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INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

AGENCY FOR INTERNATIONAL DEVELOPMENT

WASHINGTON, D.C. 20523

PROJECT PAPER

EGYPT: Science and Technology for Development (263-0140)

July 30, 1985

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AGENCY

PROJECT DATA SHEET

A = Add
C = Change
D = Delete

A | 3

2. COUNTRY/ENTITY
ARAB REPUBLIC OF EGYPT

3. PROJECT NUMBER
263-0140

4. BUREAU/OFFICE
USAID/Cairo
HRDC/S&T Office

5. PROJECT TITLE (maximum 40 characters)
Science and Technology for Development

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)
MM 07 DD 01 YY 93

7. ESTIMATED DATE OF OBLIGATION
(Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 85 B. Quarter 3 C. Final FY 02

8. COSTS ($000 OR EQUIVALENT $1 = 0.83168L.E.)

A. FUNDING SOURCE	FIRST FY 85 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	3000	--	3000	131,600	--	131,600
(Grant)	(3000)	(--)	(3000)	(131,600)	(--)	(131,600)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1.						
Other U.S. 2.						
Host Country		300	300		65,900	65,900
Other Donor(s)						
TOTALS	3000	300	3300	131,600	65,900	197,500

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) SA	750	870		--	--	3000	--	131,600	--
(2)									
(3)									
(4)									
TOTALS									

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)
710 | 550 | 860 | 950 | 960 | 970

11. SECONDARY PURPOSE CODE
510

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	RGEN	R/H	INTR				
B. Amount							

PROJECT PURPOSE (maximum 480 characters)

The purpose of the project is to enable the S&T community to solve national development problems and constraints through applied research and technology in the fields of health, productivity and science and technology.

DISTRIBUTED

14. SCHEDULED EVALUATIONS
Interim MM 07 YY 88 MM 03 YY 90 Final MM 06 YY 93

15. SOURCE/ORIGIN OF GOODS AND SERVICES
☒ 000 ☐ 941 ☒ Local ☐ Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment)

USAID/Egypt Controller concurs with the proposed methods of implementation and funding

Homi Jamshed, Acting Controller

17. APPROVED BY
Signature
Title Frank B. Kimball, Mission Director
Date Signed MM 07 DD 30 YY 85

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
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SCIENCE & TECHNOLOGY FOR DEVELOPMENT
(263-0140)

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I. PROJECT SUMMARY AND RECOMMENDATION

A. Goal and Purpose

The overall goal of the Science and Technology for Development (STFD) project is to improve the welfare and productivity of the Egyptian people. The purpose of the project is to enable the Egyptian S&T community to solve national development problems and constraints through applied research and technology in the fields of health, productivity and science and technology.

The overall project purpose will seek:

- to maximize the contribution of science and technology to Egyptian socioeconomic development;
- to generate and extend interdisciplinary and interinstitutional cooperation;
- to develop, introduce and transfer technologies to meet important and well-defined end-user needs.

B. Summary Project Description

The S&T for Development project is an eight year endeavour with estimated total funding at $197.5 million: an AID ESF grant of $131.6 million and a GOE contribution of $65.9 million in kind. Of these figures only $3 million will be required for the first year -- a start up/planning phase -- these figures are reasonably firm. Figures for component implementation (Phase II) are currently best estimates subject to further review and approval by AID following detailed planning of each component.

The project calls for the integration of Egyptian and AID resources to solve higher level and more complex problems in health, land-use, energy and industrial productivity. The project's primary focus will be on development problem solving and technology transfer to meet end-user needs.

The general requirements of the project include: a) building on capabilities developed by previous projects, both bilateral and multilateral; b) establishing R&D management systems and R&D processes which will remain after project completion; and c) developing methods of more carefully planned and effective technology transfer.

The project uses an umbrella framework to direct technical and financial resources rapidly and effectively to three new initiative areas, or project components. The project components are:

1. Critical Childhood Diseases: This component will be a comprehensive research and development effort to conduct basic and applied research on the discovery and development of vaccine agents for the control of Schistosomiasis in Egypt.

2. Productivity: This component will assist Egypt in making effective use of its human, capital and natural resources by increasing productivity through better use of its lands and reduced energy consumption. Two initial activities identified are:

a) Land Use: the objective is to develop modelling systems to make best choice/least cost decisions on the use of lands for residential, industrial and agricultural purposes.

b) Energy Management and Training: the objective is to promote and accelerate the adoption of energy efficient technologies and operational practices by energy consumers, and to further develop indigenous technical and management capabilities in energy production, use and advanced energy technologies.

3. S&T Cooperation: This component will promote research on economically and socially important problems that confront Egypt at both the national and governorate levels. Research categories may include such areas as water use, rural productivity improvement, construction materials, plant biotechnology and microelectronics.

C. Implementation

The project components will be implemented by various GOE agencies, research institutes and universities with responsibilities in the areas relevant to component activities. These are tentatively identified in the individual component descriptions. The initial project phase (Phase I--first year) will be used to plan each of the components' activities and management and implementation plans. Component implementation will start after each plan has been approved by USAID.

The project will be managed by the S&T Office. In order to promote maximum joint effort, each component will feature an Egyptian-U.S. management system made up of USAID and implementing agency members. The system will consist of a policy steering committee to ensure that component activities support component goals. A technical secretariat for this committee will have shared responsibility in subproject activity planning, implementation and monitoring, and for decision making and day-to-day operation. The secretariats will be assisted by U.S. and Egyptian consultants.

D. Budget Estimates $(000)

Components	AID	GOE	TOTAL
1. Critical Childhood Diseases	33,200	12,200	45,400
2. Productivity			
A. Land Use Planning	7,557	940	8,497
B. Energy Management	47,455	13,061	60,516
C. Energy Training	7,100	680	7,780
3. S&T Cooperation	36,300	39,000	75,300
TOTAL	131,600	65,881	197,495

E. Recommendation

It is recommended that (a) a grant for $3 million be authorized for the Science and Technology for Development (STFD) Project for the project's first year planning and start up (Phase I); and (b) that the Project Authorization and Project Grant Agreement contain language committing us, in principle, to funding of the follow-on components as planning arrangements for those components are completed.

All statutory requirements have been met and the NEAC issues concerning the project have been answered.

II. PROJECT BACKGROUND AND DESCRIPTION

A. Introduction and Background

Egypt has a sizeable and well-trained science and technology (S&T) community. However, linkages between Egypt's S&T community and the R&D needs of productive enterprises in both public and private sectors are still weak or relatively undeveloped. Within the S&T community there are also gaps in expertise, a bias towards basic or fundamental as opposed to applied research, and problems in institutional orientation which inhibit the organized and systematic application of available knowledge to pressing development problems. Despite examples of institutional excellence and individual research achievements, Egypt's S&T community does not yet fulfill its potential contribution to national economic development.

Mobilizing Egypt's S&T community to make an expanded contribution to the solution of priority national development problems is a critical need. Egypt's rapidly expanding population and food imports and its limited prospects for major expansion of agricultural production in the shrinking arable land base of the Nile Valley and Delta imply that new directions for economic growth must be developed and sustained. Industrial productivity has been stagnant and exports of finished goods must rise sharply to help alleviate Egypt's balance of payments deficits.

Science and technology and an effective applied R&D capacity are essential ingredients for sustaining broadly-based development. Egypt's S&T community has the potential to help provide new and adapted technologies capable of raising productivity and incomes, reducing mortality and illness, and coping with economic and environmental constraints. Effective application of science and technology can increase the effectiveness of development efforts. However, in order to realize the S&T community's potential contribution to

development there must be an increased orientation of the S&T professions toward greater involvement in applied research and more direct collaboration with the production sectors.

After more than a decade of GOE/USAID cooperation in the redevelopment of the capacity of the Egyptian S&T community, its components have added substantial strengths and capabilities which are applicable to the solution of major S&T problems affecting the Egyptian economy. In general, however, despite some advances in organization and coordination, there is still no overall system of intersectoral cooperation and necessary interdisciplinary research to bridge the gap between the needs of end-users of technology and its development.

1. Present Status of Egyptian S&T Community

The S&T community, broadly defined, includes the consumers and users of the technology output. Primary sources of science and technology production are:

- Twelve public universities with associated research institutes and centers.

- Approximately 260 research institutes and laboratories of various ministries.

- The Academy of Scientific Research and Technology which includes an administrative structure for broad S&T policy recommendations and coordination, as well as responsibility for the National Research Center and seven national research institutes.

In the industrial sector there has been relatively little development in R&D for new technology although, reportedly, 80 of the 117 public sector industries have established R&D units. These are reported to serve primarily as technical service units, dealing largely with daily operational problems.

Private sector companies generally do not support R&D activities primarily because of their small size and limited resources.

The R&D units composing the S&T community vary widely in their capacity and capabilities. In the main, despite various attempts to coordinate efforts, the segments to a large extent still operate independently.

a. Universities

Among the twelve universities, the most highly developed in terms of R&D capabilities for Science and Technology are Cairo, Alexandria and Ain Shams Universities. Seven other regional universities have been established over the past fifteen years and are less well developed in science, engineering, agriculture, health and social sciences.

Research efforts and organizations within the universities have traditionally been, and continue to be, directed toward "academic" research with the main objective being journal publications. In a Middle East context that production is substantial. According to a 1978 survey, in 12 selected technical fields Egypt was the most active Arab country in international scientific publishing, outpublishing ten other Middle Eastern countries combined by a ratio of about 3 to 2. Based on somewhat earlier data, the publishing rate per unit GNP was more comparable to developed than developing countries.

Questions of the overall scientific impact of these publications were raised in the 1984 Science and Technology assessment based on the frequency of citiation of Egyptian articles for 1973 within the international scientific community. Nevertheless, based on 1973 statistics, Egypt marked fourth among Third World countries in total publications. It can be assumed that the substantial growth in S&T capabilities has kept Egyptian universities in a relatively strong, central position in Egyptian and Middle Eastern Science and Technology production, capabilities and potential.

In manpower terms, substantial production of scientists and engineers has continued during the past ten years. It is estimated that there are now up to one million university graduates in Egypt, including approximately 30,000 Master's and 16,000 doctorates. In 1979/80 approximately 120,000 students were registered in science, engineering and agriculture with over 20,000 graduates. In medicine and pharmacology, 52,000 students were enrolled with over 6500 being graduated. In 1981/82 a total of 1150 Ph.D.s and 3550 Master's degrees (in all fields) were awarded. Assuming that similar enrollments and production will continue, there will be a steady flow of scientific and engineering personnel available for development activities.

In terms of Science and Technology production, universities are hampered by constraints of high enrollment, low salaries for faculty members which forces them to seek additional sources of income or employment in other countries, and inadequate budgets for research, along with pressure to publish for promotion. These factors, along with limited experience in the identification of practical problems and in interdisciplinary research or inter-institutional collaboration severly reduce university contributions to the solution of major economic problems.

b. Ministerial Research Institutes and Centers

The large number of research institutes and laboratories attached to various ministries are organized around specific assignments, e.g. Building Research Institute, Tropical Medicine Research Institute, Desert Research Institute, and even though some activities may overlap, each institute functions essentially autonomously. General information about resources and productivity of Institutes has been difficult to obtain and is primarily anecdotal, but the general view prevails that there is a considerable variation in facilities, capabilities and S&T production which is primarily a function of the leadership of the unit even with institutes in the same ministry. While there has been more effort in recent years to establish

cooperative relationships between university and institute researchers, such cooperation has been sporadic.

At this stage, the institutes, with some notable exceptions, represent primarily a potential resource for the creation and transfer of technology necessary for solutions to major problems facing Egypt.

c. The Academy of Scientific Research and Technology (ASRT)

This organization has an unusual structure in that it is both a coordinating body for Science and Technology efforts in Egypt and is also administratively responsible for the National Research Center and seven national research institutes including the Remote Sensing Center, the Petroleum Research Institute, the Theodor Bilharz Institute for endemic Diseases, and the National Institute of Standards.

The coordinating function of the Academy includes responsibility for general recommendations on national science and technology policy and for providing decision makers with studies, options and analytical reports reflecting current situations in S&T matters and the recommendations of Egyptian scientists and technologists on national priority issues.

To provide for the coordination of policies and the formulation of recommendations, the ASRT operates with a National Research Council with a number of specialized research councils and committees. The National Research Council includes representatives of Egypt's technical ministries with S&T responsibilities, and representatives of the Universities and industry as well as other organizations such as the National Research Center, the Egyptian Scientific Union, and an Undersecretary of State. The Council's work is directed by a separate Bureau and is serviced by a Technical Secretariat.

In 1981, the ASRT prepared Egypt's first-ever five-year plan for Science and Technology as part of the Academy's responsibilities for establishing policy and priorities for scientific research directed towards the goals of the national development plan. Some projects have been funded under this plan but details of areas and level of funding have not been made available.

The GOE provides the ASRT with funds for research, which the Academy in turn allocates to its own institutes. The National Research Center (NRC) created in 1956, is independently funded and administered but functionally responsible to ASRT. It is the largest applied R&D institution in Egypt, with a staff of over 1400 professionals organized into twelve divisions. The Center is governed by a Board of Directors, which includes the heads of the divisions of the NRC and representatives of the Ministries of Industry, Agriculture and Heath, the primary areas of concentration for the Center. In addition to internal funding, projects are supported by direct contacts with industry and ministries.

The primary function of the NRC is intended to be R&D services to industry and other users of technology. In that sense many of its research laboratories have R&D efforts which parallel these of laboratories of the ministries which it mainly serves, and which have grown significantly in strength during the 30 years of NRC existence.

Also while the Center has clearly defined responsibilities for applied research, research efforts have tended towards the academic in many cases, with many not directly aimed at major problems and needs as defined by end users of the technology. In recent years there have, however, been substantial efforts to provide more focus on end-user needs and on the development of more effective R&D management with some progress in both areas. Even though the ASRT has been given overall responsibility for the coordination of S&T activities, it has not been able to achieve the level of cooperation, overall management structure and focus needed to provide a strong

impact on the solution to socioeconomic problems. Likewise, the National Research Center, while substantially improved in capabilities and productivity in applied research and development has not played the central role in overall coordination which might have been anticipated by its structure and scope of activities.

In summary, as was found in the joint S&T assessment, it is not possible to provide an objective evaluation of the actual strength of the components of the S&T community. The details of budgets, personnel, active projects and successful achievements have not been made available in any systematic way. It is only possible to extrapolate from performance on joint GOE/U.S. projects. Here performance and productivity have ranged from world class to marginal. Nevertheless, viewed as a whole, the community is judged to be quite capable of attacking major S&T related economic problems given the appropriate structure and management.

2. Cooperative GOE-U.S. Activities in S&T

Over the past ten years, the importance of Science and technology in meeting Egypt's needs in industry, energy, agriculture, health and infrastructure development has been increasingly recognized by the Government of Egypt. This recognition is evident in the present consideration of a National Science and Technology Policy and the initial funding of GOE of portions of the ASRT Five-Year Plan for Science and Technology. Nevertheless, there have not been clear examples of comprehensive and integrated solutions to major S&T national development problems which will crystallize this recognition, further elevate the status of the S&T community, and stimulate the GOE to provide the level of funding that future successful efforts will require.

To achieve that level of recognition requires building the S&T process, i.e. the capacity, resources and management to attack these highly complex problems. Overall, building that process has been the major focus of joint GOE/U.S. activities.

Support for development of the S&T community began in 1961 with the use of PL-480 funds. Since that time over 400 projects in that program were carried out involving direct linkages between Egyptian and U.S. researchers. Since 1974, through GOE and GOE/USAID joint efforts, major progress has occurred and there has been a continual improvement in S&T capabilities. Early efforts focused on essential institution building and staff training. Later efforts were designed to continue institution building but to begin to focus on the solution of major problems facing Egypt in major sectoral areas such as Agriculture, Health, Energy and Industry.

In addition to S&T related institution building and research carried out in direct sectoral projects, there have been five specific projects used by the S&T office and the Education and Training office to build Egyptian S&T capabilities. They are:

1. University Linkages (initiated 1980).
2. Applied Science and Technology (initiated 1977).
3. Development Planning Studies (DRTPC) (initiated 1978).
4. Peace Fellowships (initiated 1979).
5. Technology Transfer and Manpower Development (initiated 1977).

The first three projects are essentially institution building in nature and are specifically designed to substantially increase the capacity and effectiveness of the Egyptian S&T community to carry out applied research and accomplish technology transfer. Each focuses, to varying extents, on R&D management development, the evaluation and administration of applied research projects and on end-user needs. To date, more than 300 research projects have been funded.

The University Linkages project provides broad general support for research and research equipment for faculty members at Egyptian universities. The focus is on end-user needs according to established priorities of topical

fields, but the major objective of the project is to build applied research capabilitites to meet development needs.

The Applied Science and Technology project is a more broad-brush approach involving the Academy of Scientific Research and Technology and its related institutes. The goals of this project are also institution building. The major objectives are to strengthen the applied research and technology capabilities within the Academy by addressing the research and management structure and support services including equipment acquisition and maintenance, and the initiation of a nationwide Science and Technology Information System. As a vehicle for development of these capabilities individual larger projects have been funded which are end-user focussed

The Development Planning Studies Project takes a third and different approach to meeting S&T objectives. The establishment of the Development Resources and Technical Planning Center (DRTPC) mobilized academic resources at Cairo and other universities for applied research on selected developmen problems. The DRTPC gives a management focus to highly selected research areas in response to problems identified by ministries and industries. As a separate organization it operates on a contract basis and has established a totally new management structure and operating procedures, flexible research teams, and customized research portfolios.

Under the Peace Fellowships and Technology and Manpower for Development projects, extensive training has been provided in technical and managerial aspects of S&T related areas. Under these programs more than 500 university faculty members have received additional training in scientific and technological subjects.

3. Proposed New Activities in Science and Technology

Because of continued concentration in developing capabilities and facilities, previous projects covered a wide range of topics and lacked focus. They

provided substantial improvements in Egypt's capacity to conduct applied research, trained a substantial number of scientists, engineers and technicians, supplied major scientific equipment, and improved management capabilities for research and development and technology transfer. While important in developing the S&T infrastructure they did little in resolving socioeconomic problems.

Subsequently, the need to test the strengthened S&T capacity became apparent, as did the need to apply those strength to resolving some of the major economic and social problems.

To evaluate those problems and relate S&T strengths and capabilities to their solutions, a major joint (Egyptian-U.S.) assessment of S&T was undertaken in 1983-1984. The assessment confirmed a pattern of individual successes in selected USAID supported subprojects in applied research and substantial progress in institution building in Egyptian universities, ministry and GOE research institutions and in the coordinating functions of the Academy of Scientific Research and Technology. It also confirmed the need for a more powerful impulse to mobilize, develop and channel Egyptian S&T capabilities in solving priority development problems.

The conclusions from the Assessment strongly reinforce the fact that Science and Technology requirements undergird the myriad development problems facing Egypt, whether in food, tranportation, housing, energy, industry or land use. Another conclusion reinforced is that sociological and socioeconomic research must be an integral part of the development process to ensure acceptance and utilization of R&D results by end-users.

Additionally, a review of USAID Country Development Strategy Statements (CDSS) indicates the fundamental dependence on S&T information, processes and management systems for support of many sectoral projects. For example, examination of present and potential programs listed in recent CDSS's for some sectoral offices illustrate clearly the need for S&T contributions. These include:

Agriculture: seed varieties, modification and production; irrigation practices; water conservation; cropping patterns; development of high value crops; systems research for production and packaging of perishable exports; land reclamation and social aspects of agricultural development; insect control.

Industry: process design and engineering improvements; development of indigenous R&D capabilities and management; discovery, analysis and development of natural resources; increased energy efficiency; development of new products and materials.

Health: disease research, vaccine development; low cost diagnostic tests; sanitary engineering; water; air pollution; general biomedical research and technology development; social science research on health services; maternity and child care and nutrition.

Urban Development: land use in peripheral areas; transportation research; waste disposal; water and air pollution; waste water management; treatment and reuse; low-cost housing; energy conservation and management; corrosion of structures; telecommunications; urban and regional planning; construction materials and practices.

Education and Training: development of research capabilities and cooperative institution building in selected areas (sanitary engineering, industrial engineering, applied social science research)

The S&T office, after analyzing past and current projects and the joint S&T assessment, formulated a new USAID assistance program to bring focus and direction to the present relatively diffuse and disparate group of projects. The program is intended to provide a framework for GOE/U.S. S&T cooperation over the next ten to fifteen years and is designed to build on previously developed Egyptian S&T capacity to provide solutions to well-defined and major

development constraints. This effort represents the third phase of the process of development of Egypt's S&T community discussed above, i.e., providing solutions to major problems to demonstate the critical importance of science and technology in contributing to the national economy.

Above all, it is clear that the time has come to test the effectiveness of previous building efforts by focussing on, and providing direct solutions to major problems facing Egypt. As a first principle in this approach, the direct involvement of end-users is crucial and must be an integral and continuing element not only in the application of results, but also, in the conception, planning and execution of programs or projects.

In addition to testing developed capabilities, each effort undertaken should force the further development of structural and management relationships and processes, and information sharing and cooperative efforts that have previously been lacking and have reduced the effectiveness of previous efforts.

To make this fundamental change in direction for specific projects within the S&T office there is a set of objectives which must be met. The project(s) must provide:

1. Solutions to major Egyptian development problems.

2. An effective process for end-user involvement in definition of needs, and in project planning and execution.

3. A well-defined, effective system for direct application of results by end-users.

4. Integrated project elements and manpower organization which will require information sharing, interdisciplinary efforts in planning and execution of projects, and cooperation of S&T agencies for successful completion of the project.

5. A mechanism for further development of Egyptian R&D management capabilities which fits their management approach, in and through the achievement of project objectives.

