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APPLIED SCIENCE AND TECHNOLOGY RESEARCH IN EGYPT
Quarterly Report No. 9: Phase II
October - December 1983

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INTRODUCTION

This is the ninth quarterly report, Phase II, of the Applied Science and Technology Research Program in Egypt, covering the period October-December 1983. The program is supported under Contract NEB-0016-C-00-1058-00 of the United States Agency for International Development (AID) with the National Academy of Sciences/National Research Council (NAS/NRC).

For a background description of all elements of the Applied Science and Technology Research Program during Phase I (1978-1981), see the report prepared by the NAS/NRC staff dated June 1982.

11

CONTENTS

	Page
MAJOR ACTIVITIES	
I. <u>Program Policy Planning and Management</u>	1
A. Joint Consultative Committee	1
B. Science and Technology Policy Measures	4
C. Research & Development Management	9
II. <u>Demonstration Projects/R&D Projects</u>	
A. More and Better Food	10
B. Biogas Technology for Rural Areas	13
C. Arid Land/Land Reclamation	15
D. Phosphate Fertilizers	18
E. Corrosion in Petroleum Refining	20
F. Wool Scouring/Wool Wax Recovery	22
G. Red Sea Fisheries	24
H. Bentonite Clays for Industrial Applications	25
I. Pharmaceutical Chemicals	26
DISCUSSION	26
Problem Solving Indicators in the Applied Science and Technology Research Program	26
I. Background	26
II. Problem Solving Indicators: End-user participation	27
A. Industry Oriented Projects	28
B. Agriculture Oriented Projects	28
III. Problem Solving Indicators: Institution Building	29
IV. Examples	30
A. More and Better Food	30
B. Biogas Technology for Rural Areas	32
C. Phosphate Fertilizers	33
D. Wool Scouring/Wool Wax Recovery	34
E. Corrosion in Petroleum Refining	34
F. Red Sea Fisheries	35
G. Other	35

	Page
STATISTICS	36
Training, Orientation and Study	36
<u>ATTACHMENT A</u>	37
Twelfth Meeting, Joint Consultative Committee Applied Science and Technology Research Program, Cairo, Egypt, November 19-21, 1983	37
Annex I. Report from U.S. Participants Land Reclamation Seminar	47
Annex II. Remarks by Dr. V. Slamecka, Georgia Institute of Technology, November 20, 1983	51
Annex III. Agenda, Twelfth Meeting, Joint Consultative Committee, Cairo, Egypt, November 19, 20, 21, 1983	55
Annex IV. List of Participants, Invited Guests, and Observers	58
<u>ATTACHMENT B</u>	
Quarterly Summary of Travel	62

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APPLIED SCIENCE AND TECHNOLOGY RESEARCH PROGRAM IN EGYPT

NINTH QUARTERLY REPORT : PHASE II

October - December 1983

MAJOR ACTIVITIES

I. Policy Planning and Management

A. Joint Consultative Committee (JCC)

The Joint Consultative Committee held its twelfth meeting (JCC XII) in Cairo at the headquarters of the Academy of Scientific Research and Technology (ASRT), November 19-21, 1983. (A report of JCC XII is included as Attachment I).

Preceding and following the meeting, JCC members had an opportunity to visit several of the projects including:

- Experimental plots for new crops (jojoba, guayule, buffalo gourd, euphorbia, pigeon peas, cassava, hibiscus, licorice, etc.) at the agricultural high school in Omar Makram village.
- Two biodigester models in individual homes, also in Omar Makram village.
- The ore beneficiation pilot plant of the Central Metallurgical Research and Development Institute at El Tibin where a number of activities for the phosphate and for the bentonite clay projects are conducted.

- The site for training and for maintenance and repair of scientific instrumentation and equipment (The Scientific Instrumentation Center, an affiliated institute of the ASRT).

The meeting in Cairo gave an opportunity for individual presentations by principal investigators and project officers. JCC members then integrated those presentations and the special reports prepared for the meeting into the larger and more comprehensive issues of the Applied Science and Technology Research Project. It is at these times that topics such as relations with end-users, promotion of user-oriented research, building stronger R&D extension services, development of an Egyptian R&D technical information system, strengthening maintenance and repair services for scientific instrumentation, improving the utilization of scientific and technical manpower for Egypt's development planning, and linkages to the new ASRT 5-year S&T program were covered and guidance offered.

In its open sessions three topics were emphasized during JCC XII:

- A proposed land reclamation study by the ASRT within the context of the JCC program (discussed in greater detail on pages 15-18)
- Results of Seminar III, Science and Technology Policy Project, (see pages 4-9).
- Linkages between the Applied Science and Technology Research Program and the 5-year S&T Program of the ASRT, particularly through R&D management training for project principal investigators, Secretaries of ASRT Councils and Commissions, and for specialized staff.

