records examined at the U.S. Embassy, the NSF experience has roughly paralleled that of USAID/T's Science and Technology program--an achievement rating of less than five on the foregoing scale.

(C) The Ministry of Plan would probably be the best place to center this responsibility. It is already involved in and familiar with all branches of Government. However, the Ministry lacks management staff, and the function of monitoring the sub-projects would no doubt be relegated to someone as a secondary, part-time assignment if the Ministry would even consider taking on the task.

The continuation of the S&T Project (Phase II) in its present unstructured form with the addition of more ad hoc projects would no doubt produce results similar to those of Phase I. There is no end of possible diverse, unrelated, small sub-projects in the scientific and technical fields which have been suggested for inclusion in Phase II:

Desertification/soil erosion control
Environmental impact assessment
Computerized data bank network for Ministry of Agriculture
Alternate Energy Studies
Bureau of Standards--general assistance
Improved charcoal production
Exploitation of underbrush
Reforestation
Etc.

Each of these carry as much potential for operational, organizational and political difficulties as the sub-projects now being pursued.

The interests of the U.S. and Tunisia would be better served by directing the limited resources made available for this program into an activity where potential for sound achievement has been proven, or at least appears more certain.

RECOMMENDATIONS FOR PHASE II

The computer and remote sensing sub-projects should be continued by the Mission to the conclusions described under their respective headings in the foregoing pages. While delays have occurred, they are well conceived activities which will ultimately be of benefit to Tunisia as well as to the United States. The Mission should also consider a second phase for the petroleum technology sub-project when the official request is received. A second phase would have as much if not more potential for success as Phase I. An effort should be made to link ETAP with the U.S. petroleum organizations listed on page 13 if the Mission decides to do this one. Whether these project activities should be lumped together and identified as Phase II of an S&T Project is for the Mission to determine in its programming exercises.

In a discussion at the Ministry of Plan at the outset of this evaluation, the Deputy Director for International Cooperation made a case for directing more of the resources available for this activity towards graduate level education in the United States, even at the expense of eliminating one or more of the sub-projects. He also indicated the need for assistance of this type in the health field.

The Director of International Cooperation of the Ministry of Health confirmed these needs, emphasizing particularly their weaknesses in the management area. The Ministry is evidently encountering much difficulty in the selection, allocation and maintenance of sophisticated medical equipment.

The Ministry also has had little direct contact with American medical institutions, and would like to explore U.S. training possibilities in orthopedics, patient rehabilitation, cardiac vascular surgery, and other fields where the U.S. state of the art is especially advanced.

After programming the three remaining sub-projects, the balance of the resources of the program should be directed towards a comprehensive U.S. training program--graduate level as well as technical--in a single field (single discipline) if possible, such as the health field mentioned above, or the energy field, if the government gives it higher priority. This new sub-project should be designed along the lines of the Mission's Agriculture Technology Transfer Project, an activity which is working well.

An encouraging sign from two directions: ETAP as well as the Ministry of Health have both recognized their need for management assistance, and are asking for it.

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