6. A mechanism for increasing Egyptian responsibility in planning, organization and execution of projects.

7. Further institution-building as required for successful completion of the project, but in a focussed, comprehensive and sustainable approach which will close gaps in the system.

8. A mechanism for exploring less well-defined S&T areas to provide information and capabilities which can be used to formulate major projects as a basis for potential areas of cooperation.

The incorporation of these objectives into selected projects requires a level of planning with other USAID sectoral offices and Egyptian counterparts that is new, complex and difficult. To facilitate the process, new levels of integration and cooperation will be required within the Mission, with Ministries, the Academy for Applied Science and Technology, and the Universities. Special attention to the process will be required as project planning commences.

These considerations have guided the planning and selection of project components in the Science and Technology for Development project. Out of the numerous possibilities suggested in the Science and Technology Assessment and areas of sectoral interest, a limited number of projects of varying depth and complexity have been chosen which not only will have major impacts on Egyptian socioeconomic problems but which also will require coordination between concerned ministries, research units and end users to develop the effective system for their solution. The first three components: Critical Childhood Diseases: Schistosomiasis; Productivity: Energy Conservation and training, and Land Use; constitute these types of major problems.

Work on Schistosomiasis will involve the entire range of health resources from R&D through production and distribution of medical agents and services. Questions of energy conservation and land use planning are important to, and cut across the activities of several ministries and will require a degree of cooperation which, heretofore, has not been attempted.

The fourth component, a grant program organized under Science and Technology for Cooperation, will serve not only to build the system on a smaller scale but will serve to identify crucial problems and organize R&D activities, again with the cooperation of end-users, which can lead to additional major projects as needed background data and information are assembled from the results of the grant activities.

In summary, this project is intended not only to solve substantial problems with direct and immediate value in Egyptian economic and social development, but also to provide models for coordination of activities of the S&T community which have, in the main, been lacking in previous efforts.

To meet these objectives, USAID will assist the GOE to marshall Egyptian technical and management capabilities to pinpoint critical problems and structure comprehensive S&T projects to develop technological solutions and their practical application. In this context, the focal point will move from one of broad-based capacity building to a primary focus on resolving a limited number of development problems and on technology transfer to meet important and well-defined end-users needs. This key departure represents the core of the S&T program, and provides a framework that is development-oriented rather than one driven by scientific disciplinary interests.

B. Project Goal and Purpose

The overall goal of the Science and Technology for Development Project is to improve the welfare and productivity of the Egyptian people. The purpose of

the project is to enable the Egyptian S&T community to solve national development problems and constraints through applied research and technology in the fields of health, productivity and science and technology.

The overall project purpose will seek:

- to maximize the contribution of science and technology to Egyptian socioeconomic development;
- to generate and extend interdisciplinary and interinstitutional cooperation;
- to develop, introduce and transfer technologies to meet important and well-defined end-user needs.

Each of the individual components will have its own more appropriately defined purposes and objectives. These are generally defined below and will be specifically articulated during component planning in phase I.

C. Project Description

The S&T for Development project is an eight year endeavour and is funded at a total estimated cost of $197.4 million of which AID will provide a grant of $131.6 million and the GOE will contribute $65.9 million in kind. (other than $3 million in planning/start up costs (Phase I), cost and administrative planning for each component's activities remain to be determined at the planning stage).

This project represents a new, more sophisticated phase of assistance to, and working with, the Egyptian science and technology community. The project calls for the integration of Egyptian and AID resources to solve higher level and more complex problems in health, land-use, energy and industrial productivity. The project's primary focus will be on development problem solving and technology transfer to meet end-user needs.

The general requirements of the project include: a) building on capabilities developed by previous projects, both bilateral and multilateral; b) establishing R&D management systems and R&D processes which will remain after project completion; and c) developing methods of more carefully planned and effective technology transfer.

The project will use an umbrella framework to permit a faster and more flexible technical assistance effort. In developing the framework, the intent is to direct technical and financial resources rapidly and effectively to three new initiative areas, or project components. The new initiatives are intended to provide achievements in technical areas which will have national and international impact. These efforts will involve the marshalling of research capabilities across required disciplines, development of management processes for research, development of needed capabilities where they do not exist, and development of technology transfer for increased productivity where necessary. The project components and total estimated funding is:

1. Critical Childhood Diseases ($45.4 million)
2. Productivity
   A. Land Use ($8.5 million)
   B. Energy Management and Training ($68.3 million)
3. S&T Cooperation ($75.3 million)

The next Section (III) provides a brief description of each of the components, including a problem statement, goal and purpose, description and outputs. Sections IV, V and VI provide proposed management, financial and implementation plans. We anticipate that details and costs of these components may change somewhat during the project's planning/start up phase.

III. DESCRIPTION OF PROJECT COMPONENTS

III.1. CRITICAL CHILDHOOD DISEASE: SCHISTOSOMIASIS

A. Problem:

High morbidity and mortality, largely in the area of controllable diseases, have been continuing problems in Egypt despite growing strengths in biomedical research capabilities and continued efforts in developing health delivery services. The major diseases contributing to this situation include diarrheal diseases, acute respiratory infections, Schistosomiasis, and other diseases which could be prevented by immunization.

Diarrheal diseases and acute respiratory infections are actually families of diseases with multiple causes. These diseases are particularly serious among infants and younger children, with 50% of total deaths in Egypt occurring under the age of five, primarily from these types of infections. Moreover, the two classes of disease are interrelated, with the weakening effects of diarrhea frequently being linked to the onset of other infections, particularly respiratory infections. Present approaches to control are concentrated in Oral Rehydration Therapy and a potential vaccine for Rotavirus for diarrhea and control of respiratory infections with early diagnosis and treatment.

Prevalence of Schistosomiasis, a major debilitating disease and one of the most extensively studied diseases in Egypt, still has not been completely defined, but it has been estimated that twenty million people are at risk from the disease, with an estimated annual cost to the economy of $200 million. Even though the cycle of Schistosome from human to snail to human is well understood and an effective curative agent is available, control is complex and expensive. This results from the high probability of reinfection;

especially in younger children, because of social customs, inadequacies in water supply and sanitary conditions, the cost of massive, repeated drug treatments, and the high cost of molluscicides.

In purely economic terms, setting humanitarian considerations aside, failure to control these diseases has major direct and indirect impacts. Attempts to provide even fundamental health care, particularly in rural areas, is high-cost and, when applied in the face of frequently reoccurring serious diseases, represent a drain on funds which are in short supply and could otherwise be more effectively applied.

The constant struggle against controllable disease must be paid for either in financial or human terms, the former in the form of taxes, out-of-pocket expenditures or expensive deficit financing; the latter, in terms of decreased labor productivity and increased pressure for larger families particularly in rural areas where the uncertainties of child survival are highest.

When the human dimension is considered in addition to the economic costs, there is a clear, major need to provide more basic control of these diseases. The approaches to control, however, present complex and difficult obstacles. These have been attacked on a variety of fronts by the GOE but there has been no concerted, coordinated effort to focus the efforts of the biomedical research community on the problems, primarily because of lack of funds and gaps in technological capabilities.

Ultimate control of each disease will require the development of effective, stable vaccines for mass immunization. The development of such vaccines, while difficult, is technically feasible and extraordinarily important for Egypt and other developing countries. To mount a successful effort would require substantial strengths in the biomedical R&D area, which Egypt has, and would require a long-term effort in organization of R&D activities, epidemiological and clinical studies, and planning for production and delivery.

To undertake a vaccine research and development program on diarrheal diseases and acute respiratory infections would mean diffusing funds and effort on approximately six different varieties in each category. The effort and time required are further compounded by the sparseness of etiological and epidemiological data and the large number of causative agents. Moreover, world-wide research efforts are in progress on these ubiquitous diseases and the present strength of an Egyptian biomedical R&D effort would offer only marginal contributions.

Schistosomiasis, however, is a different case. Limited to two varieties, it provides an opportunity for a sharply focused research effort. Its etiology in Egypt has been well-defined. Substantial epidemiological work has been done and a system for application of controls has already been established in several sections of the country. As a result, a considerable body of knowledge and expertise on the disease exists in Egypt. Internationally, much less emphasis has been placed on the disease because of its lack of prevalence in developed countries, even though several of them have the technological capacity for vaccine development.

Considering the present state of knowledge on these diseases, the potential strengths of the Egyptian biomedical community and its strong relationship with NAMRU-3, NIH and CDC, a concerted attack on schistosomiasis offers the possibility for major advances against the disease and high potential for successful development of a vaccine.

B. Goal and Purpose:

The goal of this component is to improve the health of the Egyptian people. The primary purpose is develop a vaccine, associated rapid diagnostic agents and complementary chemotherapeutic regimens for detection and control of Schistosomiasis.

A secondary, but equally important purpose, is establishing an organized, biomedical research system of R&D capabilities, R&D management and technology transfer mechanisms which can be replicated to attack other major biomedical problems.

This component will seek to organize a comprehensive interdisciplinary R&D effort which builds on Egyptian and U.S. capabilities to conduct necessary research on the control and improved treatment of Schistosomiasis. It will provide, in cooperation with the USAID Health Office, an organized continuum starting with research and development--including essential basic research, clinical work, production of a vaccine, and social science research--through to the organization and staffing of necessary delivery systems.

C. Description:

The component will involve interdisciplinary team work in four subdivisions of an R&D program:

1) Laboratory studies - to develop rapid diagnostic agents and techniques, a vaccine and improved chemotherapy regimens.

2) Clinical studies - to test diagnostic agents and to establish treatment success and effectiveness of the vaccine and/or chemotherapy.

3) Comprehensive epidemiological research-to specifically define incidence, prevalence and severity of Schistosomiasis.

4) Behavioral and economic studies - to develop effective procedures for detection, cost effective delivery methods and associated improvements in social habits and sanitary conditions.

Because of the complexities of vaccine development and strong social and behavorial patterns which exist in rural areas, overall control of the disease can best be accomplished by a four-pronged approach:

1. Laboratory Studies

a. Vaccine Development--The main focal point will be the development of a vaccine which will be effective against cercaria, that is, the form of the parasite first infecting humans. The ideal vaccine should be effective, efficient, long lasting, stable under Egyptian climatic conditions, specific and inexpensive. At present, a radiation attenuated cercarial vaccine is available which, in laboratory studies, has provided a 40-70% reduction in worm burden. The vaccine is unstable and must be used when freshly prepared or preserved under low temperature conditions, making it unusable for any major studies. Nevertheless, it represents an important starting point for isolation of antigens and development of alternative immunological approaches to the ideal vaccine.

b. Development of Diagnostic Agents--To allow rapid definition of epidemiological information, new diagnostic agents will be required. These agents should provide specificity for Schistosomiasis parasite species; have no cross-activity with other parasite species; should be able to differentiate active/inactive states of the disease; and indicate the acuteness (i.e., level of infection). Research on the diagnostic agents will follow the same pathways of research as the vaccine development and the agents will be available relatively early in the research program (two to three years). The research required for diagnostic agents will provide valuable preliminary information and leads to identification of antigens for vaccine production.

c. Improved Chemotherapeutic Regimes--There is no indication that a vaccine can be developed which will confer complete immunity to Schistosomiasis. More realistic is the objective of providing 90-95% immunity

(one injection) with complementary efforts in control by improved chemotherapeutic regimes.

d. Biochemical Studies for Snail Control--New approaches to snail control, by biomedical studies directed to the interruption of the worm life cycle.

2. Clinical Studies--A broad range of clinical studies will be conducted for testing diagnostic agents, animal and primate testing of vaccine candidates and planning of immunization test programs. Comparative mass chemotherapy applications versus vaccination treatments on a defined regional basis may also be required for test purposes.

3. Epidemiological Studies--To define the prevalence and types of infections, and to provide a basis for clinical studies, considerable epidemiological survey work remains to be done, particularly in the Delta area. Fortunately, considerable organizational and training capabilities exist as a result of a major study of the Qualyub area by the Center for Field and Applied Research of the Ministry of Health, and major use of this center is planned in organizing for the work.

4. Social/Behavorial Studies--In addition to economic feasibility studies as an ongoing element in the study, all of the individuals with whom this component was discussed agree that considerable social and behavorial research is needed to supplement the biomedical studies. Studies such as modes of medical delivery, social elements of water contact, importance of utilities, and background information for educational programs related to Schistosomiasis control are typical topics on which information is needed.

Within the Health Sector, USAID has been concentrating its cooperation with the GOE on strengthening health delivery services with particular emphasis on improvement in immunization procedures, Oral Rehydration Therapy, and providing extensive background data on childhood diseases, sanitation problems

and nutrition. These efforts will continue and be expanded under the new Child Survival Program. The vaccine R&D effort would complement that activity and component activities will be co-managed and co-monitored by the USAID Health Office. The requisite epidemiological research, and the testing of new vaccines or agents will ultimately be coordinated with activities already planned by the GOE and the USAID Health Office.

The subdivisions of the R&D effort will be centrally planned and directed with interaction via research staff meetings and seminars to provide central exchange of information. Specific R&D activities to be conducted by various units will be preplanned with overall authority vested in a Project Director.

Component activity will be a joint effort between Egyptian organizations which have been working on Schistosomiasis (MOH, several universities and the Bilharz Institute) and U.S. organizations (NAMRU, CDC and NIH) and will build on the knowledge and capacity developed in early efforts sponsored by USAID, PL 480 and other donors.

Necessary training will be provided primarily at the Post-Doctoral and Doctoral level in biotechnology, microbiology and epidemiology to meet the staffing needs. To the maximum extent possible, facilities will be centralized to allow maximum interaction of the R&D staff.

To provide overall policy direction and coordination, a Steering Committee will be established including representatives from each participating ministry or agency, as well as the AID S&T and Health Offices. Each unit representative will be in a high level position, capable of speaking for each unit. For day-to-day management, a Secretariat will be established under the Steering Committee. The Project Director and Secretariat will provide coordination with other foreign donors and coordination in the development of contingency plans for production of agents and development of delivery services.

D. Outputs:

At the end of the first five year period of this activity, rapid diagnostic methods for the Schistosomiasis will be available and, as a minimum, considerable progress toward the development of a successful vaccine and improved chemotherapy regimes will have occurred. In place will be an integrated interdisciplinary R&D system capable of carrying the effort to a successful conclusion, of replication for attack on diarrheal diseases and respiratory infections , and to serve as the nucleus for major biomedical research within the Middle East region.

In addition, the first comprehensive epidemiological data on Schistosomiasis in Egypt will be available, as well as extensive information on effective methods for health education to accompany other health services.

Also available will be firm contingency plans for production, storage and delivery of the vaccines under development.

Finally, success in providing control methods for Schistosomiasis will have two important implications: First, availability of a control system will have a world-wide impact; and, second, success will strongly demonstrate to the GOE the worth of the S&T community in solving major problems, and the utility of funding such efforts at more appropriate levels.

E. Initial Implementation Steps:

For detailed planning of the organizational structure of the activity, the services of a major health services contractor will be required. The contractor would be expected to provide all necessary coordination of planning activities involving Egyptian and U.S. counterparts.

Because of the complexity of the program planned, it is anticipated that a planning period of approximately nine months will be required at a funding level of approximately $700 thousand.

III.2 PRODUCTIVITY

In order for Egypt to achieve many of its development goals it will have to increase its productivity. In many cases for Egypt this means: a more effective and imaginative use of its natural resources; increased labor proficiency through effective selection, training and use; more efficient and effective application of capital for investment; increased expenditures for both basic and applied research; and effective technology adoption and adaptation to meet local needs. Activities in this component will initially address some of these factors in problems of inefficient land use and inefficient energy use in the modern sector.

a. LAND USE

A. Problem:

The effective use of land, given limited investment resources and social constraints, is one of Egypt major problems. The need to compensate for disappearing arable land and to improve agricultural production; the pressures to reduce population density and to provide sufficient housing for a rapidly rising population; and the drive for increased industrialization have all increased exponentially since the 1950's.

Cumulative efforts from 1952 to 1979 to reclaim new lands have brought into agricultural production only 670,000 feddans of which only 500,000 feddans are above marginal production. At the same time, approximately 700,000 feddans of prime Nile Delta soils were lost to production because of urbanization,

industrialization and other forms of development. Analysis of Landsat Imagery between 1972 and 1982 estimates the annual loss of prime soil between 20,000 and 40,000 feddans.

Subsequent land reclamation projects have now targeted nearly all of Egypt's heavy, alluvial soils and calcareous desert soils suited to reclamation. Any new land reclamation projects, therefore, must be on sandy desert soils. On purely economic grounds, neglecting social pressures, such reclamation efforts will be unfeasible because of costs for water pumping and the new technologies required to bring the lands to productivity equivalent to Delta lands. To provide maximum food production potential, alternative choices such as the rehabilitation of previously reclaimed lands ("Old New Lands") offer potential for much higher return and lower risk. These efforts do not, however, offer the same potential for reducing population density and accomodating increased urbanization.

Problems of food production are compounded by other pressures which actually frustrate any coherent plans for orderly land use development, such as the rural to urban migration which places inordinate demands on formal housing and causes an indiscriminate growth of informal housing, and the growth of industry on arable lands.

The problem of urbanization pervades Egypt. The cities of the Delta with populations greater than 50,000 (i.e. Tanta, Mansoura, and El Mahalla) have grown more rapidly over the last twenty years than Cairo or Alexandria. Generally, the Delta cities have no horizontal expansion possibilities except on arable land.

The danger of continued prime land loss is exacerbated by the existing industry base. The location of the Delta cities is such that they have substantial economic potential and the demand for industrial expansion in these areas as preferred sites is likely to continue, with accelerated loss of arable lands unless alternative sites can be identified.

In some cases a socioeconomic benefit such as increased energy supply may have negative implications with respect to land use. For example, the continued expansion of electrical generating capacity in Mansoura is likely to encourage additional Delta industrial growth, with continued loss of arable lands.

Other factors encroach on ultimate decisions regarding land use: present and potential water supplies and transportation and communication systems; the location and extent of mineral and energy resources; and the extent and cost of necessary infrastructure (schools, hospitals, stores) all play a role and are inextricably intertwined in questions of future land use.

The GOE has responded to these pressures in both planning and practical terms. Major studies financed by the GOE, World Bank, USAID and other donors have examined questions of land availability and characteristics, water supply and irrigation demands, urbanization, energy, transportation and communication. Large allocations of funds, L.E. 1.3 billion in the current Five-Year Plan (1982-87), have been made for land reclamation, principally on sandy soils. An additional L.E. 167 million is targeted for construction or completion of three irrigation canal systems (El Nasr, El Salaam and Ismailia Canals) to service land reclamation projects. Funding of new cities development is continuing; planning for the Cairo Ring-Road is underway; decentralization efforts for the Sinai, Gulf of Suez and the Northwest coast and a multiple growth center strategy for upper Egypt are all being planned.

Many of these efforts and plans are based on incomplete data on such elements as soil characteristics, renewable water resources, potential for new technologies, appropriate mix of crops, and future capacity of settlements and required costs. Moreover, diffuse ministerial management has not provided a coherent examination of variables and their impact on costs and results. Providing a framework for the examination of such interactions is the goal of this component.

B. Goal and Purpose:

The goal of this activity is to increase productivity through land use planning. The purpose is to develop analytical models which can be used by the GOE as a framework for making best choice/least cost decisions on future use of old and new lands for industrial, residential and agricultural purposes.

This activity will carry out an interdisciplinary effort to compile and organize existing and newly collected data, and to construct analytical models which provide an integrated selection and classification system for decisions on land use.

C. Description:

The activity will involve an interdisciplinary team, or teams, including architects, social scientists, economists, engineers, physical scientists and agriculturists, in a holistic approach to land use planning. Teams will be engaged in the following activities:

1. Compilation of existing data and, when necessary, of location data such as soil characteristics, demography, topology, natural resources, agronomy, and energy resources to determine potential use of land for industrial, residential or agricultural purposes.

2. Cataloging of infrastructure by selected regions including environment, housing, general services, energy sources, associated industries, transportation and utilities.

3. Compilation and extension of social science research on such topics as family relocation, adaptation to a rural environment, critical infrastructure requirements for successful relocation and community development, and relationships of potential industrial development to resources and infrastructure.

Results will be organized into a data base to be used for model development. A family of models will be constructed for investment, site, and resource allocation for individual and collective ministry use and for integrated planning purposes.

A current modeling system for agricultural uses in North Sinai developed by the IBM center, in collaboration with the Ministry of Irrigation, is a prototype which can form the basis for the more comprehensive modeling systems. By analyzing variables and comparative advantages, the models will provide an integrated selection and classification system for best choice/least cost decisions on land use. Initial focus will be on selected regions where the need for determining land use is greatest.

Considerable experience exists in the types of studies necessary to provide the data needed for model application. Model construction and data collection will proceed in parallel since model development does not depend on data availability. Actual data collected will be used for planning and decision making.

The chief additional factors involved in this component will be coordination and management across ministries, universities and research institutes, and training at the executive level in the use of models for planning purposes, and at the operational level in computer programming and model analyis.

To ensure the application of models in considerations of land use, key individuals from each of the involved ministries will be intimately involved in each phase of the activity. For this purpose, a Steering Committee will be established including representatives from each participating ministry or agency as well as the USAID S&T office. For overall management, a Project Director will be appointed and a Secretariat established.

The tentative implementers will be the Ministries of Planning's Regional Planning Group and the Ministrtries of Development, Reconstruction and New Communities.

D. Outputs:

At the end of this activity, a comprehensive data base on key land data will be available.

A family of planning models will be provided for assistance in land-use planning decisions. These models will be available in incremental stages and will be applied to actual planning needs as they become available.

Technical personnel trained in model analysis will be available in a center to provide consultation and assistance in the application of models in analysis of proposed land uses. Analysis for the private sector will be made on a fee basis.