In recognition of the fact that the current phase of time period for the Applied Science and Technology Research Program is nearing its end, the JCC once again addressed the issue of program follow-up. Four sub-projects (S&T Policy studies, Phosphate Ores, Corrosion and Wool Scouring) are essentially completed; two others will be completed by the end of 1984 (More and Better Food, Biogas Technology) and three projects in 1985 (Bentonites, Pharmaceuticals, and Red Sea Fisheries). Prior to the April 1984 JCC meeting in Washington, a comprehensive review of remaining activities, budgets and other resources is to be undertaken by the program staff. Specific reports and studies requested for JCC XIII are:

- A report on the ASRT Policy Project which will include: a) the summary technology policy statement, b) recommendations on institutional and structural arrangements within Egypt to pursue S&T policy studies, and c) an outline of measures which need to be taken by the ASRT.
- A status report from the land reclamation group which covers study objectives, terms-of-reference, and a detailed study design plan.
- A staff report on budget reallocations and projections.
- A report from U.S. AID in Cairo on the current evaluation of the Applied Science and Technology Research Program.
- A status report from the U.S. AID Mission in Cairo on its Science and Technology Sector Assessment project.

B. Science and Technology Policy Measures

1. Background

On November 16-17, 1983, the third and final of the series of Phase II Seminars was held in Cairo on the theme "Towards a Technology Policy for Egypt." The seminar was formally opened by the Prime Minister and the Minister for Education and Scientific Research. The Minister for Petroleum also attended.

As reported earlier, Seminar III was preceded by extensive preparations of two task force groups responsible to the ASRT Council on Science Policy. One group under Dr. I. H. Abdel Rahman, Chairman of the ASRT's Science Policy Council, dealt with a sectoral analysis of policy planning, principally with industrial and agricultural policies. The second group, lead by Dr. Essam Galal, who is also a member of the same ASRT Council, followed an "integrative" look at technology policy issues such as those dealing with manpower, institutional, financial and legal constraints. Although the two efforts were developed in parallel, there were links both at the operational level of the studies and at the level of the ASRT Science Policy Council.

The Seminar invited two planning and policy experts as special guests:

- Dr. Ahmed Rahman, Head, Centre for the Study of Science, Technology and Development of the Council of Scientific and Industrial Research, New Delhi, India.
- Dr. Delwin A. Roy, President, Development Decisions International, Atlanta, Georgia. (Dr. Roy is an economist who for several years was associated with the Egyptian

National Planning Office; in 1983 he authored a report on technology transfer to Egypt for the Office of Technology Assessment of the United States Congress).

2. Description of the Integrative Approach to Policy Planning

The goal of the integrative approach is to produce a draft technology policy statement for Egypt based upon the 1983-1987 National Development Plan. The National Plan sets overall targets for resource investment and for productivity increases on a sectoral basis--agriculture, manufacturing industries, mining, housing and construction, irrigation and water use as well as goals for improved services in education, manpower development public health, nutrition, and energy. Because scientific discoveries and their adaptation to the productive sectors during the twentieth century have had such a profound multiplier effect upon economic growth in so many countries and because the social consequences of technological change have affected the lives of so many persons, a better informed and more rational approach to the utilization of technology in Egypt could have far-reaching consequences. Like investment policy planning, technology policy planning therefore merits explicit study.

Participants from the executive and from other high supervisory levels of the Egyptian Government as well as scholars from the universities were organized into six sub-groups under an overall supervisory committee chaired by the ASRT President. The sub-groups were:

- Group I: Choice of Technology, responsible for identifying criteria needed in selecting technologies to increase productivity in a given sector.
- Group II: Indigenous Capacity, dealing with factors which promote effective national technological innovation, adaptation and selection.
- Group III: Technology Transfer, concerned with criteria and operational methodologies for the negotiation and purchase of new technologies and with its follow-up to ascertain benefits and costs.
- Group IV: Institutional Factors, focused upon the conditions within an organization or a firm that enhances adaptation and incorporation of new technologies within the Egyptian development environment.
- Group V: International Cooperation, concerned with the task of identifying new technological trends, their analysis, and the presentation of their relevance to Egypt.
- Group VI: Instruments of Technology Policy concerned with planning, legislation, and institutional structures that enhance or impede transfer or utilization of new technologies for Egyptian national development.

Each sub-group was composed of a chairman and from 10 to 15 members drawn from the ASRT, NRC, other affiliated research institutes, universities and the ministries. Each sub-group produced a final report in Arabic which was made available to participants in the

National Seminar held on November 6, 1983. A composite report in English was prepared by Dr. E. Galal for the International Seminar (Seminar III).

Finally, a draft "Technology Policy Statement" was prepared and released without formal editing by Dr. E. Galal. That document elaborates a rationale for an official Egyptian technology policy (relevance to development policy, importance as a catalyst in Egyptian development, and the need for top political and administrative support). It argues that the implementation of a technology policy is both immediate and long term, requiring legislation, planning and creation of a continuing technology policy planning mechanism responsible to the highest levels of the Egyptian Government.

3. Description of the Sectoral Approach to Policy Planning

The premise of the sectoral approach (also called the "interactive approach") is that technology choice and development, adaptation and implementation, follow-up and evaluation are sufficiently different at the level of manufacturing industries, agriculture and irrigation, energy, construction, transportation, and communications to warrant the decentralized attention of the appropriate experts throughout the Egyptian development and decision making communities. In 1983 two separate sets of studies were undertaken and national seminars convened.

First was the application of the "interactive approach" to examine issues of industrial technology. A task force was organized by Dr. I. H. Abdel Rahman and Dr. M. Shahat Awad served as its executive director.

The activities of the group were supported by the Minister of Industry and culminated in a seminar held on October 22, 1983.

Industry affairs, however, are decentralized within the Government of Egypt. There are separate Ministries for Energy, Petroleum, Housing and Construction as well as the Ministry of Industry itself which supervises 120 major companies in the public sector. Responsibility for the pharmaceutical industry is with the Ministry of Health. In all, 17 different government offices are involved in industrial planning and its implementation.

The October meeting brought together nearly 300 officials representing food, textiles, chemical, metallurgical, mining, petroleum, pharmaceutical, and housing industries as well as participants from ASRT, NRC, other industrial research centers, consulting and design firms, and the General Organization for Industry (GOFI) of the Ministry of Industry. The seminar recommended the creation of an industrial technology information and documentation centre, requested greater attention be given to training of cadres for technological services (maintenance and repair), recommended creation of a strong Egyptian capital goods capability and laid plans for a second industrial technology conference in 1984. Fifty technical papers which were written for the October 22 meeting, were assembled, reproduced and bound into one volume for the Egyptian National Science and Technology Policy Seminar held on November 6th.

The second sectoral group organized under the "interactive approach" to science and technology policy planning focussed on agriculture. A meeting was convened by the Minister of Agriculture on October 30, 1983 and was attended by nearly 175 scientists and policy officials.

Important R&D capabilities for the agricultural sector in Egypt exist within Egyptian universities and the National Research Centre, but by far the largest number of agricultural scientists are employed by the Ministry of Agriculture itself where the Agricultural Extension Service (2000 workers) has recently been joined to the Agricultural Research Center (3000 qualified R&D workers in 11 specialized institutes). Overall, the coordination of R&D in the agricultural sector is perhaps less difficult than that faced by the industrial sector. Financial support for agricultural development in recent years has come from the Egyptian Government, from international organizations (Food and Agriculture Organization, World Bank, UNDP, etc.) and from individual country donors (USA, West Germany, Saudi Arabia, etc.).

C. R&D Management

The JCC recommended in May 1983 that links between the ASRT 5-year R&D program and the R&D management element of the Applied Science and Technology Research Program be established. R&D management training aspects were thought to be particularly relevant to strengthening new management systems in the greatly expanded ASRT research and development grants effort. Discussions continue but no specific projects have been undertaken.

Four Egyptians were selected by the ASRT President to participate in two separate workshops at the Denver Research Institute:

- R&D Project Management Workshop, Oct. 24-Nov. 11, 1983.
(Designed to assist project managers in strengthening planning, monitoring and control, extension, reporting, evaluation and financial administration.)

Dr. Farouk M. Taleb, ASRT Specialized Research
Council

Dr. Abdel Hamid Agha, ASRT Sinai Research Project

- R&D Institute Management Workshop, Nov. 14-Dec. 9, 1983.
(Designed to strengthen the organization and management of research organizations and covering the broad spectrum of issues involving personnel, financial, extension and information systems).

Dr. Zein A. Shoeb, Head, Food Science Laboratory,
National Research Centre

Dr. Mohamed I Roushdi, Secretary General, ASRT
Petroleum Research Institute.

II. Demonstration/R&D Projects

A. More and Better Food

One result of the monitoring of the nutritional status of school age children (6-12 years) in Kafr Al-Khadra village was the discovery of high rates of anemia as measured by blood haemoglobin (Hb) levels. This led the NRC Child Health Division, one of the participating groups in the More and Better Food Project, to do a pilot study of iron fortification through a nutrition intervention program.

The objectives of the program were:

- To find a satisfactory food supplement which could be produced locally in the village that would provide adequate levels of iron and zinc;
- To demonstrate that the food substitute would combat iron deficiency anemia and protein-energy deficiencies in the target population; and
- To raise blood Hb of the target population.

The nutritional status of the target population of school age children was measured by: a) clinical examination, b) anthropometric measurements, c) parasitic infestations, d) biochemical parameters, and e) daily food intake.

A highly nutritious formula was devised that was rich in protein and fortified with iron and zinc from locally available ingredients which agreed with the food habits of the target population. The ingredients were made into a cake by the only bakery in the village. This work was supervised and continuously monitored by NRC scientists during the 90 day test period of the nutrition intervention program. The supplementary cakes were distributed six days weekly in the classroom and eaten by the children under supervision of their teachers.