The outputs from this component will be discrete and become available according to the following tentative schedule:

Year 1 - Concrete application of existing IBM model to actual case(s).

Year 2 - Model analysis Center installed and ready for operation. Executive training completed.

Year 3 - Comprehensive models construction completed and ready for test application.

Year 4 - Models will be demonstrated and center for end-user services installed.

E. Initial Implementation Plan:

The initial implementation steps and funding--approximately $250 thousand--will cover component plan development. Planning can be started in Fall 1985 and completed in approximately 3 months using a joint Egyptian-U.S. planning team, whose services will be funded by the project.

2.b ENERGY MANAGEMENT AND TRAINING

A. Problem:

ince 1975, consumption of petroleum and electricity have increased over 300 percent. In addition to fuel cost subsidies, the major negative factor in consumption is the inefficiency of many technologies employed in Egypt's modern sector-- the principal consumer of fuels and electricity[1/]. In 1983, this sector was responsible for approximately 80% of the nation's total commercial energy consumption, which was approximately- 200 -million barrels of oil equivalent (MBOE). More than 63% of the primary energy consumed was lost in conversion, transmission, heat transfer and stack losses, as compared with approximately 42% in the United States.

1/ The modern sector of Egypt is the principal consumer of fossil based fuels and electricity. The modern sector is composed of those firms or groups in the economy that provide goods and services using equipment and processes comparable to those in the major developed countries. The modern sector covers such activities as manufacturing, commercial establishments (e.g. hotels, department stores, office buildings), transportation, and electricity generation and transmission, and includes firms of all sizes.

The reasons for this energy loss are:

- o old and inefficient equipment resulting from past industrial and construction investment decisions made when fuel and power costs were a less important factor; in fact, such decisions were generally made on a least-cost capital basis; and

- o inefficient management and operational practices.

As a result, the modern sector costs the national economy several billion dollars annually through energy waste, reduced productivity and lost revenues from potential petroleum exports.

A second serious problem confronting Egypt in the energy "sector" is a shortage of skilled personnel trained in conventional energy technologies. This has been brought on by skilled administrative and technical personnel going abroad for higher wages, a lack of facilities and teachers capable of providing training in newer technical areas, and programs which educate engineering graduates in the theoretical and scientific application of engineering rather than in the application of technology. This shortage will acutely increase as Egypt undertakes projects and programs incorporating increased technical and management complexity.

To help overcome these problems, this activity will focus on two important areas; technology transfer for energy management and energy training.

B: TECHNOLOGY TRANSFER FOR ENERGY MANAGEMENT

1: Goal and Purpose

The activity's ultimate goal is to conserve energy use among conventional energy users in Egypt, thereby providing increased foreign exchange earnings through increased oil exports. As importantly, this effort provides an excellent vehicle for introducing increased energy prices. That is, the GOE can increase energy prices while it provides the technologies and services available in this component as an incentive to ameliorate the shock of the new prices.

The primary purpose of this activity is to promote and accelerate the adoption of energy-efficient technologies and operational practices by energy consumers who are heavily dependent on fossil fuels and electricity. Adoption of these technologies will reduce commercial energy consumption, increase productivity and improve economic growth prospects.

Secondarily, the activity seeks to establish a strong institutional capacity to undertake and manage conservation-related investments and programs. This capacity will be developed among energy consumers, suppliers of equipment and services, lenders and government policy-makers.

2. Description:

Activity elements are designed to overcome a number of critical constraints to the widespread adoption of energy efficient technologies and operational practices. The key elements are:

a. A program of technical assistance, training and information dissemination, studies and policy analyses, including the services of a U.S.

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consulting team to assist the component staff in preparing annual budgets and action plans, developing criteria and procedures for evaluating and implementing demonstration activities, providing technical assistance on design and analysis of specific activities, and leading the training, data collection, information dissemination and policy research activities of the component; and

b. A financing program to demonstrate the technical, financial and economic feasibility of specific conservation measures and to facilitate their widespread adoption. This will serve to introduce a wide variety of proven energy-efficient technologies that are rarely used here. These technologies and operating practices offer economic and technical potential for significant national energy savings and foreign exchange earnings as well as financial paybacks to individual users.

In order to facilitate adoption, the demonstrations will include: publication and dissemination of clear, comprehensive feasibility studies; direct observation through on-site visits; access to actual performance data; on-the-job and classroom training; circulation of case studies and journal activities; personal contact between energy consumers and others through workshops, seminars, trade association membership, and other mechanisms; opportunities for Egyptian A&E firms, manufacturers and equipment vendors to increase their capabilities--leading to expanded markets; and increased inter-agency coordination.

The demonstrations will provide start-to-finish evidence that conservation is viable and highly attractive technically, financially, economically and institutionally. The likelihood of widespread adoption of the demonstrated technologies will be enhanced by choosing technologies that are proven and commercially available and thus relatively low in risk, and that have relatively low inital cost and ongoing management, maintenance and operational requirements.

Funding for demonstrations will be on a grant basis. Once sufficiently demonstrated, loans for replication outside of the activity could be made available through a USAID or development bank sponsored loan program. In view of potential loan requirements, financial evaluation of the candidate demonstrations will be based on conservative assumptions and real market conditions rather than the more favorable incentive terms available in this activity. Success will be enhanced by providing all required technical assistance and training associated with each technology.

Candidate technologies to be demonstrated during the first phase include combustion monitoring and control systems, flue gas heat recovery systems, insulation, power factor control systems, steam distribution system maintenance procedures, and energy management systems for buildings. (An illustrative list and description of initial technologies, studies and workshops to be presented appears in Annex E).

Demonstration targets will include all subsectors of the industrial sector. Since the activity's objective is to save as much energy, capital and foreign exchange as possible, participation by enterprises in the industrial sector has not been limited by size or ownership pattern. These factors may be taken into account, however, in evaluating and making decisions on individual demonstrations.

A core team, with assistance from a private U.S. contractor, will be responsible for day-to-day project implementation including administrative support and monitoring. The team will receive guidance from a Steering Committee made up of representatives from the major organizations cited above. The project team will work with local end-users, A&E firms, vendors and financial institutions in developing, implementing, monitoring and reporting on subprojects.

The major implementers have been tentatively identified as the Ministry of Industry and the Ministry of Petroluem (with demonstration assistance from the Egyptian Electricity Authority), Egyptian private-sector organizations and banks and a U.S. consulting team. In addition, private energy users, vendors, academics and professional and trade associations will participate in specific subproject efforts and through advisory panels.

3. Outputs:

As a result of this project, energy producers and private and public sector end-users will be more aware of the conservation options available to them and will become more capable of analyzing their specific situations and making technology investment decisions that most appropriately meet their needs. Moreover, because of active involvement, private sector service firms will be better prepared to provide the services needed to implement sustainable change.

At the national economic level, the present pace of economic growth and industrialization in Egypt makes it imperative to give high priority to improved productivity. The benefits of such efforts could be substantial; for example, the GOE has projected an annual growth rate of 3.3% for commercial energy consumption through 1993, and with only a 15% reduction in energy consumption per unit of industrial output, annual savings in the industrial sector alone would reach $221 million in 1987, $300 million in 1988, $520 million in 1991 and well in excess of $600 million in 1993 (assuming a constant oil price of $30 per barrel[1/]). The improvement of energy

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[1/] Although oil prices are currently $27 and $28 per barrel, most price forecasters anticipate $40/bl by 1990; thus $30/bl is a conservative figure.

efficiency, and thus productivity, in the modern sector remains one of the most urgent needs of the Egyptian economy.

4. Initial Implementation Steps:

The initial implementation steps and funding--approximately $250 thousand--will cover a modern sector analysis for energy conservation potential (energy audits have already started under the Energy Policy Planning Project (263-0123)) and activity plan development. Analysis and planning work can be completed in approximately four months using an existing S&T Bureau contract which includes these kinds of services. The energy consulting firm involved is highly respected by its clients and competitors and has experience developing similar projects in several LDCs. USAID can pay for their services by channeling funds through the current S&T/EY contract, and have the consultants available soon after signing a Pro Ag.

C. ENERGY TRAINING

1. Goal and Purpose:

This activity's goal is to support a large part of Egypt's energy sector through improvement of its manpower. The purpose of this activity is to increase Egypt's technical competence to explore for and exploit conventional energy resources and to better operate and maintain its industrial and commercial infrastructure. This will promote productivity through improved resource management and planning.

This activity will support other AID/GOE efforts in fuel production and consumption resource development and industrial productivity. The activity will provide degree and non-degree academic training and industry internships in science and engineering fields related to fuel resource development; and technical and management capabilities in industrial/commerical plant operations, directly related support activities, and "advanced" energy planning and technologies. The training will contribute to improved technical expertise and practices, and enable responsible agencies to factor technological progress and trends into national planning.

2. Description:

The development of Egypt's conventional energy resources and the operation and maintenance of its industrial/commercial infrastructure partly will be a function of the available technical manpower. The application of technologies in the energy field will require people educated in science, engineering and related fields at a level most appropriate for their position and agency. This may be accomplished through degree programs, in-service academic programs (non-degree) or industry internships, with individual requirements determining which is most appropriate. In addition to science and engineering, related disciplines--economics, business and resource management, environment and law--will also be covered.

The main activity in training is the identification, selection and placement of Egyptian personnel in academic institutions and industry in the U.S. Recruiting and placing will be a direct effort with a management group actively recruiting according to agreed upon criteria. The criteria will be designed to ensure the quality of the participants and the relevance of training to subsequent employment. (See Annex F, for a description of the types of training and the specialty areas and disciplines tentatively identified).

Day to day management of the training activity will be contracted for with USAID retaining general management responsibilities. USAID will assist in general participant identification and the managing consultants will be responsible for their qualifications review, selection, placement and administrative support in the U.S. The consultants will also be responsible for identifying new training opportunities and modifying training activities as needed.

3. Outputs:

The result of the training activity will be more and better trained personnel to conceptualize, design, present and implement energy production projects, as well as managing energy resources more effectively. An improved capability to develop and manage energy resources will have a large beneficial effect on the Egyptian economy.

4. Initial Implementation Steps:

Initial funding for this activity--approximately $150 thousand--will cover a manpower needs analysis and design of a coherent and coordinated energy manpower training plan and program which will describe the priority areas for energy training and the rationale for each. This work can be completed in

approximately three months using an existing S&T Bureau contract which includes these kinds of services. The contractor has extensive training management experience, and has received excellent performance evaluations for its planning and management of a similar energy training program worldwide. USAID can pay for their services by channeling funds through the current S&T/EY contract, and have the services available soon after signing a Pro Ag.

III.3. S&T COOPERATION

A. The Problem:

Each of the previous components address well defined problems of high socioeconomic impact. The capabilities necessary to attack the problems are relatively well-developed, and a high potential for successful solution and application of the results exists. Moreover, these problems will be solved by a limited number of qualified organizations and research groups.

There are a large number of remaining problems having a direct economic impact on Egypt's growth which require the participation of a large segment of the S&T community for their solution. Some of these problems were identified and partially implemented in previous AID funded projects. Future research will give priority to carefully selected problems consistent with the GOE five-year plan and with USAID sectoral and subsectoral programs. The same approach to problem solution used in the other components will apply here, i.e., organized R&D with interdisciplinary and interinstitutional cooperation will be employed to bring these problems to successful solution or to major project status for further organized work.

While end-user orientation will be retained, it is recognized that problem solution may not be as complete in some cases as they are in the other project components, and considerably more capacity-building may be required to develop the overall resources for success.

The problems fall into three categories: 1) need for state-of-the-art technology for future industrial development; 2) problems which affect the economy or social infrastructure nationwide; and 3) problems with more direct impact at the regional or local governorate level.

This component will be planned to provide appropriate solutions to problems at each of these levels.

B. Goal and Purpose

The goal of the S&T Cooperation component is to contribute to increased production and income through the generation and application of research findings to Egyptian development problems.

The purpose of the S&T Cooperation component is to solve priority development problems that will have socioeconomic impact and to promote cooperative processes within the S&T community. This purpose will be achieved by focusing the efforts of the S&T community on problems at the national/local level.

C. Project Description:

The S&T Cooperation component will:

- Fund collaborative research activities between Egyptian universities and research centers on carefully selected and important problems as identified by end-users.

- Provide major support for the pre-planned strengthening of specified research units for research in, and adaptation of, limited and carefully selected frontier technologies.

- Provide funding to support a newly created National Science and Technology Committee (NSTC) as the steering committee for this component, its technical secretariat and an Industrial/Technical liaison service.

- Provide funding to enlarge the Scientific and Technical Information service network at ASRT and to integrate it into networks connecting universities and research institutes.

The National S&T Committee (NSTC) will provide a grant program for research in pre-defined high priority categories of S&T needs. These categories will include problems at both the governorate and national levels. To the extent possible, there will be an organized relationship among the projects selected for support and a mechanism to bring together researchers and end-users in each category for on-going discussion and review. This will maximize the utility of research results in practical applications. Research grants will be awarded to institutions on a generally competitive basis and, exceptionally, on an unsolicited basis.

1. Research Programs

Research capabilities vary substantially across the universities and research centers. More advanced institutions will address more difficult research problems. A limited number of research institutes will be required to compete on cutting edge research or frontier technologies. Less experienced universities or institutions will be expected to limit their contribution to the solution of relatively simple research problems, while their capabilities are being strengthened.

In order to achieve the purpose of the S&T Cooperation component, consideration will be given to dividing a priori the grant program into three subgrants for funding advanced technology, national and local programs:

a. The Advanced Technology Program (ATP) subgrant will promote research on frontier technologies in two main areas; plant biotechnology and microelectronics application. These will be awarded to pre-selected Egyptian institutes where the capacity to undertake the work has been clearly indicated. Research on frontier technologies will be designed to produce advanced applications which are strongly needed but not yet highly developed in Egypt.

b. The National Research Program (NRP) subgrant will focus on solving limited, but well defined national technological problems. Solutions to these problems should provide a direct contribution to both on going GOE and USAID programs both sectoral and subsectoral. It is expected that the R&D units in the major universities and research centers will be better equipped and capable of solving these problems with less capacity building but more technology transfer being required.

c. The Local Research Program (LRP) subgrant will allocate funds for solving local/rural development problems identified by and associated with a governorate or region. While the categories to be addressed will be restricted to practical research of economic value, it is anticipated that neither the problems, nor the research capabilities will be as sophisticated as those at the national level. Emphasis will be on capacity building and technology transfer strengthened by linkages with major Egyptian universities and/or research centers, with the local university as the research leader. Matching funds from the governorate or local services should also be considered for supporting research in these universities.

For budget purposes, funds will be allocated to the subgrants on a percentage basis determined during the planning phase. These allocations should, however, remain flexible to reflect changing needs and priorities and to maximize the cooperation of the S&T community with end-users.

In addition to the research subgrants, funds will be made available to expand the Scientific and Technical Information network (established under the Applied S&T project 263-0016) for: a) establishing information centers at four-five major universities which will be linked to the ASRT information network and serve as information satellites to neighbouring universities; and b) providing on line data base search via direct access to major U.S. data base vendors. Local funds earned from data base searches will be used to sustain the central management information unit established at the ASRT.

Funds will also be provided to the National Science and Technology Committee for establishing and operating the technical secretariat responsible for awarding, managing, and evaluating research proposals. Finally, funds will be available for establishing an Industrial/Technical liaison office which will be responsible for collecting, analyzing and synthesizing all the previous work carried out in the selected research categories and disseminating these results to interested governmental or private sector entities.

2. Potential Research Categories

It is anticipated that specific target research categories will be selected by the NSTC in consultation with AID. These research categories will address national/local development problems identified and prioritized with the participation of end-users. Both substantive and procedural criteria will be established during the planning phase. Annex G contains criteria identified to date.

A manual for policies and procedures was developed by the Foreign Relations Coordinating Unit of the University Linkages project. It will be modified in order to meet the criteria and requirements for research categories to be funded under this component.

At this point, it is possible to suggest likely target research categories that meet the criteria stated in Annex G. These categories will eventually be selected by the NSTC in consultation with AID. Specific limited categories will be identified with specific research objectives in each category. Illustrative examples, based on Mission sectoral needs and the S&T Assessment include:

a. Construction Materials: This might include structure/material research, civil and mechanical engineering, and material sciences. Examples of research topics are: Substitute of red brick using indigenous materials and appropriate technology; study of corrosion resistant drainage pipes for water/wastewater use in Egypt.

b. Rural Productivity Improvement: Emphasis might be given to artisanal industry, appropriate mechanisation and electrification, increasing crop production, crop disease, animal breeding and feedstock, and fertilizers. Examples of research topics could be study of crop disease in selected fruits and legumes at the village level, or participation of women in artisanal industry.

c. Water/Wastewater Reuse: This might include chemical, biological and microbiological research, soils engineering and environmental and ecological studies. Examples are studies on improved thermochemical cleaning and storage of water and wastewater, water conservation and the use of wastewater for agriculture purposes.

d. Plant Biotechnology: This might include tissue culture, microbiology for applications in agriculture with emphasis on salt tolerant crops, drought resistant crops and systemic insecticides.

e. Microelectronics: This might include curricula development at universities, application of microelectronics in design and manufacturing, maintenance and repair, low cost information technology.

It is understood that other limited categories will be identified once the NSTC is established. These categories however should be consistent with the purpose of and selection criteria developed for this component.

D. Outputs

At the end of this activity, it is expected that:

a. Selected universities and research centers will be capable of using advanced technology research (biotechnology, microelectronics) for improvement in plant characteristics and industrial productivity.

b. Budgetary savings and income generation will result from the solutions of key national problems.

c. The local/rural universities will be capable of providing technical solutions to rural/local problems, thus fostering the linkage between the universities and their socioeconomic environment.

d. International and local information services will be widely used by the S&T community and in particular by the universities for supporting current research projects thus improving the quality of research and its applications.

e. The establishment and operation of the Industrial/Technical office will permit the dissemination and application of research findings, and will bridge the gap between researchers and the productive sector of the economy.

E. Initial Implementation Plan

The initial implementation plan will cover the component plan development. The planning can start after the Project Agreement is signed and can be completed in approximately 3 months. A joint U.S.-Egyptian team will participate in the planning and will also identify with the assistance of research institutes and universities the first national and local research programs for funding. The team will also be expected to assess the capabilities and resources of selected research centers for implementing research projects on the frontier technologies. Funds are included in the budget for contracting the services of the planning team.

IV. PROJECT MANAGEMENT

As agreed in earlier Mission discussions and at the S&T Game Plan NEAC, the project will use a flexible planning and implementation strategy involving a number of GOE and non-governmental groups and institutions in implementation. As much as possible, project organization decentralizes the project adminstration and relies on existing GOE structures and systems and the research management capabilities of the S&T community.

As noted earlier, each of the project components will have a separate management structure. While the final structure for each will be determined during component planning, a proposed organization has been developed and will serve as the model. The proposed organization has been kept as simple as possible, given the number of participants that will exist in some components. Each group while actively participating in implementation and contributing to immediate project goals, will also directly benefit by developing capabilities to conduct and manage research efforts after project completion.

A. Organizational Guidelines

Four considerations guided component organization. First, each component must involve competent Egyptian research and implementing groups, preferably using a competitive selection process. These groups include national, university, ministerial and private sector research organizations, private consulting groups, engineering and A&E firms, suppliers, manufacturers, professional associations, and government organizations responsible for implementation, regulation and decision making.

Second, the project will capitalize on existing S&T community capabilities. In some restricted instances, the project will need to improve human and institutional skills to improve the community's ability to address national

development problems. This will be done by building on existing institutions, both public and private sector. No new institutions will be created.

Third, the project is designed to respond flexibly to implementation needs by incorporating an adjustable annual budget and by involving researchers, line agencies and end-users in formulating policies and priorities. By reviewing component progress, expenditures, implementation plans and budgets annually, the project will be able to respond to the positive factors and constraints in each of the components and their subactivities.

Finally, the project is designed to leverage AID funds by capitalizing on earlier and on-going AID efforts, and the efforts of other donors and international networks in order to use the cumulative body of knowledge developed by others in each of the components as a departure point.

B. Component Management Plan (Structure)

In order to promote maximum joint effort, each project component will feature a joint Egyptian-U.S. management team made up of USAID and implementing agency members. The team will consist of a Steering Committee which will determine component policies, approve annual work plans, and determine annual allocations of component funding; and a Technical Secretariat of the Steering Committees responsible for decision making and day-to-day operations, and, generally, shared responsibility in component activity planning and implementation (such as, technical reviews, monitoring component activities and reports and coordinating evaluation activities). The implementing agencies will initiate and/or prepare proposals for and carry out approved activities. This model has proven effective in the Mission's Oral Rehydration project.

1. The Steering Committee (SC) will provide overall policy guidance and oversight to the component. The committee will be made up of representatives of ASRT, MPIC, and each of the implementing agencies or groups. The director of the Secretariat and a USAID representative will serve

as ex-officio and non-voting members of the Committee. The SC will be responsible for (a) approving the component annual work plan and budget (The Action Plan), (b) approving criteria used for activity evaluation and selection, and (c) reviewing subactivity performance. The SC will not be involved in the selection of activities or in the day-to-day management of the component.

Each member of the SC will become a permanent link between the component and the organization or agency represented by coordinating component activities with his respective organization and representing the component to his management. This may, in some instances, include being able to speak for one's Ministry or agency on questions or matters which require inter-ministerial or agency coordination, such as joint activities or a decision on potentially duplicative activities. It is, therefore, important that the individuals on the Committee be at the Director level of their organizations to ensure effective coordination and representation. For example, the ASRT will be represented by a vice president or a NRC division director. The MPIC representative would be designated by the Minister of Planning.