Using standard measurements, 75.2% of the target population of the students were found to be suffering from various degrees of malnutrition--27.5% severe and 47.7% of moderate severity. As measured

by Hb levels an average of 30% of the children suffered from anemia. However the anemia was found to rise to about 50% in the 11-12 year age group and to 44% in the 7-8 year age group. Although iron content in the food is on the margin of being sufficient for the physiological requirements of the target population, the form in which the iron is present is of low bioavailability.

The nutrition intervention program after ninety days succeeded in reducing the measured protein energy deficiencies from 75.2% to 57.7% and those in the "severe" category from 27.5% to 11.4%. The effectiveness of the program in combating anemia is given in Table 1 below:

Table 1

Effectiveness of a Nutrition Intervention Program in Kafr Al Khadra Village on the Prevalence of Anemia and Hb levels.

<u>Age Group</u>	<u>Prevalence of Anemia</u>		<u>Mean Hb</u>	
	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>
6-7 years	20%	7%	10.0	12.3
7-8 years	44%	6%	9.9	11.7
8-9 years	31%	11%	10.3	11.8
9-10 years	16%	9%	9.8	12.3
10-11 years	16%	10%	10.0	12.7
11-12 years	50%	9%	10.0	12.1

B. Biogas Technology for Rural Areas

Activities of the technical team have chiefly centered upon: a) monitoring the 50 cubic meter demonstration unit at Shubra Kass built for a large poultry farm; b) follow-up activities (including modifications and improvements) for the operating demonstration reactors at Manawat and Omar Makram; c) preparation of the NRC biogas/biomass site; d) supporting R&D activities on fertilizer evaluation, pollution control, and microbiology; e) operations of the central services laboratory which provides analytical services for the entire project; and f) preparations for the November 1984 International Biogas Conference to be held in Cairo.

Table 2 summarizes the status of the demonstration reactors.

Table 2

The Development and Applications of
Biogas Technology in Rural Areas of Egypt

Summary Status of Demonstration Reactors

<u>Unit</u>	<u>Location</u>	<u>Status</u>
1. NRC Plug Flow Type (Indian Unit)	Old Demonstration Site	a) Operational b) Measuring feed-output parameters for large Shubra Kass unit
2. One family Unit (Modified Indian design)	Manawat (Khamis family)	a) Operational for two years b) Routine replacement of gas-holder c) Feed tank mixer improved
3. Village Collective Unit (Modified Chinese design)	Manawat	a) Operational but at reduced feed- output level
4. Chinese.type family unit	Omar Makram (Sharkawy family)	a) Operational b) Produces all gas requirements need for cooking, baking, and water heating
5. Indian-type family unit	Omar Makram (Diab family)	a) Operational b) Design is small for family needs (only 3 animals provide feed stock but original design requirements were 5 animals)
6. Shubra Kass Unit (50 m ³)	Shubra Kass (Poultry farm near Tanta)	a) Operational b) Producing all gas needed for operation of hatchery.

C. Arid Lands/Land Reclamation

The rationale for bringing new lands under cultivation in Egypt has been evident for many years. With the present per capita ratio of 1 feddan per seven inhabitants declining and with the constantly increasing population, increases of agricultural lands are needed in addition to productivity increases in the presently cultivated lands. The problem lies in the economics of bringing new marginal lands into production and achievement of economically justifiable returns within the resources available to the Government of Egypt.

Consequently, the Ministry of Land Reclamation and the ASRT are interested in studying past land reclamation practices in Egypt to determine the most promising conditions for success. At the same time, the Egyptian experience needs to be compared with experience in land reclamation elsewhere in the world to adapt the best and most promising of those techniques and management methods to Egyptian conditions.

In November 1983, the ASRT was host to a panel of land reclamation specialists that met to discuss the terms of reference for a land reclamation study in Egypt as prepared by Dr. M. El Gabaly, member of the JCC and former Minister of Agriculture. (A document "Evaluation of Reclamation Projects in Egypt: Terms of Reference of the Study" is available from the ASRT in Cairo or from NAS/NRC through the Egypt program of the Board on Science and Technology for International Development, Washington, D.C.)

Members of the Egyptian panel were :

Dr. Mostafa El Gabaly	President, ASRT Food and Agriculture Council and Former Minister of Agriculture.
Dr. Salah El Abd	Former First Under Secretary, Ministry of Land Reclamation
Dr. Baleig Shendi	Former Director, Soil Research Centre Ministry of Agriculture
Dr. Zaki Arnaout	First Under Secretary Ministry of Land Reclamation

Members of the American panel were:

Dr. J. A. Allen	School of Oriental and African Studies University of London England
Dr. Wilford R. Gardner	Head, Department of Soils, Water and Engineering University of Arizona Tucson, Arizona
Dr. Robert M. Hagan	Department of Land, Air and Water Resources University of California Davis, California
Dr. Jan Van Schilfgaarde	Director, Soil Salinity Laboratory U.S. Department of Agriculture Riverside, California

Dr. James B. Fitch, an economist from the consulting firm Agrimanagement, Inc., was invited to be a panelist but was unable to attend. Dr. Gilbert White, Chairman of the U.S. JCC panel attended the group discussions in Cairo but was unable to accompany the group on its field trips.