The Committee will have a chairperson who will convene meetings and communicate with the Secretariat on behalf of the Committee. After initial start-up and organization, which might require monthly or bimonthly meetings, the Steering Committee is expected to meet only two or three times a year.

Note: The Steering Committee chairmen, Secretariat Directors, a senior representative of each implementing agency and the USAID project officers will meet annually to discuss major elements of progress. These meetings will enable USAID to synthesize common themes, to identify areas for policy dialogue, and to provide long range planning for incorporation of project results into GOE ministry and agency activities.

2. The Technical Secretariat will have responsibility for preparation and technical review of all component activity planning and budgetary documentation. The Secretariat staff will be created by the lead implementing agency, and a senior official of that agency will be designated as Director. The Director will be assisted by full-time and part-time professionals and support staff. The size and membership of the staff will be determined during component planning and may vary over time as responsibilities and workloads change.

The staff will have responsibility for day-to-day operations, annual plans and budgets and preparation and/or review of all activity proposals to be implemented by the component according to criteria established during component planning. They will also be responsible for processing and reviewing regular reports from on-going activities in order to monitor progress, identify possible problems, and provide adequate central-level oversight. On an annual basis, the staff will present the SC with each component's Action Plan. This plan will contain the component's work plan and budget request for the coming year. Upon approval by the SC the Director will forward the Plan to USAID and the MPIC for review and approval (see VI, A, below). The staff will also coordinate and participate, as required, in evaluations of individual activities. Documentation and reports prepared by the staff which require Steering Committee approval and/or review will be transmitted to the SC by the Secretary General.

In addition to the above responsibilities, the staff in some components will sponsor research and analysis activities by groups outside the component's formal structure. In those cases, the staff will assist the proposing group in submitting the proposal, but primary responsibility for preparation rests with the proposer.

Each staff will be advised and assisted in their activities by long-term and short-term U.S. and Egyptian technical and management specialists funded under

the component. Additional support may be provided, as required and as approved by the SC, for short-term technical specialists or for a limited number of administrative personnel. A USAID Project Officer will be designated to serve as an advisor to the staff, but will not serve as a member.

Additionally, the staff will be assisted by advisory panels composed of representatives of government agencies, and educational and research organizations, end-users, and professional groups. The advisory panels will be constituted on an ad-hoc basis by the Director or Steering Committee to provide advice on activities targeted at specific component subsectors or groups (See Figure 1).

FIGURE (1)

PROPOSED COMPONENT ORGANIZATIONAL STRUCUTRE

o Policy guidance o Adminstrative oversight o Approval of annual plan/budget	STEERING COMMITTEE IMPLEMENTING MINISTRIES AND ORGANIZATIONS, ASRT TECHNICAL SECRETARIAT DIRECTOR* USAID REPRESENTATIVE*	Ex Officio Members (non-voting)
o Day-to-day management	TECHNICAL SECRETARIAT DIRECTOR	
o Activity selection	Component Activity Selection Committee Implementing Ministries and Agencies, U.S. Consultants	Advisory Panel(s)
o Technical assistance o Monitoring and Evaluation o Information dessemination	Subactivity Managers and Support Staff	

V. FINANCIAL PLAN

A. PROJECT BUDGET

The S&T for Development Project proposed herein totals $ 197.5 million of which $ 131.6 million will be provided by AID and $ 65.9 million by the GOE. The estimates are based on recent AID and GOE experience with other research projects and the experience of professional groups and/or consultants in the component areas. This experience enables us to estimate adequately broad component funding requirements. Detailed financial plans, and cost estimate justifications, will be prepared for each component during the planning phase.

Table I, Summary of project funding reflects project budgeted costs by project components and subcomponents.

The AID input will be ESF Grant funds and will be incrementally obligated during the life of the project, with the first obligation of $ 3.0 million to occur in the third quarter of FY 85 as shown in Table II. Subsequent funding obligations, in rounded figures, are: FY 86, $24.0 million; FY 87, $25.0 million; FY 88, $25.7 million; FY 89, $21.2 million; FY 90, $17.5 million; and FY 91, $15.2 million.

Table III summarizes the initial $3.0 million obligation in FY 85. The funds will be used for project component planning as well as for other Phase I activities such as consulting services, training, equipment and research support and other sevices necessary to project commencement. These Phase I activities are necessary to provide continuity to component management following the completion of their planning. They are described in the financial plan narratives and identified by the line item in each component's financial summary table.

Tables IV through VIII provide a budget estimate for each of the project components and subcomponents by input categories. Project disbursements are expected to start in FY 85 and terminate in the fourth quarter of FY 92. Disbursement schedules for each component will be prepared during the planning phase. All dollar costs were inflated with a compounded 7% increase over the seven years. A contingency line item of 5-to-10% is stated as separate line item. In order to provide flexibility on project components funding, it will be possible to adjust between line item categories in the same project component for an amount not to exceed 15% of any individual line item.

AID will fund technical and administrative costs for U.S. and Egyptian personnel, incentives to Egyptian researchers and support staff in accordance with Egyptian law, honoraria and meeting fees for the advisory and meeting members, commodity procurement from the U.S. and Egypt, training in Egypt and in the U.S., component support services, evaluation and independent auditing services. AID funds will be both in foreign exchange and local currency. The latter will be determined during project design.

GOE will fund all the basic salaries of the research and support project staff, the office and laboratory facilities, the institutes' overhead and indirect costs as well as all operating costs including customs clearance, transportation, storage, remodelling and installation of commodities. The GOE contribution will be in kind and is estimated at $ 65.9 million (L.E. 54.8 million equivalent) for the life of the project.

AID and the Ministry of Planning and International Cooperation (MPIC) may transfer funding from one component to another after consultation with the relevant component Steering Committees.

TABLE I

S&T FOR DEVELOPMENT

Summary of Project Funding
$(000)

Components	AID	GOE*	TOTAL
1. Critical Childhood Diseases	33,200	12,200	45,400
2. Productivity			
A. Land Use Planning	7,560	940	8,500
B. Energy Management	47,455	13,061	60,516
C. Energy Training	7,100	680	7,780
3. S&T Cooperation	36,300	39,000	75,300
TOTAL	131,615	65,881	197,496

* In kind contribution in LE estimated at the rate of 1$=0.83168 LE.

TABLE II

S&T FOR DEVELOPMENT

Obligation Plan

Components	FY85	FY86	FY87	FY88	FY89	FY90	FY91	Total
1. Critical Childhood Diseases	1,360	8,000	6,000	6,000	5,000	4,000	2,840	33,200
2. Productivity								
A. Land Use	350	3,500	2,500	1,21[illegible]				7,560
B. Energy Management	300	5,000	6,000	7,000	9,000	9,300	10,855	47,455
C. Energy Training	180	1,500	1,500	1,500	1,250	1,170	—	7,100
3. S&T Cooperation	810	6,000	9,000	10,000	6,000	3,000	1,490	36,300
Total	3,000	24,000	25,000	25,710	21,250	17,470	15,185	131,615

Table III

S&T for Development

Summary of Phase I Project Funding

$(000)

Category/Component	Critical Childhood Diseases	Land Use Planning	Energy MGT	Energy TNG	S&T Cooperation	Total
1. Planning Team	500	70	250	170	120	1110
2. Start-Up Activitie*	800	260	50	--	650	1760
3. Contingencies	60	20	--	10	40	130
Total	1360	350	300	180	810	3000

*Start-up activities are broken out by line item in the Expenditure Plan of each component.

B. Component Budgets

1. Critical Childhood Diseases: Schistosomiasis:

The funding illustrated in Table IV A and B, is subdivided into seven activities over the seven years LOP: Epidemiology, laboratory research, clinical studies, behavorial and economic feasibility studies, information data base development, management and activity evaluation. The main bulk of the project component work will be carried out in laboratory and clinical studies. These should be viewed as overlapping activities since the subactivity work in diagnostic agents, vaccine development, improved chemotherapy regimes and new snail control techniques all have common elements such as biotechnology, biochemistry and animal and field testing.

Extensive scientific training will be required, primarily at the post-doctoral level, because of the need to provide state-of-the-art capabilities in biochemistry and biotechnology, particularly in the areas of immunology, enzymology, protein chemistry and recombinant DNA techniques. Training will also be required for a sharply expanded group of field workers in both epidemiology and field testing. Major expenditures will also be required for equipment and supplies to bring present facilities to levels required for advanced work.

The management category includes funds for the Steering Committee, Project Director and Secretariat. At this point, it is anticipated that extensive services of PASA's or a health contractor may be used for overall project management.

Information development and behavorial/economic activities are supporting activities. The former to provide computer equipment and hardware to construct a data base and communication system for the diverse units involved

in the work; the latter, to support selected coordinated projects to provide key information on economic feasibility and such areas as water contact customs and control regimen acceptance.

Because evaluation and program adjustments will be an important element in these component activities, funding has been allocated for second, fifth and seventh year evaluations.

Phase I costs: The first year budget provides $500 thousand for the approximately 33 man-months of effort estimated to be required for component planning. An additional $800 thousand is budgeted to cover preliminary collection of background information and epidemiological data, initial equipment acquisition, and initial research efforts in improved chemotherapy regimes and biochemical approaches to snail control. These activities are deemed necessary independent of the final plan for the component.

TABLE III-A

Critical Childhood Diseases; Schistosomiasis
Proposed Funding Summary
$(000)

Categories	AID	GOE*	Total
1. Component Planning	500	—	500
2. Epidemiology	2,950	1,700	4,650
3. Laboratory Research			
A. Diagnostic Agents (Development and Testing)	6,750	2,200	8,950
B. Biochemistry of Parasites/ Snails	1,500	2,000	3,500
C. Vaccine (Development and Preliminary testing)	9,500	2,300	11,800
4. Clinical Studies			
1. Chemotherapy program	4,050	3,400	7,450
5. Behavioural/Economic Studies	400	—	400
6. Information Development	500	100	600
7. Evaluation & Audit	800	—	800
8. Project Management	3,250	500	3,750
9. Contingencies	3,000	---	3,000
Total	33,200	12,200	45,400

*In kind contribution in L.E. estimated at the rate of $1=0.83168 L.E.

TABLE III-B

Critical Childhood Diseases; Schistosomiasis

AID Estimated Budget Schedule
$(000)

Categories	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92	Total
A. Component Planning	500								500
B. Epidemiology	250	250	450	550	600	450	200	200	2,950
C. Laboratory Research									
1. Diagnostic agents (Development & Testing)		1,500	1,000	1,000	1,000	1,000	750	500	6,750
2. Biochemistry of Parasites/Snails	300	200	200	200	200	200	100	100	1,500
3. Vaccine (Development & Preliminary testing)		1,000	2,000	1,500	1,500	1,500	1,000	1,000	9,500
D. Clinical Studies									
1. Chemotherapy program	200	600	1,000	750	500	500	250	250	4,050
E. Behavorial/Economic Studies		50	100	50	50	50	50	50	400
F. Information Development	50	200	75	50	50	25	25	25	500
G. Evaluation & Audit		—	250	—	—	250	—	300	800
H. Project Management		2,500	—	—	—	—	750	—	3,250
I. Contingencies	60	670	500	430	390	400	310	240	3,000
Total	1,360	6,970	5,575	4,530	4,290	4,375	3,435	2,665	33,200

2. Productivity

A. Land Use:

Component activities funds, as illustrated in tables V A and B have been subdivided into seven categories: component planning, survey and data collection, computer based analysis and planning, field work, technical services for end-users, training, management and evaluation.

Survey and Data collection funding covers collection of existing data on land, water, energy and industry pertinent to land use, using contractor and Egyptian personnel. Computer based analysis and planning involves compilation of existing data into a data base and model development and demonstration. Field work covers the collection of new data required for model demonstration, using contracts with Egyptian units such as the Geological Survey of Egypt and the Desert Research Institute.

Initial funding of the Technical Services Office for end-user use is budgeted for years three and four. Training funds are provided for training of executive decision makers, and field and model analysts.

The Management Category includes funds for the Project Director, technical Secretariat and Egyptian and U.S. consultants in land-use planning and modelling systems development.

Evaluation funds are also budgeted for the mid-term and final component evaluation.

Phase I costs: Phase I activities total $350 thousand. Of this, $70 thousand will provide a total of 4.5 man-months of planning services. The remainder, $280 thousand, will fund a demonstration of the current IBM model applied to a specific region. This will require survey and data collection for approximately five man-months of effort; modification of software and computer time and analysis; field work for collection of specific data and training equivalent to twenty man-months for five persons in model development, computer programming, and analysis.

Table V-A

Land Use
Proposed Funding Summary
$(000)

Categories	AID	GOE*	Total
1. Component Planning	70	—	70
2. Survey & Data Collection	455	40	495
3. Computer Based Analysis & Planning	3,130	350	3,480
4. Field Work	1,130	125	1,255
5. End-Users Services	300	100	400
6. Training	810	250	1,060
7. Management	1,150	75	1,225
8. Evaluation & Audit	150	---	150
9. Contingencies	365	---	365
Total	7,560	940	8,500

*In kind contribution in LE estimated at the rate of $1=0.83168 L.E.

TABLE V-B

Land Use

AID Estimated Budget Schedule

($000)

CATEGORIES	FY85	FY86	FY87	FY88	FY89	TOTAL
1. Component Planning	70	--	--	--	--	70
2. Survey & Data Collection	80	100	125	150	--	455
3. Computer Based Analysis & Planning	80	1,500	800	750	--	3,130
4. Field Work	30	100	500	500	--	1,130
5. End-Users Services	--	--	--	200	100	300
6. Training	70	140	300	200	100	810
7. Management	--	1,150	--	--	--	1,150
8. Evaluation & Audit	--	--	50	--	100	150
9. Contingencies	20	150	90	90	15	365
Total	350	3,140	1,865	1,890	315	7,560

2.D. Technology Transfer for Energy Management:

Funds will be applied to six major activities over the LOP, as shown in Tables VI A&B : Component planning, technical assistance; studies; training and information dissemination; purchase of commodities and monitoring instruments; demonstration financing; activity operations and management and activity evaluation. In addition, first year funding will include planning team costs.

The bulk of the USAID funding will be used to finance demonstration subprojects and to purchase equipment, primarily from the U.S. Other costs include: a U.S. technical assistance contractor and the purchase of activity start-up equipment, mainly vehicles, several programmable calculators, and basic instruments needed to conduct energy audits; costs for local and U.S. consultants to conduct studies and carry-out workshops and seminars; hiring an activity core team, including several senior activity officers.

The estimated budget does not include financial contributions by users of the demonstration activities or the users contributions to studies, training and information dissemination.

The final figures will depend on the need for U.S. manufactured equipment in each demonstration, and on the degree to which the activity emphasises demonstrations and institutional building as against additional equipment purchasing to promote replication.

Phase I costs: Phase I costs for this activity total $300 thousand. Two hundred and fifty thousand dollars will be used to provide approximately 17 man months of assistance in activity analysis and planning. The planning team will consist of one energy conservation specialist, two energy economists/enginners, two energy engineers, one auditing specialist and two-three research assistants. An additional $50 thousand will be used for initial monitoring equipment, workshops and information dissemnation.

TABLE VI-A

Energy Management
Proposed Funding Summary
$(000)

Categories	AID	GOE*	Total
1. Planning team	250	—	250
2. Technical Assistance	3,080	170	3,250
3. Studies/Workshops/ Information Documentation	1,950	265	2,215
4. Commodities for Application	28,350	5,670	34,020
5. Demonstration	12,150	6,600	18,750
6. Monitoring Instruments	280	56	336
7. Activity Operations	1,155	300	1,455
8. Evaluation & Audit costs	240	---	240
Total	47,455	13,061	60,516

*In kind contribution in LE. estimated at the rate of $1=0.83168 LE.

Table VI-B

Energy Management
AID Estimated Budget Schedule
$(000)

Categories	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92	Total
1. Component planning	250	—	—	—	—	—	—	—	250
2. Technical Assistance		350	385	415	450	480	500	500	3,080
3. Studies/Workshops/ Information Dissemination	50	200	250	300	300	300	300	250	1,950
4. Commodities for Application		1,750	3,500	3,500	4,900	4,900	4,900	4,900	28,350
5. Demonstrations		750	1,500	1,500	2,100	2,100	2,100	2,100	12,150
6. Monitoring instruments		30	35	35	50	50	40	40	280
7. Activity operations/ management		125	130	150	175	175	200	200	1,155
8. Evaluation and Audit costs		—	—	100	—	40	—	100	240
Total	300	3,205	5,800	6,000	7,975	8,045	8,040	8,090	47,455

2.C. Energy Training

In preparing this budget estimate, we chose to work with an estimated number of participants that seems reasonable at this time. Project costs run at approximately $1-to-1.5 million per fiscal year. Tables VII A&B estimates training activity costs and the number of participants we can expect each year. A much clearer picture of training apportionment will be available once the manpower needs analysis and training plans are completed.

Should requests for two years M.S. programs be less than estimated, more one year academic and industry fellows could be accomodated. Should the reverse be true, and project funds are not increased, fewer participants can be accommodated.

The figures assume that Egypt will provide the participant's salary while he/she is in the U.S. All other costs are realized by the activity, including international transportation at $2,000 per participant. Academic costs were calculated using an estimate of $1,850 per month for long-term academic training in FY 1986. The monthly costs include maintenance, tuition, books, supplies, insurance, administration and a contingency factor. Thus for FY 1986 a 21 month M.S. degree program costs $40,850 and a 12 month non-degree academic program costs $24,200.

The cost of short-term technical training (usually OJT non-academic) is estimated by the Training Division at $3,400 per month. Thus a three month program costs $12,200.

A 12 month internship in industry is estimated to cost $13,000 in 1986. This figure assumes that companies do not charge A.I.D. to place an intern. This is reasonable as the intern is expected to contribute to as well as learn from the company.

Training costs for FY 87-91 use a 5% inflation factor. The academic costs may be reduced if no special services (i.e. English courses, orientation, special meetings) are needed and students attend state universities.

Contractor costs to administer this activity are estimated at $300,000 for the first year and 15% of annual training costs thereafter.

Phase I costs: Initial costs for this activity total $170 thousand to provide approximately twelve man-months of assistance in activity analysis and planning. The planning team will consist of one energy training specialist, one energy manpower analyst and three research assistants.

TABLE VII-A

Energy Training
Proposed Funding Summary
$(000)

Categories	AID	GOE*	Total
1. Component Planning	170	—	170
2. Industry Fellowship	1,354	146	1,500
3. 2nd Year Academic	891	144	1,035
4. 1st Year Academic	1,559	215	1,774
5. Short term technical training	1,625	175	1,800
6. Management	1,047	—	1,047
7. Evaluation and Audit costs	125	—	125
8. Contingencies	329	---	329
Total	7,100	680	7,780

* In kind contribution in LE estimated at the rate of 1$=0.83168 LE.

TABLE VII-B

ENERGY TRAINING
AID Estimated Budget Schedule
($000)

Categories	FY85	FY86	FY87	FY88	FY89	FY90	FY91	Total
1. Component Planning	170							170
2. Industry Fellowships		130	137	215	225	315	332	1,354
3. 2 Yr. Academic		82	129	135	142	247	156	891
4. 1 Yr. Academic		121	203	213	280	441	301	1,559
5. Short-term technical training		122	192	269	282	371	389	1,625
6. Management		300	99	125	140	206	177	1,047
7. Evaluation and Audit Costs				50			75	125
8. Contingencies	10	38	38	48	53	79	63	329
TOTAL	180	793	798	1,055	1,122	1,659	1,493	7,100

3. S&T Cooperation

As shown in Tables VIII A and B, the total AID Grant is estimated at $36.2 million divided into three categories:

a) A research Grant subdivided into three subgrants for solving national and local problems as well as strengthening the capabilities of selected institutions for advanced technologies.

b) Scientific and technical information service grant for extending the scientific information network at four to five universities and funding on-line data base searches in the U.S.

c) Management and support services for funding costs related to the establishment and operation of the Industrial and Technical liaison office, the National Science and Technology Committee (NSTC), the technical secretariat, as well as an AID direct contractor for grant support and services to assist in the assessment, evaluation and panel reviews of the different programs that will be identified by the NSTC and AID.

The use of U.S. expertise will be limited to selective short term problem solving, to management and establishment of the Industrial/Technical Liaison office attached to the NSTC and to the provision of technical panel reviews and evaluation for AID. This is consistent with the project emphasis on enhancing the role of and assisting the Egyptian S&T community in solving development problems. Research will actually be carried out by Egyptians, with the exception of the Advanced Technology Program where U.S. contractors will be closely involved in the institutionalization and adaptation of these new technologies in Egypt. It will be left to the Egyptian institutes to identify, after consultation with NSTC and AID, the U.S. organizations with

extensive experience and state of art knowledge in different aspects of the research categories.

The GOE contribution estimated at $37.0 million will be in-kind and will cover the following elements:

- Basic salaries of researchers and support staff
- Office and laboratory facilities including standard materials and supplies
- University overhead and other indirect costs
- Local cost related to equipment installation, storage and customs clearance
- Local costs related to normal project operation

In the absence of detailed knowledge of the research categories to be funded, the budget for the three research subgrants (NRP, ATP, LRP) are purely an educated guess based on similar research projects funded under the University Linkages and the Applied S&T project and Development Planning Studies project. It is expected that during the planning of this component the specific nature and composition of research activities will be better defined. Once the base project guidelines are developed, it will be possible to make accurate estimates for broad program categories.

The project plan assures that in its first two quarters of FY 86, one advanced technology program, two national research programs and the two local research programs will be approved for funding. Subsequent subgrant approval of the research programs will be made on a biannual basis but should be completed in the second quarter of FY 88. Funds are also budgeted for a mid term and final component evaluation.

Phase I costs: $810,000 will be allocated for the component to cover the cost of the planning team and pre-component activities that are necessary for the start-up of the research grant specifically.