Field visits were made to land reclamation sites in the western Delta region on November 15 and to the area east of Cairo on

November 16, 1983. Discussions were held in Cairo on November 17 and during a general field visit to Omar Makram village on November 18th. A final series of discussions was held with the members of the JCC on November 20, 1983. The report of the U.S. Panel is included in this document. (Attachment A, Annex I).

The group did not produce a joint report but the U.S. team provided a statement with the following principal comments:

- Notwithstanding pessimistic conclusions in some past Egyptian and foreign land reclamation studies, the team is fully convinced of the urgency and need for further major reclamation efforts in Egypt. They are equally convinced that such efforts can be successful if they are properly chosen, planned and executed. Thus the team wholeheartedly endorsed the proposal to make an assessment.
- The team stressed the need for well defined and clearly stated objectives in making an assessment.
- The team also stressed that an assessment should be managed by the ASRT itself using the best talent available in Egypt and allowing the entire spectrum of land reclamation viewpoints and experience to be reviewed. The study should be inclusive, impartial and free to examine all evidence from the past.
- Although the need to introduce new technologies in land reclamation is a plausible argument, the team saw, and from its experience believes, that the latest technologies have been or are being introduced. Past failures may not be so

much the failure of technologies per se but rather institutional deficiencies that contributed to the apparent technological failure. The experience should be carefully examined and documented.

- In selecting evaluation procedures, the team recognized the need for benefit/cost comparisons but cautioned against over-emphasis upon that economic criterion. Thus, issues such as food sufficiency, employment, living space and water utilization, although far more difficult to quantify, are necessary factors in the assessment.

D. Phosphate Fertilizers

It is useful to re-state the goals of the R&D project for the evaluation of Egyptian phosphate ores for wet process phosphoric acid and phosphate fertilizer production. Those goals are:

1. Evaluation in the NRC laboratories of the technological problems involved in the beneficiation of phosphate ores from the Nile Valley (Al Sebaiya), Western Desert (Abu Tartur), and Eastern Desert (Hamrawein).
2. Pilot plant design and testing of beneficiation of the ores, based upon the laboratory studies.
3. Laboratory and bench scale technical studies of the chemical processing of beneficiated ores to convert these materials to phosphoric acid and thence to end products suitable for fertilizers and other industrial applications.
4. Agronomic studies of the sample fertilizers on Egyptian soils and on some selected Egyptian crops.

5. Feasibility and marketing studies for the best utilization of the Egyptian phosphate ores.

Goals 1 and 2 have been accomplished and documented in previous quarterly reports.

Goal 3, wet acid conversion, has been accomplished at the laboratory level but halted at the bench-scale level because of the delayed arrival of the custom-designed wet-acid conversion unit. Some of the components of the conversion unit had not arrived at the NRC as of the end of December 1983.

Goals 4 and 5 are also pending because of the need to produce phosphate fertilizer materials which require the conversion unit for one step of the process.

Although not explicitly stated as a goal, a valuable element of the R&D project has been the opportunity for training at the International Fertilizer Development Center and the laboratories of the Tennessee Valley Authority in the U.S.A. This training has included ore characterization and analysis, pilot plant operations both for beneficiation of phosphate ores and for wet acid conversion to phosphoric acid, continuous conversion of phosphoric acid to phosphate fertilizer materials (monoammonium phosphate and concentrated super phosphate), and granulation studies of fertilizer end products.

Experience gained in the project has resulted in closer NRC-industry ties in phosphate ore beneficiation and related problems. The NRC-industry cooperation has, in turn, resulted in contracts on specific technical problems for the Misr Phosphate Company (Red Sea materials) and training for staff of the Kafr-El-Zayat Fertilizer Company.

The phosphate R&D group has been asked to terminate its work as soon as the wet acid unit has been assembled and tested. This decision is being reviewed in the light of the reassessment and reallocation of resources for the element of the Applied Science and Technology Research Program, as requested by JCC XIII.

E. Corrosion in Petroleum Refining

The objectives of the Corrosion R&D Project may be summarized as follows:

1. Establishment of a well-equipped corrosion R&D laboratory at the NRC and training of a national team capable of dealing with diverse, complex industrial corrosion problems.
2. Establishment of close ties with the Egyptian petroleum industry and cooperation in solving technical problems.
3. Introduction of new technology in the fields of corrosion monitoring and prevention.
4. Conduct of basic research to elucidate fundamental aspects of corrosion mechanisms.

Examining the achievements of the R&D project in the light of the goals one may conclude the following:

1. A modern, well-equipped corrosion laboratory at the NRC is well on its way to realization. The principal instrument acquired is the Perkin-Elmer Model 550 surface-science spectrometer (ESCA/SAM: electron spectroscopy for chemical analysis and Auger electron spectroscopy). A team of 23 persons from various departments of the NRC is available to work on all aspects of corrosion evaluation.