- An amount of $120,000 will be used to contract the services of two U.S. and two Egyptain staff for two months to complete the component planning. A total 8mm of effort is anticipated through an IQC mechanism or PSC.
- $270,000 will be used to initiate the STI network at two Egyptian Universities such as Alexandria and Assuit. Costs will cover the procurement of two minicomputers, development of local scientific data bases, lease of foreign data bases, and on line access to U.S. data base vendors.

- A total of $300,000 will be used to establish the two offices of the NSTC and Industrial/Technical liaison office. Funds will be used to hire Egyptian directors and competent support staff, provide office equipment, pay for costs related to workshops, meetings organized by the NSTC and the provision of 4 mm of U.S. consultants to assist in the design and establishment of the Industrial/Technical liaison office.

- $80,000 will also be used to provide 5mm of technical services for the preparation of the request for proposals, and proposal evaluations for the national and local research programs that will be identified during the planning phase.

Table VIII-A

S&T Cooperation
Proposed Funding Summary
$(000)

Categories	AID	GOE*	Total
1. Component Planning	120	—	120
2. Research Grants			
A. Advanced Technology Programs (ATP)	8,600	3,400	12,000
B. National Research Programs (NRP)	11,250	18,750	30,000
C. Local Research Programs (LRP)	7,800	13,000	20,800
SUBTOTAL	27,650	35,150	62,800
3. Scientific and Technical Information	3,000	2,800	5,800
4. Management & Support Services			
A. Industrial/Technical Liaison Office	850	300	1,150
B. NSTC and technical secretariat	750	750	1,500
C. Grant Support & Services	1,500	—	1,500
SUBTOTAL	2,900	1,050	3,950
5. Evaluation and Audit costs	700	—	700
6. Contingencies	1,730	—	1,730
TOTAL	36,300	39,000	75,300

* In kind contribution in LE estimated at the rate of 1$=0.83168 LE.

Table VIII-B

S&T Cooperation
AID Estimated Budget Schedule
$(000)

Categories	FY 85	FY 86	FY 87	FY 88	FY 89	FY 90	FY 91	Total
1. Component Planning	120							120
2. Research Grants								
A. Advanced Technology Programs		1,305	2,670	2,510	1,260	585	250	8,600
B. National Research Programs		795	2,075	3,895	2,435	1,010	1,040	11,250
C. Local Research Programs		1,485	2,865	1,860	1,040	550	—	7,800
3. Scientific & Technical Information Grant	270	730	400	400	400	400	400	3,000
4. Management & Support Services								
A. Industrial/Technical Office	150	200	100	100	100	100	100	850
B. NSTC and Technical Secretariat	150	100	100	100	100	100	100	750
C. Grant Support & Services	80	920	100	100	100	100	100	1,500
5. Evaluation and Audit Costs		—	—	200	—	—	500	700
6. Contingencies	40	280	415	460	270	145	120	1,730
Total	800	5,815	8,725	9,625	5,725	2,990	2,610	36,300

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C. FUNDING FLOW

Project implementation calls for AID direct contracting, host country contracting 1/, PASAs, participant financing, equipment procurement, and advances and replenishment of advances to GOE agencies. Funds for these transactions will flow as follows:

1. AID direct contracts, PASAs, participants and equipment procurement will be paid directly by AID or through a Letter of Commitment. As GOE agencies do not have the resources to make direct payments to contractors and suppliers, AID will make such payment through direct Letter of Commitment.

2. GOE implementing agencies will receive advances and replenishment of advances to pay for costs related to research materials and supplies and administrative and technical support, incentives and project support costs.

3. Where Procurement Service Agents (PSA) are used to purchase equipment and commodities from vendors, Bank Letters of Commitment will be used to pay suppliers for equipment and Direct Letters of Commitment will be used for the PSA fees.

1/ During the planning phase, each of the proposed implementing agencies will be appraised for their ability to work with host country contracts. The appraisal will include the agencies' ability to: (a) advertize, award and negotiate contracts; (b) monitor contract implementation; (c) examine invoices; and (d) audit contractor records and reports.

VI. IMPLEMENTATION PLAN

Implementation of component activities will be highly decentralized and will probably involve several agencies and institutions as determined through the planning process. These will include: appropriate levels of implementing ministries; local governments; national, regional and university research institutes; private consultants and firms; and professional groups. These groups will be involved with basic and applied research (chemical, biotechnological and engineering), analysis, R&D management, pilot activities, policy formulation, technical assistance and training. The Technical Secretariats will provide some technical assistance support, evaluation of site-specific activities, and promotion of participatory approaches to ensure peer review and end-user input. As a rule, the SC and Secretariat will not be involved in the implementation of specific activities, concentrating primarily on monitoring, evaluation and decisions concerning future funding.

This structure has the advantage of encouraging multiple points of creative initiative within the system while reducing management burdens at the central level. This is accomplished by providing the Steering Committees and Secretariat with decision making responsibilities.

Under the project's approach to design and implementation, only the types, but not the specifics, of activities undertaken in each of the components can be identified at this time. The specific responsibilities and the relative importance of the different organizations will evolve during component planning and cannot be detailed in advance. Similarly, the implementation schedule for this project cannot be formulated now since objectives and milestones will be developed during the planning of the individual components. Once component planning is completed, the rolling implementation plan will include a complete schedule for the first year, with subsequent years having less detail. As noted earlier, the schedule will be revised

annually. The implementation plan at present is consequently limited to a description of project phases and a generalized schedule for the first year, focusing on the planning of the four components.

The initial project authorization, based on the foregoing, will be for a currently "firm" $3 million and the commitment "in principle", based on current estimates, to follow-on components. As planning for each component is completed and accepted by AID, the Project Authorization and Project Grant Agreements, will be amended accordingly. Project Implementation Letters will be issued as appropriate, e.g., to adjust budget components or expedite disbursement to specific activities if circumstances warrant.

A. Administrative Arrangements:

1. Government of the Arab Republic of Egypt (GOE): The Ministry of Planning and International Cooperation (MPIC) will be the signatory to the Project Grant Agreement (ProAg) and to all Pro Ag amendments and Project Implementation Letters (PILs) related to the annual allocation of funds to the different components.

2. GOE responsibilities: The GOE through its implementing agencies is responsible for:

a. Developing a system for the review and approval of the annual action plan.
b. Administering all aspects of the component activities.
c. Providing quarterly reports to AID and MPIC on component operations.
d. Participating component and project evaluation.

3. AID responsibilities: Project Implementation management and monitoring of the AID inputs will be the responsibility of the Office of Science and Technology which is responsible to the USAID Associate Director for Human

Resources and Development Cooperation. A member of the S&T office will be assigned responsibility for the project and will be assisted as needed by project officers for the three components in monitoring, evaluation and review of all aspects of the Grant. The USAID project officer will be an ex officio member on each component steering committee. USAID will have access to all pertinent project reports and other documents issued by the implementing agencies, the technical secretariats and the individual activities. USAID will monitor project progress and make field inspections as required.

4. Project disbursements: Disbursements will be pursuant to procedures to be set forth in Project Implementation Letters (PILs) based on each component's recent performance and estimates of future requirements. An annual plan will be prepared by the Secretariat staffs and will include at a minimum a review of the previous year's activities, a description of the overall thrust of the coming year's activities, a specific work plan and an operating budget. The plans must also address any proposed changes in selection criteria. Annual funding levels, within the constraint of component authorization amounts, will be determined by component progress as indicated through monitoring and evaluation and projected annual requirements.

The individual components will be administered approximately as described above, with the actual system for each determined during component planning.

5. Implementing agencies: Each of the components will have an implementing agency responsible for managing and coordinating all component activities. While the final designation will be determined during component planning, the principal implementors identified to date are: (1) Critical Childhood Di ses--Ministry of Health; (2) Land Use--Ministries of Planning, Development, Reconstruction and New Communities; and (3) Energy--Ministries of Industry, Electricity and Petroleum. In the S&T Cooperation component, which is mostly a research grant, the Academy of Scientific Research and Technology (ASRT) will be the coordinating body, with the universities and ASRT research

institutes as the potential implementing agencies. Other ministries, universities, local governments, private consultants and firms and professional groups will be identified during component planning and later as component activities are implemented and new needs are identified.

B. Implementation Strategy

The project components will be implemented in two phases. In the first, USAID and GOE, with assistance from U.S. and Egyptian consultants and AID/Washington staff, will plan each of the components. During the second phase, component activities will be implemented.

The first phase will be split into two steps: (1) Detailed problem definition and planning; and (2) start of activities for each component.

1. Problem Definition: This step, carried out primarily by consultants (both U.S. and Egyptian), and AID/Washington staff, will involve research and analysis activities leading to clear problem and response definition. It will include:

a. Information collection and analysis.
b. Review of relevant research, application, management and production structures.
c. Recommendations on focus of component activities.
d. Decision on key component elements, i.e., goals and intermediate and long-range activities.
e. Recommendation on R&D structure, social science research needs, application infrastructure and production development, and institution building.

2. Component Planning: In this step the planning teams will use the analyses and conclusions from step one to prepare a planning document similar

to the standard PP. It will include the standard project description (including refining the goals and objectives developed in step one), and detailed project analysis sections, i.e., technical, economic, and social soundness feasibility. Major emphasis will be placed on developing a clear management structure, including:

a. overall (component) and specific (subactivity) responsibilities,
b. interdisciplinary research management,
c. coordination of research with development application and potential production,
d. an implementation plan and schedule,
e. a short and long range budget.

C. Implementation Schedule for Phase I

Because of the differing nature of the project components and the planning and implementation demands/requirements that will be unique to each, we anticipate the implementation schedules will not provide for a concurrent three track system. The likelihood is that component start dates may vary by a year or a year-and-a-half.

Date	Major Activities
June 1985	Pro Ag Signed
July 1985	Development of RFTPs for component planning consultants
August 1985	RFTPs issued
October 1985	Contractor's proposals received, evaluated and contracts awarded
December 1985	Contractors begin analysis
March 1986	Contractors begin planning work
May 1986	Planning finished

June 1986	Planning reviewed and approved by AID and MPIC. Authorization and ProAg amended, PILs issued
July 1986	Implementation of approved component activities begins

D. Procurement Plan

Phase one planning activities will AID direct contracts obtained through IQCs, "buy-ins" with centrally funded projects, PASAs or PSCs. Actual procurement plans will be prepared for each component during the planning phase. Current plans call for procurement of commodities and equipment and technical assistance.

1. Commodity Procurement

In each component, commodities procurement will use standard dollar and local financing regulations. It is anticipated that each principal implementing agency will be responsible for carrying out commodity procurement in accordance with AID rules and regulations set forth in HB 11 Chap. 3. Invitation for Bids (IFB) issued by the implementing agencies will be the normal mode of procurement. Review and identification of equipment as well as the specifications write up will be made during project planning or at the early stage of project implementation with the assistance of specialized specification writers. If, during the project planning, it is found that the component implementing agency does not have the resources and capability to perform its own procurement, a procurement service agent (PSA) will be contracted by the implementing agency to write the equipment specifications and perform the procurement in accordance with HB 11 Chap. 3.

Commodities will be financed by an AID direct Letter of Commitment (L/COM) or an AID/W Bank L/COM to a bank designated by the implementing agency and by subsequent commercial Letters of Credit. In case a PSA is contracted its fee will be paid by a separate USAID Direct L/COM issued to the PSA.

Commodities will be procured mainly from the U.S. The need for source and origin waiver, however, for purchasing commodities from geographic code 899, will be considered during the planning phase of each of the components. We believe the code 899 limit for shelf items procurement is too low. At present the limit is $5,000 per unit or LE 4,150, however, since Egyptian suppliers are importing goods on the basis of the new incentive exchange rate of 1$=1.45 LE (instead of 1$-0.8316 LE as used for this grant) commodity prices have increased in the local market. Therefore, we expect to propose that the $5,000 limit per item for code 899 countries be increased to $10,000 per item.

2. Technical Assistance Contractors

Technical assistance contracting will primarily use the host country and AID direct modes, depending on the capabilities of the implementing agency. In either case, selection will be according to standard AID competitive procedures.

The exception will be Critical Childhood Diseases which will probably use an AID direct contract for management and a PASA(s) for much of the technical work. At present, it appears that organizations such as the Naval Medical Research Unit/Cairo (NAMRU), the Communicable Diseases Center/Atlanta (CDC) and the U.S. National Institutes of Health (NIH) have unique capabilities and experience in guiding or conducting many of the activities required in this component.

E. Evaluation Plan/Approach:

Because of the innovative nature of many of the project activities and the interest in the findings and lessons they may reveal, the project requires evaluation as a continuous process, involving each of the components in ongoing self-assessment and plan revisions. During component planning, complete evaluation plans will be developed for each of the four project

components, including the development of evaluation criteria. The criteria should include objective, quantifiable guidelines that provide a basis for assessing progress toward component objectives (development-oriented research, adequate extension and application of findings and institutional development). The values expressed in the component criteria will be incorporated into the evaluation criteria of subcomponent activities. What follows below describes the project's overall approach to evaluation.

The evaluation process must be as flexible and responsible as the project itself is intended to be. Specific needs for evaluation information will arise during the component planning phase and throughout the implementation process concerning; a) selection criteria, b) funding levels, c) administrative implementation procedures, d) assessments of the success of various subactivities, and e) identifying general lessons for improvement of other development programs. Project implementers, managers and facilitators will be encouraged to carefully identify and refine their information needs as the project evolves and new component subactivities are identified.

STFD evaluation will be basically of three types: The first and most important will be that which is ongoing and integral to each of the components' management systems. The second is the annual progress review which will serve as a basis for annual funding allocations. The third will be a biennial or triennial external evaluation carried out by independent teams to assess technical accomplishments and to evaluate the linkage between those results and their application to technical, economic and social problems.

1. Ongoing Self-Evaluation

Self-evaluation will take place simultaneously at various levels. Each Technical Secretariat Staff, with direct assistance from implementing agencies, will present to its Steering Committee an annual assessment of progress achieved against plans, technical findings, lessons learned, issues

raised, changes in assumptions and strategy suggested by these lessons, findings and unresolved issues, and a work plan and budget for the next year. To provide the basis for this annual report, each Director will require subactivity managers to provide a similar annual assessment and work plan for Secretariat review of their subactivity. Normally these reviews will be integral to the annual component work plan and budget proposal approval process and therefore are a critical element of the self-evaluation process. They will be based on information from a variety of sources such as monitoring and evaluation reports from implementing agencies, normal ministry monitoring systems, monitoring, field observations and assessment by Secretariat members, by technical assistance contractors, consultants, and by other project staff. The specifics of the reports and supporting evaluation will vary from component to component and will be determined during component planning.

2. Annual Progress Review

The annual progess review, conducted by each of the component Steering Committees, will assess component and subactivity progress and serve as the basis for approving annual work plans and budgets. These reviews will, in turn, serve as the basis for subsequent funding requests to AID and MPIC. In addition to the materials described in subsection 1) above, and those developed by the Secretariat, the SCs may conduct independent reviews and field visits to develop their own assessment materials/information.

3. Biannual/Triennial External Evaluation

Approximately every two years a major process assessment will be conducted in order to 1) verify that the self-evaluation process is functioning as intended, that critical issues are being addressed, and that project objectives have a reasonable probability of attainment, and 2) provide an assessment of redesign requirements, including whether individual subactivities should be continued at the same, higher, or lower levels or

terminated altogether, and 3) verify the suitability for inclusion of suggested new subactivities. Although a specific workscope and evaluation issues will not be prepared until after 12-18 months of implemenation, evaluation questions and issues of the following general nature are likely:

1. Are component activities moving ahead at a satisfactory rate? What are the reasons for any major delay? What might be done to overcome these in ways consistent with the nature of the component?

2. Does progress suggest that component purposes will be achieved on schedule? Which may not? What changes should be made either in the purposes themselves or in the approach to achieving them?

3. Is the component proceeding according to design guidance and expectations? What assumptions and other aspects of the design are no longer realistic?

4. What are the views, attitudes, and perceptions of the component from the perspective of MPIC, USAID, Steering Committee, Secretariat, contractors, consultants and end-users? Are these views consistent? What changes would improve the acceptance of the component by major participants at all levels?

5. Is the Steering Committee operating effectively? What decision-making criteria are being used? Are budget problems being resolved rationally? What improvements are recommended?

6. What is the quality of subactivity proposals that are forwarded to the Steering Committee? Are there adequate provisions for continued monitoring, evaluation and redesign?

7. Is the Secretariat system operating effectively? Are general administrative arrangements providing sufficient support for key implementers?

Are all important groups participating actively? Are the views of the members and Director being considered by senior officials? Are the participants enthusiastic about the component? What can be done to improve the operation of the Staff?

8. Where applicable, is there an appropriate balance between national and local-level involvement in the component? Are local, site-specific subactivities receiving adequate attention?

9. What steps might improve use? Are research and extension efforts organized in manner that will result in the greatest possible dissemination of research results and development assistance?

10. Are the operational programs giving adequate attention to involvement of local governments and private sector institutions?

11. Is the component making an effective contribution to the development and involvement of Egypt's resource institutions? Have the technical assistance consultants played an effective role in this process?

12. To what degree are the implementing agencies able to act as focal points for continued assistance relating to attainment of the project goal by evaluating their performance in conceptualizing, selecting and managing problem-oriented research?

13. Are linkages between the research community and end-users being forged as a result of this project. Is there a measurable increase in demand for services from end-users? Examine management and promotional activities of S&T resource under the project and whether they have served to strengthen and increase these linkages. In sum, has the project succeeded in re-orienting the significant Egyptian research capacity toward more applied, rather than basic research, in an attempt to address national development problems?

It should be possible for the evaluation teams to answer most such questions from a review of project documents, interviews with key personnel, and selective spot-check visits to the field. It is anticipated that the review teams would be composed of one representative each from the GOE, the Mission and the Near East and S&T Bureaus in AID/W, plus one or two outside consultants from Egypt and/or the U.S. The assessment would be expected to require 3-4 weeks, including discussion of preliminary findings with the Steering Committee, the Secretariat and with the USAID Mission, and preparation of a final report and recommendations. The first assessment is expected to be scheduled for the end of the first two years of component implementation, with subsequent assessments approximately every two years thereafter.

F. Conditions and Covenants

The Grantee agrees to cooperate fully with AID to accomplish the purpose of the Grant. To this end, it agrees to the following conditions:

1. Conditions Precedent to Disbursement:

A) Initial Disbursement

Prior to any disbursement or to the issuance by AID of documentation pursuant to which disbursement will be made for Phase I activities other than the individual project component planning, the Cooperating Country shall, except as AID may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

a) A statement of the names and titles, with specimen signatures, of the person or persons who will act as the representatives of the individual project component.

b) Such other documentation as AID may require.

B) Additional Disbursements

a. Component Activities

Prior to any disbursement or to the issuance by AID of documentation pursuant to which disbursement will be made for each individual component's Phase II activities, the Cooperating Country shall, except as AID may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID:

a) Evidence that the Steering Committee and its technical secretariat have been established and have outlined their responsibilities.

b) Statement of the names and titles with specimen signatures of the Director of the Technical Secretariat.

c) Such other documentation as AID may require.

b. Individual Project Components

Additional CPs will be determined with the planning of each individual component.

2. Covenants

1) The Cooperating Country shall covenant that it will provide on a timely basis all necessary local logistic support as may be required to ensure effective use of goods and services financed under the Grant.

2) Other covenants, i.e., for particular components, are to be determined at the time of authorization of each component.

3) The Component Steering Committee chairmen, Secretariat Directors, a Senior representative of each implementing agency and the USAID project officers will meet annually to discuss major elements of progress. These meetings will enable USAID to synthesize common themes, to identify areas for policy dialogue, and to provide long range planning for incorporation of project results into GOE ministry and agency activities.

G. Environmental Considerations

Phase One is exempt since it provides only technical assistance, training, etc. Phase Two, if construction or other activities of environmental concern are included in particular components, will be reviewed from an environmental standpoint during planning of components.

AID 1020-25 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 85 to FY 92
Total U.S. Funding $ 131.5 million
Date Prepared: 5/20/85

Project Title & Number: Science and Technology for Development - 263-0140

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To improve the welfare and productivity of the Egyptian people.	Measures of Goal Achievement: Vaccine for a critical disease developed. Land use models incorporated into land use decision-making. Industrial productivity improved at demonstration sites through use of energy efficient technologies. Energy manpower capabilities increased. Research community adopts applied research for solutions to development problems.	- Progress reviews and examination of final reports of individual research activities. - Review of number of solutions/technologies adopted by end-users. - Interviews with end-users.	Assumptions for achieving goal targets: -- That the S&T community is capable of solving well-defined development problems. - The GOE will remain committed to applied research activities directed at national development problems.
Project Purpose: To enable the Egyptian S&T community to solve national development problems through applied research and technology in the fields of health, productivity and science and technology.	Conditions that will indicate purpose has been achieved. End of project status. 1. Vaccine available for a critical disease. 2. Improved GOE land use analysis capability. 3. Increased productivity in modern sector through energy training. 4. Development of technical solutions to local regional and national development problems. 5. Increased interinstitutional cooperation.	- Process and progress evaluation, site visits, interviews with end-users. -Project evaluation to determine degree to which research is directly applicable to national development priorities and end-users needs. - Interviews with institutes involved in project activities and canvassing of S&T community.	Assumptions for achieving purpose: - Activities funded under this project will yield results that can be directly applied to national development problems. - Research results are directly applicable at appropriate levels of targeted problems. - S&T community is prepared to engage in interinstitutional cooperation.
Outputs: 1. Epidemiological data developed. 2. R&D on antigenes and chemotherapy completed for vaccine development. 3. Land use planning models developed and used. 4. Energy efficiency of new technologies and management systems demonstrated. 5. Increased trained personnel for managing energy resources and utilities. 6. Solutions to local and national problems applied by end-users.	Magnitude of Outputs: 1. Vaccine developed for one critical disease. 2. Four-five diagnostic agents developed. 3. Two-three areas for epidemiological studies chemotherapy regimes are improved. 4. Two-three land use models developed. 5. 75-100 demonstrations completed. 6. 280 persons trained in energy use and management. 7. 10-12 research programs completed.	- GOE, USAID, and consultants' project monitoring assessments and reports, and interim and final evaluations. - Review of studies, site and facility inspections, and project files. Observed measured degree to which solutions/technologies are adopted. - Interviews with GOE officials, end-users and researchers.	Assumptions for achieving outputs: - Demand for solutions exist. - Solutions are transferred directly to initial end-user groups.
Inputs: Technical Assistance Commodities Training Laboratory and clinical research Seminars/Workshops Special studies Information services.	Implementation Target (Type and Quantity) 1. Critical Childhood Diseases - $33.2M 2. Productivity a. Land Use $ 7.5M b. Energy Mgt $47.5M c. Energy Trg $ 7.1M 3. S&T Cooperation $36.2M Total $131.5M	- Project records and reports.	Assumptions for providing inputs: - Level of inputs sufficient to attract researchers, and cooperation continues to exist between participating institutes.

ACTION: AID-0 INFO: DCM [illegible]

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HRDC ACTION FOR: [illegible]
DATE RECD: 15 OCT 1984

LOC: 69 717
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CN: 19488
CHRG: AID
DIST: AID

ACTION TO HRDC DPPC
ACTION TAKEN _____ DATE 10/18
NAME _____ INITIALS _____

AIDAC

E.O. 12356: N/A
TAGS:
SUBJECT: NEAR EAST ADVISORY COMMITTEE (NEAC) REVIEW OF S AND T STRATEGY AND GAME PLAN

1. S AND T STRATEGY WAS REVIEWED (1) BY AID TECHNICAL AND PROJECT DEVELOPMENT STAFF IN NE, S AND T, AND PPC; (2) BY A NAS PANEL FROM THE US SCIENTIFIC AND ACADEMIC COMMUNITY; (3) BY THE NE AND S AND T BUREAU LEADERSHIP; AND (4) AT NEAC FOR FORMAL APPROVAL OF STRATEGY AND CDSS GAME PLAN. ALL FOUR GROUPS COMMENDED THE MISSION ON A WELL PREPARED STRATEGY AND THOUGHTFUL PRESENTATIONS BY MISSION STAFF. THE REVIEW GROUPS WERE VERY SUPPORTIVE OF THE USER- ORIENTATION PROGRAM THEME, THE SIX AREAS OF CONCENTRATION, AND FLEXIBILITY OF INCLUDING APPLIED AND BASIC RESEARCH. SINCE THIS IS A MISSION-WIDE S AND T STRATEGY, THE REVIEW GROUPS EMPHASIZED THAT IT IS THE RESPONSIBILITY OF ALL CONCERNED MISSION OFFICES TO BE INVOLVED IN FURTHER DEFINING THESE SIX AREAS AND IN DESIGNING AND IMPLEMENTING PROJECTS/ PROGRAMS TO SUPPORT THE DEFINED S AND T ACTIVITIES. AID/W TECHNICAL GROUP AND NAS PANEL COMMENTS HAVE BEEN HAND-CARRIED BY ERVIN AND WILDER. THE FOLLOWING REPRESENTS NEAC DECISIONS.

2. NEAC, CHAIRED BY DAA/NE, BRADSHAW LANGMAID, MET ON OCTOBER 2 AND APPROVED THE S AND T STRATEGY AND GAME PLAN. THE MISSION WAS REPRESENTED BY BERNARD WILDER AND LAWRENCE ERVIN, HRDC.

3. NEAC ENDORSED THE SIX AREAS OF CONCENTRATION WITH THE UNDERSTANDING THAT THROUGH MISSION INTEROFFICE DISCUSSIONS AND NEGOTIATIONS WITH THE GOE, THESE AREAS WOULD BE MORE SHARPLY DEFINED AND THEIR SCOPE DELIMITED. THE MISSION IS AUTHORIZED TO MOVE DIRECTLY TO THE DEVELOPMENT OF PROJECT PAPER(S). FOLLOWING REPRESENT CONCERNS TO BE ADDRESSED IN PP.

4. S AND T COOPERATIVE ELEMENT OF THE STRATEGY WAS SEEN AS A VEHICLE ALLOWING CONSIDERABLE FLEXIBILITY IN RESPONDING TO RESEARCH NEEDS, AND ONE THAT HAS THE POTENTIAL OF IDENTIFYING AREAS THAT MAY LATER BE DEVELOPED AS PRIORITIES. TO ENSURE THAT FUTURE RESEARCH PRIORITIES ARE SHARP-

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LY FOCUSED AND USER-ORIENTED, MISSION SHOULD DELINEATE, AS A CRITICAL PART OF PROJECT DESIGN, EXPLICIT CRITERIA TO BE USED IN IDENTIFYING THESE ADDITIONAL KEY AREAS. MISSION MAY ALSO WISH TO DESIGN ACTIVITY IN SUCH A WAY THAT AID RETAINS CONTROL OVER A PORTION OF THE MONEY FOR DIRECT DISBURSEMENT.

5. IT WAS OBSERVED THAT URBAN STRATEGIC ISSUES (I.E. EMPLOYMENT GENERATION, INFORMAL HOUSING, RELOCATION/SETTLEMENT ISSUES) MAY BE CONSIDERED UNDER THE SOCIAL SCIENCE PORTION OF THE S AND T COOPERATION AREA AS WELL AS WITHIN THE FOCUSED AREAS OF CONCENTRATION, DEPENDING ON HOW THE MISSION DEVELOPS ITS URBAN STRATEGY.

6. INCENTIVE QUESTION FOR RESEARCHERS WAS ADDRESSED AS IT RELATES TO STRATEGY IMPLEMENTATION. WHILE THIS WILL BE A PP ISSUE, MISSION STRONGLY ENCOURAGED TO EVALUATE VARIOUS INCENTIVE PLANS USED IN COMPLETED AND CURRENT PROJECTS AS THIS MAY BE A KEY TO SUCCESS OF STRATEGY.

7. SPECIAL CONCERN WAS EXPRESSED REGARDING POLICY RESEARCH . RECENT EXPERIENCES WITH CU-MIT ENERGY ACTIVITY POINT TO THE NEED TO HAVE SUCH RESEARCH VERY CAREFULLY SCOPED AND MONITORED AND MAY ALSO INDICATE THE NEED FOR A BETTER SYSTEM OF PEER REVIEW. WE WOULD LIKE TO SEE A SPECIFIC DETAILING IN PP OF HOW POLICY RESEARCH WILL BE MONITORED.

8. NEAC NOTED FUNDING PROPOSED FOR FY 85 AND 86 MAY LIMIT INITIATIVES MISSION APLE TO PROPOSE. MAY WISH TO MAKE HIGHER LEVELS AVAILABLE PARTICULARLY IN FY 86 IF PP DESIGN INDICATES SUCH A NEED.

9. PP DESIGN SHOULD ADDRESS HOW OTHER USAID ACTIVITIES SUCH AS UNIVERSITY LINKAGES, LEADERSHIP TRAINING, CIP, ETC. WILL BE FOLDED INTO OR USED TO COMPLEMENT S AND T PROJECT.

10. NEAC RECOGNIZED THE DIFFICULTY OF IMPLEMENTING THE INTEGRATED APPROACH OUTLINED IN THE STRATEGY WITHIN THE MISSION AND GOE ORGANIZATIONAL STRUCTURES. THE INTERDISCIPLINARY DEMANDS OF THE S AND T PROGRAM MAY MEAN THAT REVIEW AND EVALUATION BY AN EXTERNAL PANEL AS A ROLLING PROCESS IS DESIRABLE FOR TECHNICAL INPUT TO ENHANCE USAID CONTROL, AND ENSURE THAT THE SCOPING AND DIRECTION OF RESEARCH IS FULLY COMPATIBLE WITH AGENCY PRIORITIES, STANDARDS AND POLICIES. EXPECT THIS MAY REQUIRE DOLLARS FOR MISSION UNILATERAL COMMITMENT.

11. NEAC RECOGNIZED THAT IMPLEMENTATION OF THIS STRATEGY HAS STAFFING AND ORGANIZATIONAL IMPLICATIONS FOR SEVERAL DIVISIONS WITHIN MISSION. EXPECT THIS TO FULLY BE ADDRESSED IN PP AS WELL AS ANY SUGGESTIONS USAID MAY WISH TO MAKE RELATIVE TO GOE ORGANIZATIONS AND STAFFING. AS PROJECTS

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ARE DEVELOPED AND TECHNICAL NEEDS ARE KNOWN, PLEASE KEEP IN MIND THE LONG LEAD TIME RECENTLY EXPERIENCED IN FILLING MISSION SELECTED PRIORITY VACANCIES. IN AID/W, WE ALSO PLAN TO ESTABLISH A WORKING GROUP WHICH WILL BRING IN VARIOUS OFFICERS MORE BROADLY THAN THE NORMAL PROJECT REVIEW COMMITTEE SYSTEM. FINAL COMPOSITION AND MANAGEMENT WILL DEPEND ON CONTENT OF PP.

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Annex C

STATUTORY CHECKLIST

5C(2) PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A. includes criteria applicable to all projects. Part B. applies to projects funded from specific sources only: B.1. applies to all projects funded with Development Assistance loans, and B.3. applies to projects funded from ESF.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE?	Yes
HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?	Yes

A. GENERAL CRITERIA FOR PROJECT

1. FY 1985 Continuing Resolution Sec. 525; FAA Sec. 634A; Sec. 653(b).

(a) Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the projct; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or nor more than $1 million over that amount)?	a) Congressional notification will be submitted, in accordance with regular Agency practice. b) Yes

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimte of the cost to the U.S. of the assistance?

	a) Yes
	b) Yes

3.	FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	None required
4.	FAA Sec. 611(b); FY 1985 Continuing Resolution Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973, or the Water Resources Planning Act (42 U.S.C. 1962, et seq.)? (See AID Handbook 3 for new guidelines.)	N/A
5.	FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?	N/A
6.	FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	No

7. FAA Sec. 601(a). Information and conclusions whether projects will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	Some components of the project will serve to increase productivity in the industrial/ commercial sector. These activities will directly affect (e) and indirectly affect (a) and (b)
8. FAA Sec. 601(b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	Most goods and many of the services financed under the Grant will be from private U.S. source.
9. FAA Sec. 612(b), 636(h); FY 1985 Continuing Resolution Sec. 507. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.	The Grant Agreement will specify the financial obligations of the Host Country including in-kind contributions.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	The U.S. owns no excess local currency.

11.	FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes
12.	FY 1985 Continuing Resolution Sec. 522. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?	N/A
13.	FAA 118(c) and (d). Does the project comply with the environomental procedures set forth in AID Regulation 16.	Yes
	Does the project or program taken into consideration the problem of the destruction of tropical forests?	N/A
14.	FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate sysem for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)?	N/A

15. FY 1985 Continuing Resolution Sec. 536. Is disbursement of the assistance conditioned solely on the basis of the policies of any multilateral institution? — No

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria — N/A

a. FAA Sec. 102(b), 111, 113, 281(a). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote

the participation of women in the national economies of developing countries and the improvement of women's status, (e) utilize and encourage regional cooperation by developing countries?

b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used?

c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to whch the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed country)?

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project for more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country

"relatively least developed"? (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than $100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character."

f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?

g. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

2. Development Assistance Project Criteria (Loans Only)	N/A
a. FAA Sec. 122(b). Information an conclusion on capacity of the country to repay the loan, at a reasonable rate of interest.	
b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?	
3. Economic Support Fund Project Criteria	
a. FAA Sec. 531(a). Will this assistance promote economic and political stability? To the extent possible, does it reflect the policy directions of FAA Section 102?	The project will promote economic and political stability by providing solutions to some of Egypts' major development constrints. Yes.
b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?	No
c. FAA Sec. 534. Will ESF funds be used to finance the construction of, or the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives?	No

d.	FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?	N/A

5C(3) - STANDARD ITEM CHECKLIST

Listed below are the statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

Procurement

1.	FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed?	Use of small businesses will be considered, in accordance with Agency policy and regulations.
2.	FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him??	Yes, except for local cost purchases as authorized.
3.	FAA Sec. 604(d). If the cooperating country discriminates against marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company?	N/A

4.	FAA Sec. 604(c); ISDCA of 1980 Sec. 705(a). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.)	N/A
5.	FAA Sec. 604(g). Will construction or engineering services be procured from firms of countries which are direct aid recipients and which are otherwise eligible under Code 941, but which have attained a competitive capability in international markets in one of these areas? Do these countries permit United States firms to compete for construction or engineering services financed from assistance programs of these countries?	N/A
6.	FAA Sec. 603. Is the shipping excluded from compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S. flag commercial vessels to the extent such vessels are available at fair and reasonable rates?	No

Illegit.

7.	FAA Sec. 621. If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? If the facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?	Because of the special nature of some of the research, for example, vaccine development, the services of a Federal agency such as C.D.C, NIH, or the Naval Medical Research Unit may be required. This will be determined after thorough analysis of alternative sources, in accordance with Agency and OMB regulations.
8.	International Air Transportation Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will U.S. carriers be used to the extent such service is available?	Yes
9.	FY 1985 Continuing Resolution Sec. 504. If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States?	Yes

B. Construction

1.	FAA Sec. 601(d). If capital (e.g., construction) project, will U.S. engineering and professional services be used?	N/A
2.	FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?	N/A

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million (except for productive enterprises in Egypt that were described in the CP)? — N/A

C. Other Restrictions

1. FAA Sec. 122(b). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? — N/A

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? — N/A

3. FAA Sec. 620(h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries? — Yes

4. Will arrangements preclude usen of financing:

   a. FAA Sec. 104(f); FY 1985 Continuing Resolution Sec. 527. (1) To pay for performance of abortions as a method of family planning or to motivate or coerce persons to practice — Yes

abortions; (2) to pay for performance of involuntary sterilization as method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization; (3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of family planning; (4) to lobby for abortion?

b.	FAA Sec. 620(g). To compensate owners for expropriated nationalized property?	Yes
c.	FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs?	Yes
d.	FAA Sec. 662. For CIA activities?	Yes
e.	FAA Sec. 636(i). For purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained?	Yes
f.	FY 1985 Continuing Resolution, Sec. 503. To pay pensions, annuities, retirement pay, or adjusted service compensation for military personnel?	Yes

g.	FY 1985 Continuing Resolution, Sec. 505. To pay U.N. assessments, arrearages or dues?	Yes
h.	FY 1985 Continuing Resolution, Sec. 506. To carry out provisions of FAA section 209(d) (Transfer of FAA funds to multilateral organizations for lending)?	Yes
i.	FY 1985 Continuing Resolution, Sec. 510. To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields?	Yes
j.	FY 1985 Continuing Resolution, Sec. 511. Will assistance be provided for the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights?	Assistance will preclude use of financing for this purpose.
k.	FY 1985 Continuing Resolution, Sec. 516. To be used for publicity or propaganda purposes within U.S. not authorized by Congress?	Yes

Annex D

GOE REQUEST FOR ASSISTANCE

to be received

Illustrative Technologies, Studies and Workshops for Energy Management

The technologies to be deomonstrated have already been tested, proven and made available in the United States and other countries. Nonetheless, their application to Egypt will, in most cases, be innovative. Successful demonstrations are expected to be replicated in other plants, buildings, and commercial units and centers as plant equipment and building stock is changed or replaced. Successful demonstration should provide the impetus to accelerated technology transfer, including promotion of local manufacture of equipment with support of the GOE, the private sector, and other donors.

This annex is divided into three sections, an illustrative list of equipment that can be applied to the Egyptian modern sector, a description of the equipment, and some suggested studies and workshops. The lists are by no means final; they will be added to by the design team and during implementation as other equipment becomes available and workshop ideas evolve.

A. ILLUSTRATIVE LIST OF ELIGIBLE EQUIPMENT AND COMMODITIES

1. ENERGY CONSERVATION AND FUEL CONVERSION EQUIPMENT

Heat Recovery Technology
- Condensing heat exchangers
- Metallic recuperators
- Economizers
- Air heaters
- Waste heat boilers

Instrumentation and Control Systems
- Automatic actuated valves
- Stack gas characterization equipment
- Data acquisition equipment

Insulation Materials
- High temperature refractory brick
- Furnace/boiler outside walls
- Steam pipe insulation
- Fiberglass

Coal Handling Equipment
- Conveyance/feeding
- Storage
- Grinding

Steam Generation Equipment
- Upgrade equipment (de-aerators water treatment)

High efficiency package boilers (oil and gas)
Coal fired package boiler (stoker and fluidized bed and gasification systems)
High efficiency and multifuel burners
Steam distribution equipment

Furnaces/waste fuel boilers
Oil/pulverized coal melting furnaces
Fuel processing equipment
High efficiency and multifuel furnaces

Motor Power Factor Correction Equipment
Upgrade equipment (capacitors and test apparatus)
High efficiency motors

Cogeneration Equipment
Packaged cogeneration systems
Waste fuel fired systems

High Efficiency Lighting Equipment

Energy Audit Equipment
Stack gas monitoring instrumentation
Thermal imaging systems
Temperature monitoring equipment
Flow meters and electric power meters
Data acquisition equipment and computers
Energy audit vehicles

2. BUILDING ENERGY MANAGEMENT SYSTEMS

Time clocks, temperature or light induced controls, and computers.

B. DESCRIPTION OF EQUIPMENT AND COMMODITIES

1. ENERGY CONSERVATION/FUEL CONVERSION EQUIPMENT

Energy efficient equipment will play a major role in achieving Egypt's energy conservation and increased productivity goals. The categories below describe the equipment that has been identified to-date for this activity. Initially, all of the equipment will be imported. Eventually some of it will be manufactured in Egypt.

a. Waste Heat Recovery Equipment

Several million tons of oil equivalent (MTOE) per year of waste heat is discharged from furnaces and boilers in Egypt's industrial sector. Heat recovery technology allows cost effective recovery and use of this heat. Heat exchangers are the primary component of a heat recovery system, enabling heat

to be transferred from the reject stock gas to useful circulation streams. These heat sinks may consist of boiler makeup water, domestic water, combustion air, or ventilation air.

b. Instrumentation and Monitoring Systems

Instrumentation and control systems in this study refer to automatic actuated valves, stack gas characterization and burner control equipment, physical measurement instrumentation and data acquisition systems. Automatic actuated valves are controlled by temperature and pressure transmitters either mechanically or electrically actuated. Automatic actuation enables more accurate and uniform control enabling higher production capacities per unit of energy consumption. Stack gas characterization equipment consists of CO_2 or O_2 analyzers and temperature indicators. Continuous monitoring of the stack gas enables burner control at maximum efficiency. Advanced versions compute efficiency based on stack temperature and O_2 concentration. The systems are also available with feedback mechanisms to control combustion air changes in the burner. Physical measurement and data acquisition systems enable parameters to be measured and stored. Examples of these parameters are pressure and energy consumption and production rates. This information can lead to optimum energy use for a given plant.

c. Insulation Materials

Insulation materials consist of low thermal conduction materials to cover the outside of pipes, ducts, vessels, furnace and boiler walls to minimize heat conduction losses. High temperature materials also need to be fire resistant. The materials are available in rolls, sheets or brick form. Materials include fiberglass, mineral wool, magnisite, zirconia, and other refractory brick.

d. Steam Generation Equipment

Steam generation equipment includes upgrade equipment such as dearators, water treatment systems, steam traps; high efficiency oil, gas or coal fired boilers; waste fuel boilers including pith, bagasse, paper waste; and high efficiency and multifuel burners.

Upgrade equipment focusses on improving boiler water quality and effective steam distribution. Existing boilers with efficiencies below 70% that are over 25-30 years should be replaced with new package boilers which can fire on multiple fuels with fuel to steam efficiencies of 82-84%.

Inefficient boilers that are too young to retire can be retrofitted with new gas and oil fired high efficiency burners. The high efficiency burners are forced draft and are made for gas, or lquid fuels. Liquid fuel burners can be pressure or steam atomized. Coal fired boilers consist of stoker, pulverized fuel, or fluidized bed. In stoker fired boilers, solid fuel burns on a grate. Pulverizd fuel fired boilers use a forced draft burner to burn pulverized coal. Fluidized bed boilers burn solid fuels in a churning bed of hot sand/limestone set in motion by upward flowing air through the bed.

e. Furnaces and Direct Heating Equipment

Furnaces and direct fired heating equipment include all fuel fired operations that are not related to steam generation. The generic type of equipment for Egypt includes electric arc furnaces, fuel fired melting operations, fuel processig equipment, high efficiency furnaces and multiple fuel furnaces. Melting furnaces are designed to heat metal scrap to 2200-3000°F range, indirect heat of oil in the refinery (250-600°F) and direct or indirect drying of solids (100-300°F).

f. High Efficiency Motors and Power Factor Connection Equipment

Recent developments in electric motor technology have allowed higher efficiencies to be achieved. Improvements in motor efficiency are achieved by reducing losses from friction and windage, core, static, rotor and stray load. High efficiency motors optimize reduction in each of these losses to improve efficiency by 5-10%.

g. Coal Handling Equipment

Coal handling equipment refers to all equipment used to transport, grind and store coal during the time between delivery and plant use. Coal requires special care in transport and storage. The coal can lose a significant portion of its volatile matter content and there is a constant danger of spontaneous oxidation during transportation and storage. Coal must be blanketed in an inert environment to minimize particle breakage and attrition during transport.

h. Cogeneration Systems

Cogeneration systems produce electricity expanding hot high pressure gas either in an engine cylinder, gas or steam turbine to produce shaft power. Only about one-third of the energy consumed by the system is converted to electricity. The exhausts from these electrical production systems contain substantial amounts of heat. The system uses this reject heat to raise steam.

i. High Efficiency Lighting

Relamping with more efficient lamps can increase lighting efficiency without the need to modify lighting fixtures or ballasts. Changes in fixtures and ballasts can provide further energy savings at substantially higher capital costs. Electricity savings of 15-25 percent for high efficiency bulbs in the 40-100 watt range are common. Although the high efficiency bulb reduces operating costs the bulb life is less than that of standard bulbs.