2. A working relationship with the Suez Refinery has been maintained over the life of the R&D project. Specific solutions to alleviate or eliminate some of the more serious corrosion problems have been proposed to management. Since corrosion is an endemic problem in oil refineries as in all chemical industries, monitoring techniques are either in place or soon to be in place at the Suez Refinery, which will enable practical studies to be continued and efforts to reduce corrosion.
3. Several promising corrosion inhibitors formulated from inexpensive, locally produced materials of plant origin have been prepared at NRC and tested under conditions typical of industrial practice. As of December 1983, however, no large scale trials of the inhibitors have been conducted under actual industrial operating conditions.
4. The ESCA unit of the NRC has been utilized as a fundamental tool for surface science measurements (corrosion being one of the most useful industrially related applications). Two members of the NRC team have travelled to the USA for specialized training on the instrument and the interpretation of results. A specialist from Battelle Pacific Northwest Laboratories has consulted with the team in Egypt both on the operation of the machine and on its application to applied problems of the Egyptian industries.

As in the case of the phosphate R&D group, the corrosion group has been asked to terminate its work by October 1983. This decision is

also being reviewed in the light of the JCC request to consider reallocation of resources among all projects of the Applied Science and Technology Research Program.

F. Wool Scouring/Wool Wax Recovery

The objective of the wool scouring/wool wax recovery R&D project is to link the Textile Research Division of the National Research Centre and the Misr Beida Dyers Company in a joint problem-solving activity that improves the principal product (wool tops/yarn for export), recovers a valuable by-product (wool wax), reduces the cost of chemicals and energy, and reduces processing wastes normally discharged to the environment.

After an initial laboratory phase, the project moved directly to the Misr Beida Dyers wool scouring facility near Alexandria. The production line served as pilot plant to test and prove the process using a centrifuge-recycle method for wax recovery. This new process which was adopted in Egypt was based upon techniques developed in Australia and perfected in the U.K. The key to its success is the integration of improved scouring methods with high efficiency wax removal, using centrifuges in continuous operation under controlled operating conditions.

By November 1983 the operation of the process had not yet proceeded to the point equalling the wax recovery/chemical reduction/waste reduction efficiencies of plants operating in the U.K. and Europe. Nevertheless improvements were being made and the principal problems remaining to be solved were identified. Improvement

in the quality of wool tops alone enabled Misr Beida Dyers to command increased prices for the product, which justified their investment costs and assured a higher profit margin. Although the project is officially completed, development work is continuing at the plant to optimize scouring and wax recovery.

The wool wax project began in a fashion similar to the other demonstration and R&D projects; i.e., an NRC "push" activity with industry. Misr Beida Dyers, however, soon realized that it would accrue a substantial, immediate return from the project. From its own funds it:

- a) Constructed a testing laboratory on the scouring line for use by NRC and company development engineers. (The testing laboratory remains operational as a part of the quality control system.)
- b) Contributed \$100,000 toward the cost of \$290,000 for the wax recovery system.
- c) Absorbed the total cost of plant modification and equipment installation for the project.
- d) Purchased the chemicals and other expendable supplies needed in making the pilot tests for the project.

Thus the wool scouring/wool wax recovery R&D project is perhaps the best illustration within the Applied Science and Technology Research Program of end user involvement and commitment to an R&D problem solving effort.

G. Red Sea Fisheries

During Phase II the elements of the Red Seas R&D study project are the following:

- Physical features including topography and climate of the area under study (Foul Bay from Bernice to Ras Benas and southward past the Egyptian Sudanese border to Ras Abu Dara).
- Socio-economic study of the population, and
- Review of previous scientific studies of the Foul Bay region (species, species composition and distribution, and fisheries practices).

Previous studies in the region of Foul Bay have been limited but there is evidence that pelagic fisheries resources are sizeable. Length distribution measurements of the typical catch indicates that the fish are smaller than those from the Gulf of Suez but are nevertheless of commercial potential.

The area under study is part of the Red Sea Governorate, is isolated, and its natural and human resources have not been systematically developed. Fishermen in the region are few; their catch is primarily for local use and is either eaten fresh locally or salted for local use. Until there is provision of potable water for settlement purposes and of some water for agriculture, the region is likely to remain underexploited. Infrastructure (docks, boat repair facilities, training centers for youth in fisheries, etc.) are also poorly developed.

The project overall is proceeding slowly, in part due to geographic isolation and in part to the lack of equipment requested, but as of December 1983 not approved for purchase.

H. Bentonite Clays for Industrial Applications

During the Oct.-Dec. 1983 period the following persons visited the U.S.A. for the bentonite clays project:

- Dr. A. A. Abdul Azim
Director, Central Metallurgical Research and
Development Institute and
Principal Investigator for the project
- Dr. Tawfik Refaat Boulos
Research Professor
(Chemical Engineering)
Clay minerals beneficiation
- Dr. Abdel Kader Attia
Research Professor (Geology)
Clay minerals analysis and characterization

The group was concerned with mining activities of the American Colloid Corporation and the International Minerals and Chemicals Corporation in South Dakota and Wyoming and held discussions on analytical procedures as well as marketing operations at the companies' headquarters near Chicago, Illinois. All three visited a pilot plant of the Colorado School of Mines Research Institute near Denver and held extensive discussions with Dr. Haydn Murray, Indiana University, who serves as principal technical advisor for the bentonites R&D project. Dr. Attia continued in Indiana for an additional week of special analytical work on Egyptian clay mineral samples. Drs. Boulos and Abdel Azim visited the International Fertilizer Development Centre in Muscle Shoals, Alabama, where they investigated the possibility for training of members of the bentonite team and held discussions on the phosphate R&D project.