2. BUILDING ENERGY MANAGEMENT SYSTEMS

An energy management system (EMS) is composed of microprocessor-based devices that control and optimize energy use in a building or facility, and is capable of on-site programming by building operating personnel. In general, the cost of an EMS, and the energy savings achievable with its use, increase with the capability of the system. Some specific uses for EMSs are:

- o Optimum start/stop. By monitoring indoor and outdoor conditions, an EMS will start equipment as late as possible and shut down equipment as early as possible while still allowing comfortable conditions to be maintained in the spaces served by building HVAC equipment.

- o Time-of-day duty cycling with temperature compensation will help to reduce building peak demand and electric energy use. This strategy is most effective where air conditioning is not needed for humidity control.

- o Peak electric demand control by load shedding or cycling. This option, while not necessarily cost effective under present utility rate schedules (which tend to have low demand charges), will become more attractive as utility rates increase and/or rates are restructured to include higher demand charges.

C. STUDIES, SEMINARS AND WORKSHOPS

Studies, seminars, and workshops will develop data on energy use and approaches to energy conservation, provide information on new technologies to be used by energy consumers, upgrade capabilities of equipment and service suppliers, aid in policy formulation and investment decision-making, and promote greater receptivity to conservation among public and commercial energy consumers by increasing their knowledge of the benefits of energy conservation. To achieve this, the project will support the activities of the GOE and business or manufacturing groups. These activities will benefit owners, managers, supervisors and technicians in the industrial, energy production, commercial and building sectors as well as financial groups and government managers.

These activities could include:

- o Studies to measure energy intensities of representative enterprises and determine the potential for energy conservation and substitution in industrial processes and building design. This baseline data can also help in developing performance standards and least-cost energy strategies, including analysis of the long-term industrial, building and urban development outlook. They can also provide benchmarks for comparison of Egyptian experience with that of other countries.

- Special technical studies on heat processing equipment, practices and processes, and electricity use and management.

- Seminars and workshops on specific topics such as: energy consumption monitoring in industry, buildings and commercial establishments; new monitoring and control techniques; electric and thermal load characteristics; payback and life-cycle costing; thermal energy systems optimization; waste heat recovery and cogeneration; new equipment and management systems; improved instrumentation; and, improved operating and maintenance practices. The project will also promote technology booths at workshops to enable suppliers to display equipment relevant to the workshop subject area.

- Survey of, and seminars for, private entrepreneurs seeking to establish or expand conservation-related businesses, such as conducting energy audits; manufacturing, importing or distributing conservation equipment; and providing design, engineering, maintenance and other services to energy-consuming clients.

- Analyses of policy issues related to energy conservation, including energy pricing, tax incentives, investment code provisions and other topics.

- Dissemination of technical and promotional publications such as industry-specific technical manuals, conservation case-study materials, and policy analysis documents selected from a large body of U.S. industrial and government literature.

- Dissemination of the technical and economic results of the technology demonstrations.

These activities are also designed to support institutional development through extension services, short-term training courses to upgrade skill levels and apprenticeships, and visits to plants and commercial enterprises where energy-efficient equipment and processes can be demonstrated. The training courses will be industry-, process-, and system-specific and will address problems of individual industries and businesses. For example, an energy management workshop that focuses on retrofit or energy conservation technologies could be very valuable. A special course could teach plant owners, managers and engineers to prepare feasibility studies and loan applications, to evaluate and develop innovative financing agreements, and to monitor the results of energy-saving investments.

Tentative Training Areas

As discussed in the project description, this activity will provide Egyptian personnel with M.S. level training in the science and engineering disciplines relating to conventional energy exploration, production and management. The training will be academic and on-the-job, with individual requirements determining which is most appropriate. While the focus will be on science and engineering disciplines, applications will be considered in related areas, e.g. economics, law, business and resource management, architecture and the environment.

1. The Disciplines

The development of conventional energy resources and technology in Egypt partly will be a function of the available technical manpower. The application of technologies in the energy field will require people educated in science, engineering and related disciplines at a level most appropriate for their positions. This may be accomplished through degree programs, in-service academic programs (non-degree) or industry internships. The following is a list of illustrative disciplines offered in this activity:

Geology and Geophysics

Petroleum, gas, coal and geothermal exploration as well as hydropower development depend on a firm understanding of geology and geophysics. Fossil fuel resource exploration in general requires the services of geologists.

Mechanical Engineering

Mechanical Engineering to advance the art of energy technology through the application of basic scientific principles from such fields as thermodynamics and heat transfer.

Chemical Engineering

Chemcial engineers to design process hardware for petrochemical and fertilizer industries, fuel cells or other applications in which one form of energy is chemically converted to another.

Civil Engineering

Civil engineers to design and construct hydroelectric facilities, fossil fuel power plants, oil wells and petrochemical plants.

Mining Engineering

The application of scientific principles in the extraction of minerals and solid fossil fuels. A specialized field offered at a few universities.

Natural Gas Engineering

Engineering applied to development of gas fields, gas transportation and consumption and processing methods.

Petroleum Engineering

Offered at relatively few institutions, the discipline is vital for oil exploration, production and reservoir analysis.

Industrial Engineering

Industrial engineers, from an energy perspective, are involved in conservation and efficient use of energy in various industrial operations.

Information Systems Engineering

Information systems engineering is the management of large quantities of data through application of digital computers. Energy program formulation requires extensive data availability on an organized basis.

Environmental Engineering

The generation and use of power can seriously affect the environment and, consequently, people through gaseous emissions, despoiling through mining, the release of heat, oil spills, etc. Environmental engineers can contribute to the safe development and use of conventional energy resources.

Business Management

Business management, although not strictly a science discipline, is a skill necessary for rational exploitation of energy resources. Financing requirements, personnel management and general corporation planning are essential ingredients for resource exploitation.

Energy/Natural Resource Law

Law underlies most agreements to identify, explore and produce oil, gas and coal. These agreements tend to be extremely complex documents, negotiated by skilled legal specialists. Resource exploitation is becoming a specialized sector within the legal disciplines.

Energy and Mineral Economics

Economics deals with the production, consumption and use of resources and commodities. Economic principles are evident in every stage of conventional energy exploration and production. Economists are employed throughout the energy industry, from cost analysts to board chairmen.

2. Types of Education:

Three types of education will be offered under this project:

- M.S. degree training
- In-service academic training
- Industry and government internships

Generally, M.S. degree training will be most appropriate for recent B.S. graduates who will form the junior staff of the energy related ministries and energy companies. These people will benefit the most from a rigorous academic program and can be released for two years. An age ceiling of 35 years is recommended for applicants for the M.S. degree.

The inservice academic and industry fellowships will be most appropriate for middle level managers who need to upgrade their technical and managerial skills but can not leave their positions for more than 12 months. Some of the fellowships will be appropriate to or design for senior management.

M.S. Degree Training

The decision to emphasize M.S. degree training rather than B.S. or Ph.D. is deliberate. An M.S. level program offers the quickest turn-around and lowest cost per student. Four years are required for a B.S. For an M.S., one additional year is necessary if the graduate work is done at the same school and in the same discipline; if not, two years are required. A Ph.D. takes two to three years beyond the M.S. Subject content consists of fundamentals at the B.S. level, new applications of research at the M.S. and new research at the Ph.D. level.

Egypt has engineering schools at the B.S. level, and a large pool of college graduates trained in basic engineering principles exists. Some of the people selected for training under this activity may require English improvement courses. Arrangements for this will be made on an individual basis.

An M.S. program is generally oriented to a speciality area within a discipline making it an ideal vehicle for training in energy. Some typical examples are:

Speciality Area

Electromagnetics
Fuels
Environmental Impact
Seismic Exploration
Thermo Dynamics
Combustion
Hydropower
Extraction Techniques
Reservoir Analysis
Energy Conservation
Statistics
Data Management
Organization Management
Pollution Control Technology
Resource Contracts
Project Feasibility
Petroleum Transportation

This list is not exhaustive. Rather it is indicative of the specialization available in the conventional energy field.

In-Service Academic Training

As a complement to degree programs, internships or fellowships in institutions such as national labs/universities will be offered. It is expected that mid-career individuals will be interested in upgrading their skills through a period of residence in organizations offering short-term professional opportunities up to 12 months. Such internships or fellowships will be provided to individuals who have responsible positions in ministries, the private sector or academia and are or will be in a position to influence energy use or policy in the future.

There are roughly two dozen universities in the U.S. which offer non-degree M.S. level academic courses. This group includes the major universities with oil, gas, and coal programs (e.g. IGT, Colorado School of Mines, Universities of Texas, Oklahoma, Houston, MIT). Courses can be taken in all of the speciality areas listed above. Courses are also offered at several of the national laboratories of the Department of Energy. Several private companies offer non-degree academic courses relevant to this activity, for example, Sylvania Training Operations (part of GTE) and Arthur D. Little's Management Education Institute (which also offers an M.S. in Energy Management).

Illustrative special courses could be:

- Industrial energy conservation to improve facility operations and optimize output.
- Fundamentals of petroleum engineering, petroleum geology, geophysical exploration and petroleum economics.

- Promoting investment in indigenous oil and gas exploration and development.
- Petroleum management program; the administration of hydrocarbon resources and energy policy.
- Planning and management of large energy construction projects.

Industry and Government Internships

The third category of education opportunities will be internships of up to 12 months in government and industry. Internships which provide on-the-job training may be the most useful training for those persons who have the requisite academic qualifications but lack practical experience of working in conventional energy industries. In addition to those coming solely for an internship, the project will enable students taking an M.S. degree or in-service academic training to spend up to 12 months interning in an industry as part of their academic training. This will enable the student to gain practical experience as well as the necessary academic background.

Internships

Examples of tailor made internships are:

Well logging
Well cementing
Computer Analysis/Energy Planning
Petroleum refinery design
Computer aided reservoir analysis
Seismic analysis
Enhanced oil recovery
Sesimic interpretation
Environmental control practices and technologies
Preventive maintenance; diesel and steam generators
National energy planning: advanced methods
Geophysics
Coal use
Coal and gas processing
Petrochemical industry conservation
Oil and gas field equipment and drilling
Fossil plant operations
Gas field development
Gas transportation
Energy Production financing

Internships will be sought with non-profit government contractors, national laboratories, federal agencies, academic institutions and the private sector. Organizations will be chosen on the basis of a strong capability in an energy

technology. Examples of some institutions working with the S&T Bureau's energy training contractor are:

Federal Government

Department of Energy
US Geological Survey
Department of the Interior - Bureau of Mines
Bureau of Land Reclamation
National Oceanic and Atmospheric Administration
Tennesse Valley Authority

National Laboratories

Brookhaven National Laboratory
Oak Ridge National Laboratory
Argonne National Laboratory
Lawrence Berkeley Laboratory
Lawrence Livermore Laboratory

Non-Profit Private Sector

Battelle
MITRE
SRI
Electric Power Research Institue (EPRI)
Institute for Gas Technology (IGT)
National Coal Association
American Gas Institute
Coal Research Center, University of Illinois
Petroleum Extension Service of Texas

Private Sector

A. D. Little
Booze-Allen Hamilton
Bechtel
Schlumberger
Scientific Software Inc.
Exxon
General Electric Company
Mobil
Standard Oil
Stone and Webster Engineering
Burns and Rowe
International Development and Energy Associates
Oil and Gas Consultants, Intl.
Gulf Oil Co.
Geochemical Testing Co.
Seismograph Services
Shell Oil Company
Signal Companies
Sohio
UOP, Inc.
Wellex
Westinghouse
International Petroleum Consulting Services
IBM

Placing interns in the private sector is not always easy. The private sector makes personnel decisions on the basis of business interests. There are few companies in the energy sector which have a training subsidiary open to

outsiders (A.D. Little and Sylvania do). Nevertheless, experience of the last several years indicats that LDC personnel can be placed in internships in the U.S. private sector.

Since 1981, the Institute of International Education (IIE) has placed almost 100 participants into specially designed training courses in private industry under the S&T Bureau's Conventional Energy Training Project. When this project was started there was very limited experience in placing LDC participants in such energy training efforts; either in firms of energy producers or energy consumers. In recent evaluations, IIE has been praised for its success in this area. There is no reason to believe this success cannot be replicated.

There are benefits and costs to industry in accepting Egyptian interns. There are long-term benefits with the company establishing contact with energy policy-makers and implementors in Egypt. The company also gains a greater appreciation of LDC energy problems by having the intern work with the company.

The costs are not insignificant. To have a productive internship, the company must select a company official to work closely with the intern. There is proprietary information which the company may wish to keep from non-company employees. The company provides training to a person it knows will leave after 12 months.

From the intern's and this activity's perspective, industry internships will be very valuable. Thus, a prime criterion for selecting the future contractor will be experience in placing students in industry.

G. Subactivity Selection Criteria for S&T Cooperation

Criteria for selection of the target research categories will be discussed at greater length in the project paper which will be specifically prepared for the STCP. However, a number of selection criteria are discussed here in a preliminary fashion. Suggested criteria for selection of target research categories might include:

1) Relevance to Crucial Sectoral Development Needs - Research categories should respond to crucial sectoral priorities and development needs within the Egyptian national economy. A selected category should also be consistent with current USAID CDSS sectoral policies and S&T Strategy.

2) Existence of R&D Capabilities - Reasonable capabilities to perform research, development, design and demonstration work should already exist within Egyptian institutions so that the achievement of measurable and significant research results is likely. Emphases will be placed on interdisciplinary and interinstitutional cooperation.

3) Application-Related Goals and Objectives - Another criterion should be the existence of clearly defined application-related goals and objectives within a target research category. Such goals and objectives should match or have a firm relationship to current GOE priorities. It will also be prudent to weigh the economic costs of the research against its benefits. Research to be conducted within a category must have the potential for producing positive economic impact and having economic feasibility (i.e. aid in cost-reduction, improved efficiency, expanded employment, or increased export potential) when applied.

4) End-User Orientation and commitment - A key criterion in selecting target research categories should be the existence of end-user groups, enterprises or organizations capable of formulating, participating and applying end-user research results.

Environmental Statement

The Science and Technology for Development Project is expected to have limited direct environmental impact. The purpose of the project is to support and encourage the expansion of applied research within Egypt's scientific and technological community to help solve Egyptian development problems. As such, project activities will primarily be of a research, analysis, demonstration and educational nature. (A note of clarification for the Energy Management activity: The equipment demonstrations to test and show the applicability and feasibility of energy-saving technologies in Egypt will bring environmental benefits to the country. The equipment to be demonstrated, varying from pre-heaters and heat recovery units to climate and lighting management systems and instrumentation, will have neither individual nor cumulative adverse environmental impacts. Indeed, any environmental effects stemming from these activities will be positive, as increased efficiency means more complete fuel combustion, a reduction in fossil fuel use, and less air pollution from toxins and heat emissions).

In accordance with regulation 16, section 216.2(c), this project does not require an Environmental Impact Statement or the preparation of an Environmental Assessment because of their research, educational, controlled experimentation and confined nature. In the event of any construction components beyond small-scale, the components will be reviewed on a case-by-case basis by the Mission Environmental Officer to determine whether or not an Environmental Assessment will be prepared.

memorandum

DATE: May 12, 1985

REPLY TO ATTN OF: DR/UAD, John C. Starnes, Mission Environmental Officer

SUBJECT: Science and Technology for Development Project

TO: OD/ST, Lawrence J. Ervin

I concur with the proposed Environmental Statement for the Science and Technology for Development Project. However, I wish to suggest that all reference to Section 216.2(b) be deleted. Also, please add the following sentence:

> "In the event of any construction components beyond small-scale, the components will be reviewed on a case-by-case basis by the Mission Environmental Officer to determine whether or not an Environmental Assessment will be prepared."

cc.
OD/UAD:FZobrist
DOD/UAD:FMiller

DR/UAD:JStarnes:mm:5/12/85 0084D

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UNITED STATES AGENCY for INTERNATIONAL DEVELOPMENT

CAIRO, EGYPT

PROJECT AUTHORIZATION

Name of Country: Arab Republic of Egypt

Name of Project: Science and Technology for Development

Number of Project: 263-0140

1. Pursuant to Section 531 of the Foreign Assistance Act of 1961, as amended (the "Act"), I hereby authorize for grant funding the Science and Technology for Development Project (the "Project") for the Arab Republic of Egypt ("Cooperating Country"). The Project involves: (a) a planned obligation in FY 1985 of Three Million United States Dollars ($3,000,000) for the Project's Phase One; and (b) estimated obligations of an additional One Hundred and Twenty Eight Million, Six Hundred Thousand United States Dollars ($128,600,000) for the Project's Phase Two. The project will extend over a currently estimated eight-year period from the date of authorization, and will help in financing the foreign-exchange and local-currency costs of goods and services required for the Project.

2. The Project will consist of assisting the Cooperating Country to solve national development problems and constraints through applied research and technology in the fields of health, productivity and science and technology. The Project's Phase One will consist of detailed analyses for the purpose of designing specific project components, and the provision of consulting services, training, equipment and research support and other services necessary to project commencement. The Project's Phase Two will consist of implementation of the Project's specific components, once designed and approved by A.I.D. Such approvals, to include amounts and conditions, will be documented by amendments to this Project authorization.

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

a. Source and Origin of Goods and Services

Goods and services, except for ocean shipping, financed by A.I.D. under the Project shall have their source and origin in the Cooperating Country or in the United States, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed on flag vessels of the United States.

b. Conditions Precedent to Disbursement:

(1) Initial Disbursement

Prior to any disbursement or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made for Phase I activities the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D.:

a) A statement of the names and titles, with specimen signatures, of the person or persons who will act as the representative of the Cooperating Country; and

b) Such other documentation as A.I.D. may require.

(2) Additional Disbursements

Prior to any disbursement or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made for individual components (Phase II activities), the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D.:

a) Evidence that the Steering Committee and its technical secretariat have been established with specified responsibilities, for each such component.

b) A statement of the names and title, with specimen signature, of the Directors of each component's Technical Secretariats, together with evidence of the authority of each such person to represent that component for Project purposes.

c) Such other documentation as A.I.D. may require, following design of Phase II components.

c. Covenants

(1) The Cooperating Country shall covenant that it will provide on a timely basis all necessary local logistic support as may be required to ensure effective use of goods and services financed under the Grant.

(2) The Steering Committee chairman, Secretariat Directors, a senior representative of each implementing agency and the A.I.D. project officers will meet annually to discuss major elements of progress.

(3) Other covenants, i.e., for particular components, will be determined at the time of authorization of each such component.

Approved _____

Frank B. Kimball
Mission Director
USAID/Egypt

Date 7/30/85

Annex J

S&T STRATEGY

USAID/Egypt

March 5, 1985

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I. INTRODUCTION

This paper does not attempt to describe the many research and development activities and programs carried out in Egypt in the recent past, the number of organizations dealing with S&T in Egypt, enumerate the talent available in the S&T community, or assess the capabilities of the last two groups. This has been done in well-organized and executed studies which are available in the USAID 1/. In preparing this paper, the S&T Office drew heavily on several of these studies, cumulative USAID experience and discussions in the Egyptian and U.S. S&T communities. Moreover, it proceeds from the basic assumption that science and technology already form a major part of USAID's efforts (whether research, technical assistance or equipment), and will continue to make a major contribution to Egypt's socioeconomic development.

The purpose of this paper is to present a strategy for the USAID's S&T assistance efforts, and to provide a suggested program to support the strategy. The strategy is intended to provide coherence and integration to S&T activities which permeate the USAID's program, both sectoral and cross-sectoral, and to establish a mechanism to make S&T activities an integral part of the USAID's program strategy. Finally, the strategy is designed to maximize and support the Egyptian emphasis on more effective use of its S&T capabilities in achieving Egypt's development goals.

1/ Among these are: "U.S. Cooperation With Egypt in Science and Technology", April 1980; "An Assessment of S&T and AID Assistance", Volumes I and II, May 1984; "S&T, Lessons From The Past", 1984; "Five-Year Plan for the Specific Councils of ASRT", December 1982.

II. BACKGROUND

For many years Egypt served as the Middle East center of education and the source of the latest technology as well as people trained in its applications. However, for almost twenty years, from the mid-50s to the early 70s, Egypt was generally cut off and isolated from most Western sources of training and new scientific and technological information. At the end of this period Egypt was 20 years behind current Western technology.

With the open door policy of 1972 and the institution of the U.S. assistance effort, projects were developed to help Egypt revitalize her universities and other S&T institutions in order to close this technical gap. These projects had four basic elements, all of which were aimed at rebuilding Egyptian S&T institutional capability.

- retraining of existing and initial training of new staff for universities, research institutions and other organizations in the S&T establishment;

- facilitating access to the latest scientific and technological information:

- assisting in renovating and replacing outdated laboratory and scientific equipment and materials; and

- providing Egyptian researchers in universities and elsewhere the means and opportunity to conduct research, with the collaboration of American researchers where necessary.

The USAID portfolio consisted of:

two massive participant training projects -- Technology Transfer and Manpower Development and the Peace Fellowship Program.

- Several hundred joint research activities funded by special foreign currencies generated by past PL-480 programs. U.S. researcher participation was usually very large in these activities;

- University Linkages Projects which provided funds for Egyptian University staff research. An American researcher or institution of the choice of the Egyptian principal investigator participated in the activity, but to a much lesser degree than in the PL 480 program;

- Applied Science and Technology Project which supports the activities of the Academy for Scientific Research and Technology. The project elements include policy formulation in technology building, the capability to repair and maintain scientific instruments, a computerized scientific information system, increased R&D management capability and funds to support R&D and demonstration activities using S&T resources to solve limited development problems;

- Development Planning Studies which created a unit to facilitate the application of Cairo University expertise toward solving development problems.

The above activities constituted the first generation of USAID activities in support of S&T in Egypt and contributed to developing the basic infrastructure. All of these projects will be completed during the next two years, and several may continue using a changed funding mode: the PL 480 program has used all of its available funds but a handful of remaining health projects will be funded using Mission project funds; the MIT/Cairo project has developed a studies institute at Cairo University which is capable of providing much of its funding by charging for the studies it undertakes; the largest project, University Linkages, will receive a final project obligation of $10 million to complete its remaining agreed upon studies. If future funding is made available for this effort, approval will be sought to use the Special LE Account with a focus on intra-Egypt university linkages with end user participation. At present, we envision little need for dollar funding for this effort. These elements of the S&T community, as well as others, will be involved in activities supported under the new strategy.

As a result of a 1980 S&T assessment, the second generation of activities funded by the USAID/S&T while remaining committed to the concept of technology transfer and training added an equal emphasis on the involvement of the S&T community in addressing problems of productivity and energy and natural resources analysis. The projects resulting from this modification of the initial activities were:

- Management Development for Productivity which provides an application of scientific management techniques in specific industries to improve productivity;

- Industrial Technology Applications Project to assist specific industries in solving production problems through the application of technology.

- Innovative Productivity Application, a blanket activity to provide flexibility in introducing innovative technologies in public and private industry.

- Minerals Petroleum and Groundwater Assessment Project to introduce the use of the latest technologies for assessing natural resources in order to provide the information needed to attract private investors.

- Energy Policy Planning to develop an integrative policy analysis capability in the GOE through data collection and analysis and formulation of policy recommendations for energy use.

- Renewable Energy Field Testing to provide support for capacity building. The main focus, however, is on testing renewable energy options appropriate to solve immediate energy use problems such as process heating and refrigeration.

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Because of the concentration of efforts in developing capabilities and facilities, the post-1980 projects were initiated to cover a wide range of needs. They provided substantial improvements in Egypt's capacity to conduct applied research, trained a substantial number of scientists, engineers and technicians, supplied major scientific equipment, and improved management capabilities for research and development and technology transfer.

At the same time, while serving important development needs in Egypt, the number and diversity of projects resulted in a relatively diffuse and disparate program which needed focussing and direction. This strategy provides that focus and direction while retaining and building on the benefits and best elements of the previous program.

III. AID ASSISTANCE STRATEGY IN S&T

The USAID S&T strategy is to build on previously developed Egyptian S&T capacity in order to provide solutions to well-defined and major development constraints. USAID will assist the GOE to marshall Egyptian technical and management capabilities to pinpoint critical problems and structure comprehensive S&T projects to develop both technological solutions and their practical application. In this context, the focal point will move from one of broad-based capacity building to a primary focus on resolving a limited number of development problems and on technology transfer to meet important and well-defined end-user needs. This key departure represents the core of the S&T strategy, and provides a framework that is development-oriented rather than one driven by scientific disciplinary interests. Included will be the involvement of end-users in the identification of needs, the design and management of projects and eventually financing of S&T efforts to fill those needs.

While on-going projects will remain at least in the mid term an important component of S&T activities, although the nature of our support to them may change, three factors have led us to reassess the S&T program and develop a new strategy:

- The concerted effort of the GOE in planning its resource use through a five-year plan.

- The realization that S&T activities permeate the Mission program, requiring a reassessment of the Mission's activities and services of the S&T Office and the USAID's overall approach to S&T.

- The need to address a new generation of complex problems described in Section IV, which require a more integrated approach.

In view of the above factors, we propose that a new, more sophisticated phase begin, that is, the integration of Egyptian and AID resources to solve major scientific and technological problems to provide "quantum jumps" in Egypt's development. The new phase does not imply moving into new areas, but does mean that we take those in which we are capable of

responding to the needs of end-users and do them better. To carry out this strategy during the last half of the 80s and into the 90s will require the concentrated coordination, cooperation and action of several entitites working together. Some of the problems will require sustained effort over relatively long periods of time.

In summary, the strategic elements of the coming phase will include:

a. Concentration on problem solving and technology transfer based on end-user goals and needs;

b. Building on capabilities already developed by previous S&T projects, both bilateral and multilateral.

c. Identification and support of major Egyptian efforts in specific S&T areas which will have major national and international impacts and will contribute to AID efforts worldwide; and

d. Support of ongoing USAID sectoral activities to provide coherence and integration of similar S&T elements and project inputs;

The strategy responds both directly and indirectly to the analyses and recommendations of the recent joint S&T Assessment. The assessment looked broadly across Mission and Egyptian activities to examine the resources, needs and types of interactions that do or should exist, and provided a perspective for the present, more coherent strategy. It also serves as a basis for present discussions with the GOE to develop a fully cooperative effort in which the GOE and AID have equally shared in project selection and development.

IV. S&T PROGRAM

The S&T program outlined below is intended to maximize the contribution of S&T to Egyptian socioeconomic development keeping in mind AID's overall assistance strategy, the limited financial resources available, Egyptian capabilities, other donor efforts and Mission staffing availabilities. The examples illustrate the major problem areas and two activity categories to which resources will be devoted during the new phase, and indicate the operating mode of the S&T Office in each. The two categories are new S&T initiatives, and support service to on-going Mission activities. The rationale for involvement in the two categories are: (a) in the case of new S&T Office initiatives, efforts will focus on addressing problems which are basic to achieving Egyptian development goals and the AID assistance strategy; and (b) in the case of on-going Mission activities, efforts will focus on support services and coordination for both existing and new sectoral S&T needs as defined by Mission Division programs. This will provide the coherent and integrated approach to S&T activities that prudent management demands.

The S&T strategy will require the S&T Office to assume two operating modes depending on the category in which an activity falls. In each case we

prefer to keep the management structure as simple as possible. We have tried to avoid creating several international joint working groups which sharply increase the number of Americans associated with a project, usurp Egyptian policy-making authority, and result in a loss of program coherence. In addition, we have eliminated a bias toward the general creation and supply of S&T services, instead of the demand for and use of these services.

A. S&T Office Initiatives

1. Components:

Efforts in this category will focus on solving a limited number of long-range major problems. Their solution will require multidisciplinary and interdisciplinary action and will be undertaken in such a way as to establish needed major strengths in critically important specific technical areas. While these components may have sectoral overlap, they are focused and are intended to provide achievements in specific technical areas which will have national and international impact. Such efforts will involve organizing existing research capabilities across needed disciplines, development of needed capabilities where they do not exist, and development of technology transfer for production processes where necessary. These efforts will be designed and implemented by the S&T Office.

The limited number of components will allow the assembly of a large enough group of expert and technical personnel, facilities and equipment to effectively address these problems. This is to avoid the current situation in which we are involved in too many areas to assemble a critical mass for problem resolutions. Efforts in these areas could mean cooperating with other donors and international networks to use the cumulative body of knowledge developed by others as a departure point.

a. Critical Childhood Diseases:

Several childhood diseases cause health problems which are among the most important facing Egypt. Infant and under five year deaths account for 50% of the total deaths in Egypt. Moreover, several of the other parasitic diseases present major problems in debilitating effects as infected children reach adulthood.

Focusing on child survival as a main goal, a comprehensive R&D program will be organized which builds on Egyptian and U.S. capabilities to conduct necessary research on the prevention and treatment of the major life threatening and debilitating diseases. The R&D program will concentrate on basic and applied research for the discovery and development of agents for the treatment of one or more of these diseases, such as Schistosomiasis, diarrhea or acute respiratory infections. The effort will complement the Child Survival Program now being jointly planned by the Government of Egypt and the USAID Health Office. This effort also meshes well with the long range plans of the Government of Egypt which has strongly emphasized the importance of preventive health programs in the current Five Year Health Plan.

A comprehensive attack on any one of these diseases requires a major undertaking; from a program of well-targeted basic and applied research to develop a vaccine or antiparasitic agent through to its distribution and appropriate use. While complex, it is achievable through the relatively narrow focus of a S&T Office vaccine development program and subsequent activities in the general health delivery program being developed by the USAID Health Office. This joint effort offers AID the opportunity to use its limited resources to significantly influence a major health problem in Egypt and elsewhere in the developing world.

Considerable experience exists in the biomedical area within Egypt and in U.S. units such as NAMRU, NIH and CDC to implement this component. What is needed now is a unified, focused interdisciplinary approach. The AID Science and Technology Office will mount an effort designed to develop vaccines, pharmaceuticals and anti parasitic agents for Egypt-specific uses. The effort will capitalize on research capabilities in Egyptian universities and research institutes and the R&D management capabilities developed in previous projects along with the expertise of U.S. laboratories. Component activities will be co-managed and co-monitored by the USAID Health Office. The requisite etiological and epidemiological research, and the testing of new vaccines or agents will be incorporated into activities already planned by the GOE and the USAID Health Office.

b. Productivity:

In order for Egypt to achieve many of its development goals it will have to increase its productivity, that is, practice a more efficient use of its human, capital and natural resources. Activities in this component will initially address problems of inefficient energy use in the modern sector and inefficient land use.

1. Land Use:

The considerations related to land use in Egypt are complex and, at times, contradictory. The rapid growth in population, the weight of urban population on all aspects of urban life, the major impacts of disappearing fertile land and the shortage of industrial sites are all factors which make the prospects for use of desert land attractive. This impetus is counterbalanced by pragmatic considerations of major economic and social factors which, at present, render the possibilities for sustained success marginal and expensive. Regardless of the difficulties, expansion of desert lands for agriculture, industry and new settlements is inevitable for the survival of future generations. The Government of Egypt has already initiated a series of major studies to develop land and groundwater master plans for arid and semi-arid lands adjacent to the old lands. A major target of the GOE is to reclaim 1.5-2 million feddans of new lands by the year 2000.

This component will build on existing studies to develop analytical models which can be used to assist the GOE in making decisions on future use of old and new lands for industrial, residential and agricultural purposes. A compilation of existing data (some of which is being developed by USAID,

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World Bank and other donor projects), and accumulation of additional data where necessary, will form the data base for model development. On the basis of comparative advantages and analysis of variables, the models would ultimately provide an integrated selection and classification system for best choice/least cost decisions on land use. Initial focus will be on selected regions where projects and needs for new uses are greatest, for example, Southern Egypt and the New Valley.

Component activities will be conducted by an interdisciplinary team, or teams, including architects, social scientists, economists, engineers, physical scientists and agriculturists. Teams will examine alternative uses of selected sites in such terms as location, soil characteristics, resources, agronomy, and infrastructure such as desert-appropriate housing, environment, general services, energy sources, associated industries, transportation and utilities. In terms of resettlement, considerable social science research is anticipated to overcome substantial problems in family relocation and adaptation to a more rural environment.

The component will be implemented either by the Ministry of Planning or by a National Land Use Board (NLUB) which will be established in the Prime Minister's Office.

2. Energy:

Since 1975 consumption of petroleum and electricity have increased over 300 percent. In addition to fuel cost subsidies, the major negative factor in consumption is the inefficiency of much of the technology employed in Egypt's modern sector. Much of the equipment or processes currently in place were planned and developed in an era of energy abundance, particularly electricity, and little thought was given to energy efficiency. As a result, the modern sector costs the national economy several billion dollars annually through energy waste, reduced productivity and lost revenues from potential petroleum exports.

The S&T energy program will focus on technology transfer and training. In the former, efforts will emphasize the transfer of proven energy efficient technologies in the modern sector--the adoption of energy efficient equipment, processes and improved management systems in public and private industry, commercial establishments, utilities and buildings--in order to increase productivity through reduced energy consumption. The project will provide assistance to improve the institutional capabilities of responsible GOE agencies and private sector groups, such as A&E firms, consultants, engineers and banks, to implement energy conservation initiatives. Technology transfer would be supported by a credit line, either CIP or project dedicated. The savings, roughly estimated at $300-400 million annually *, could be applied to increased foreign exchange earnings through increased oil exports.

* A twenty-five percent reduction in energy consumption in the modern sector, a level which has been achieved in several industrialized countries would realize a savings of $300 million annually. This assumes $28/barrel of oil and 33% thermal efficiency, $.048/kwh for unrefined oil. This covers thermal generated electricity and fuel oil consumption, using $.049/kwh for unrefined oil, and does not include hydro.

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In the latter--training--efforts will focus on further developing indigenous technical and management capabilities in electric power generation and transmission, directly related support activities, and "advanced" energy planning and technologies (such as multifueled facilities for power generation plants and cogeneration). The training will contribute to improved technical expertise and practices, and enable responsible agencies to factor technological progress and trends into national planning. Ongoing projects could be used, with some modification, to introduce this effort. A manpower analysis of the energy community will identify the training requirements of projects and programs incorporating increased technical and management complexity. Once completed, a more coherent and coordinated approach to energy training will be developed.

c. Science and Technology Cooperation:

The objective of this component is to focus the considerable strength of the Egyptian S&T community on major Egyptian economic and social problems. The topics to be addressed and the studies to be funded will be focused on needs and demands of the end-users of a technology, and will contain a well-defined mechanism for identification of needs, economic feasibility studies and commitment for the application of results.

In examining the spectrum of possible problems in Egypt, it is recognized that both needs and R&D capabilities will vary widely on a local, regional and national basis. For these reasons, the project will fund research on economically/socially important problems that confront Egypt at both the regional and national levels. Specific, limited categories will be identified with specific research objectives in each category. Illustrative examples, based on Mission sectoral needs and the S&T Assessment include:

(1) Construction Materials: Examples of possible topics are: substitution of red bricks using indigenous materials and appropriate technology; study of corrosion resistant drainage pipes for water/wastewater use.

(2) Rural Productivity Improvement: Examples of possible research topics could be study of crop disease in selected fruits and legumes; use of agricultural wastes; and participation of women in artisanal industry.

(3) Water/Wastewater Reuse: This would include chemical biological and microbiological research, soils engineering, improved thermochemical cleaning and storage of water and wastewater, environmental and ecological studies; and the use of wastewater for agricultural purposes.

(4) Plant Biotechnology: including tissue culture and microbiology for applications in agriculture such as salt tolerant and drought resistant crops, and systemic insecticides.

In addition to the primary goals of problem solving, a secondary, but important, goal of each project is that it should leave a sustainable

residual improvement in Egyptian capacity for research, training and technology transfer. To achieve this, a process must be developed as well as an end product. Particular attention in this regard will be given to the development of interdisciplinary cooperation in goal and project definition, management and execution.

Support to S&T organizations or groups will be made through a research grant mechanism and grants will be awarded by a committee or council selected for this project. In the design of the project, both substantive and procedural criteria shall be established. It is expected that the substantive criteria will incorporate R&D management, policy development, social sciences, end-user needs, and a well-defined mechanism for technology transfer (a draft of some of the criteria to be used may be found in Annex A). AID's role would be limited to an annual review and approval of the criteria employed and the funding levels to be provided. AID would not approve or disapprove individual subprojects.

2. Program Management:

Each of the above components will be managed by the S&T Office. In order to promote maximum joint effort, each component under the new initiatives will feature a joint Egyptian-U.S. management system made up of USAID and implementing agency members. The system will consist of a policy steering committee to ensure that component activities support component goals. A secretariat for this committee will have shared responsibility in subproject activity design and implementation and for decision making and day-to-day operations. A draft management and implementation plan for these activities is contained in Annex B.

B. SUPPORT SERVICES

1. Activities:

The S&T Office will play a catalytic and facilitative role to support other USAID Divisions by responding to requests for assistance or information in project design, review, monitoring and possible implementation. At present, discussions with various Mission offices have identified three areas which can serve as examples of sectoral involvement and collaboration, these are: improvement of productivity through assistance in technology identification and transfer in private/public enterprise projects; assistance in identifying, coordinating and applying S&T community resources to the GOE's national commodity program and other aspects of optimizing agricultural productivity; and assistance in mobilizing interdisciplinary research on major technical problems in water/waste-water projects.

Additonal areas of assistance and collaboration will be identified in later discussions initiated by the S&T Office, other Mission offices or Mission management.

2. Program Management:

S&T office involvement in this category will be advisory and facilitative. As noted earlier, S&T cuts across different divisions and offices within the Mission and more coherence is possible and desirable within the existing portfolio. To help support coordination, the S&T Office will offer assistance in the project design and implementation activities of the sectoral offices. This can include assistance in the formulation of project elements which involve applied research, education, institution building, research management, new technologies and technology transfer. In addition, the office will serve a coordinating function to tie together those S&T themes which are common across sectoral activities. The S&T Office will not be responsible for management of these projects or project elements. Orchestration of these S&T efforts will initially be a principal JCC Advisor responsibility.

Bringing the S&T aspects of program and project planning together in a more coherent way will not be easy. It will require establishing priorities among sectors and, as noted, redefining S&T Office functions.

Within the Mission, the priority setting process will be done by a committee made up of the ADs, the Deputy Director, the S&T Office Director and the S&T JCC Advisor serving as consultant and secretary. The JCC Advisor will initially be used to maintain contact with individual project officers or office directors, to collect and organize information, maintain a focus on key questions, and formulate recommendations to the committee. The mechanism of systematic mission-wide coordination, and the S&T Office role, will become clearer as evaluation and discussions progress.

V. PROGRAM DEVELOPMENT

As pointed out several times in the joint S&T Assessment, the AID programming and management processes are not sufficiently flexible and adapted to the timing requirements of S&T projects. From both the Egyptian and AID perspectives, there is substantial merit in addressing this constraint by creating a programming tool which will permit a faster, more flexible and more integrated technical assistance effort. In developing a new programming framework, the intent is to direct technical and financial resources rapidly and effectively in the four new initiative areas. We propose that the new initiatives be presented as an umbrella project, "Science and Technology for Development", with each initiative becoming a project component. Program documentation will call for a simplified PP describing the project, its management organization and its financial operations. This would lead to project agreement between AID and the Ministry of Planning and International Cooperation (MPIC). The overall project will have no implementing agency requirements other than financial allocations and implementation follow-up by MPIC. Once the Pro Ag is signed, the detailed design of each of the components can be carried out. Each year, the project budget will be reviewed, necessary line item adjustments made, and funds provided to each component via a subgrant

mechanism. The annual funding level will be determined by component progress and projected annual requirements. Thus, while a total amount is available to the project per se, annual component funding will more accurately reflect actual needs. The new project framework will have the following advantages:

a. By signing a long-term (7 to 10 years) agreement, the U.S. will demonstrate to the GOE its strong support for S&T based on a joint S&T strategy and a joint commitment of financial resources.

b. Egyptian S&T institutions will be involved in each component from its design through implementation and evaluation.

c. The project will provide for transferring funds between and within components. This arrangement is consistent with GOE regulations for programming its budget, and will allow more flexibility in allocation and disbursement of funds.

Each of the components will have an implementing agency responsible for managing and coordinating all component activities. The implementing agency for the first two components could be a GOE ministry or an institute under a ministry through which AID and GOE funds will be channelled based on the detailed design. In the case of the S&T Cooperation component, since it will serve both the supply and demand sides of the S&T community, there may be more than one implementing agency through which USAID and GOE funds could be channelled.

Prior to designing each of the components, the following activities will be undertaken:

a. Establishment of internal planning group

b. Appointment of consultant group

1. Information collection and analysis
2. Review of research, application, management and manufacturing structures
3. Recommendations on goals, objectives, directions, institution building, R&D structure, social science research needs, application infrastructure and manufacturing development

c. Decisions on key elements in project

1. Component definition
2. Goals, objectives both intermediate and long-range
3. Structure/responsibilities
4. Management structure
   a. Overall
   b. Interdisciplinary research management
   c. Coordination of research with development, application and manufacturing
5. Budget-short range/long range

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VI. PROGRAM COSTS

1. Critical Childhood Diseases--Initial funding will cover the costs--$400-500 thousand--of analysis and consultancy services to determine specific focus, approach, organization, and implementation and management plan. Component design should be completed in six months and implementation can start shortly after. It is estimated that component funding will require $7 to 10 million per year for 9-10 years.

2. Productivity:

a. Land Use--Initial funding will cover the costs--$200-250 thousand--of analysis and consultant services to determine approach, organization, management and implementation plans, and detailed design. Component design should be completed in four months and, implementation can start shortly after. It is estimated that the component will require approximately $2 million per year over a period of 4-5 years.

b. Energy -- a) Technology Transfer for Energy Management--Initial funding--approximately $250 thousand--will cover the costs of modern sector analysis for conservation potential and component design development. Design work can be completed in approximately three months through an IQC and implementation can start shortly after. Funding would require appoximately $7-8 million per year for seven years. This amount could be increased depending on the use of CIP funding; and b) Energy Training--Initial funding--approximately $150 thousand--will cover manpower analysis and design development. This can be completed in three months using a current S&T Bureau contractor and implementation can start shortly after. Component funding would require $2-3 million per year for six years.

3. Science and Technology Cooperation--Initial funding for identification and planning of initial subproject activities and consultancy services for detailed design will require $150 thousand. Design can be completed in three months and implementation can start shortly after. Ultimate funding will be approximately $3-4 million per year for five years. Funding level will be determined by the number of research categories agreed upon.