Dr. Haydn Murray visited the project in Cairo during the week of December 2-9, 1983. On this occasion his principal concerns were ore

characterization studies of the Cairo-Alexandria road deposit. The feasibility of marketing Egyptian bentonites is dependent largely upon economic factors. If deposits are of high grade, low in undesirable impurities, and easily mined, commercial viability of the project may prove feasible in spite of market competition from Europe and the U.S.A. The extensive deposit in the Fayoum does not appear attractive for the high-return applications of oil drilling fluids, foundry binders, or bleaching. The Fayoum material, however, is suitable for land reclamation use, construction purposes, etc., so long as transportation costs do not mount too rapidly. Dr. Murray reviewed the technical program of each sub-group offering suggestions from his extensive industrial experience. He also consulted with Dr. Adel Azim about future training, observation and study visits for members of the bentonite team.

I. Pharmaceutical Chemicals

Not reported in this quarterly report.

DISCUSSION

Problem Solving Indicators in the Applied Science and
Technology Research Program

I. Background

The principal goal or purpose of the Applied Science and Technology Research Program as stated in the AID Project Paper is:

"To improve the institutional capability of the Egyptian science and technology community to develop and manage research programs to solve priority development problems".

At this stage of the activities under the Applied Science and Technology Research Program it seems appropriate to give examples of "solving priority problems" and to illustrate the "improvement of institutional capabilities."

II. Problem Solving Indicators: End-user participation

One measure that evaluators often use as an indicator of "success" in applied R&D is end-user participation. This concept, however, is a qualitative yardstick because of differing "kinds" and "degrees" of appropriate end-user involvement. Even minimal involvement by the actual or potential end-user implies a recognition of a problem and an open attitude toward R&D. Both problem recognition and openness to R&D are essential prerequisites to more active participation in the R&D process itself. The attitude of openness on the part of Egyptian industries, most of which are in the public sector, and on the part of farmers and farming groups in the villages is a notable and highly positive factor upon which the Applied Science and Technology Research Program was able to capitalize. At the same time it should be recognized that factors such as those of economics, social acceptability, technology choice (appropriateness) and the nature of a given market at a particular time are as important, if not more important, than end-user participation and narrowly determined technical feasibility in determining whether a product, technique or process will be adopted and generally recognized as "successful" by market standards.

It is useful, nevertheless, to classify or define some of the kinds of involvement that have occurred in the R&D and Demonstration projects as measures of end-user participation.

A. Industry-oriented projects

1. Full cost reimbursement occurs when a firm or group of firms perceives a problem in a manufacturing process or seeks an improvement in a product and contracts with another group for a solution (R&D) offering full-cost reimbursement for the effort of the problem-solving group.
2. Partial cost reimbursement occurs when a firm and the R&D group agree to share in some predetermined manner costs of the problem solving.
3. Promotional R&D occurs when the R&D organization bears the major share of the problem solving costs. In these cases the firm usually consents to the use of its facilities so that the solution may be "demonstrated" in a practical manner.

B. Agriculture-oriented projects

1. Full reimbursement for loss is the case of pre-agreement to indemnify the farmer for loss of yield resulting from his willingness to participate through the use of his land, labor and water resources in a demonstration by the agricultural R&D group.
2. Shared risk is usually an arrangement whereby the R&D organization furnishes most inputs (seeds, fertilizers and chemicals) and the farmer provides the land, labor and water, with the prior understanding that any losses in yield will be borne by the farmer or shared by the research organization.
3. Demand-pull is here defined as the process by which the farmer, farm organization or village may seek R&D assistance either from a public sector assistance group or from a

commercial group with agreement to cover costs or to assume responsibility for obtaining cost reimbursement to the researchers from a third party (agricultural development fund, etc.).

III. Problem Solving Indicators: Institution Building

For purposes of the Applied Science and Technology Program, institution building is another criterion of success. Once again there are several types of evidence which serve as indicators of institution building and promotion of institutional excellence. These may be listed as follows:

1. Staff upgrading through in-service training, education, orientation and study visits.
2. Improvement of facilities through the up-grading of equipment, instrumentation, improved physical space, etc.
3. Technical contributions to conferences which is both a means to "market" the services of an institution and to upgrade staff.
4. Demands for services from an institution or its staff in the form of consulting or design assistance, or in the form of giving training to the client's personnel. These services are usually performed for fee.
5. Requests for nonreimbursed services such as pro-bono use of personnel on advisory panels, etc.

There is also another kind of evidence that is a recognition of institutional excellence but which is often destructive to institution effectiveness and productivity. When personnel are constantly

recruited away from an organization, through "brain drain" or diversion to "nondevelopment" associated activities, this clearly indicates that an R&D organization has marketable "resources." Even more damaging are those instances in which there is a loss of skilled persons because of poor management, inadequate facilities, or lack of recognition of the value of those persons to the institution. Recognition may be given in monetary terms and in other forms such as awards, promotion, encouragement to publish in national and international journals, expenses for participation in international meetings, etc.

IV. Examples

A. More and Better Food

The More and Better Food demonstration project contains many sub-elements which offer examples of both end-user participation and institution building at the NRC.

- Corn production
 - During Year 1 user participation was on the basis of full reimbursement for loss. The yield improvements were so dramatic that user participation became demand-pull; i.e., individual farmers in Year 2 and beyond purchased seed corn, fertilizers and pesticides on their own because it was economically attractive for them to do so.
 - The corn project was one of the prime motivating factors which prompted the Governor of Giza to request NRC assistance on "demand-pull" basis.

- Peanut production

After the general success of corn, tomato and small vegetable production in Year 1, the villagers of Omar Makram came to NRC in Year 2 requesting help in peanut production which had suffered disastrous declines and, even with assistance from agricultural extension workers, had not been solved. In Year 2 the NRC and Omar Makram shared risks with a spectacular increase in yields. Thereafter the project again became a demand-pull project.

- Poultry production.

The results parallel those of the peanut production sub-element.

- Food technology activities (improvement of a nutritious weaning food, improved bleaching and clarification of cottonseed oil, production of soft cheese from imported dried milk powder, etc.)

These activities are examples of technological success in promotional R&D but lack of response up to now by industry in adapting or adopting the new processes.

- Institution building

- Equipment up-grading in nutrition, plant production, dairy and other departments of NRC.

- Staff training and up-grading in all participating departments.

- Notable management success for a multi-disciplinary, multi-institutional project.

- Participation of staff, particularly in the field of nutrition, in international conferences and seminars.

B. Biogas Technology for Rural Areas

- The biogas project is a clear example of technological success and social acceptance by villagers but the economics of energy in Egypt (highly subsidized butagas and kerosene prices) mandate the need for subsidized capital costs for individual village digester units.
- The larger biogas project (Shubra Kas digester unit of 50 cubic meters for a commercial poultry farm) is an example of partial cost reimbursement R&D. The NRC biogas team and the American technical assistance group VITA (Volunteers in Technical Assistance) each received funding from AID for the demonstration project.
- Institution building
 - Completion at the NRC of a modern, fully equipped biogas analytical services laboratory with a highly trained staff.
 - Design and installation of a biogas development and testing facility at NRC.
 - Staff participation in international conferences in the U.S.A. (3 separate years), India and Sweden.
 - Use of technical staff on contract to design a waste disposal system for Damietta Governorate.
 - Pro-bono service of staff on the Minister of Energy's commission to study Egypt's energy needs and how they can be satisfied.

C. Phosphate Fertilizers

- The ore beneficiation and chemical processing group which undertook the study of low-grade Egyptian phosphate minerals received the ores as a gift from the mining companies (partial cost reimbursement of R&D). After demonstrating its technical competence, the group received two full-cost reimbursement contracts to conduct chemical and physical R&D work on phosphate ores of the Misr Phosphate Company (Al Hamrawein ores of the Red Sea area).
- Institution building
 - Staff training and development in wet chemical pilot plant design and operation, ore characterization, and product granulation.
 - Equipment up-grading in the basic chemical laboratory and the pilot plant.
 - Staff participation in international conferences in USA and France.
 - Use of facilities to train personnel from Kafr Al-Zayat at the Pilot plant facility of the project.
 - Service of the staff personnel on advisory panels for Egyptian phosphate production facilities (based upon Abou Tartur ores).
 - Service of staff personnel on an official Egyptian government mission to the Peoples Republic of China to promote sales of Egyptian phosphate ores.

D. Wool Scouring/Wool Wax Recovery

- The Textile Laboratory of NRC conducted R&D on wool scouring and wool wax recovery with the participation of Misr Beida Dyers Company on a partial cost reimbursement agreement. The project (within the Applied Science and Technology Research Program) provided over \$190,000 toward the cost of the wax recovery unit at the company's facility near Alexandria. Misr Beida Dyers contributed \$100,000 in direct costs and paid for installation, building modifications and the cost of building a production control laboratory. This is the clearest industrial example under the overall program that the R&D resulted in a process improvement adopted by an end user.
- Institution building
 - Staff training and development through study and observation travel in Europe and the USA. These technical visits stimulated major design modifications in the project.

E. Corrosion in Petroleum Refining

- The corrosion group of the NRC worked at the Suez Refinery in the promotional R&D mode, especially during Phase II. It is not clear that the desalting unit, the major equipment item in the refinery which was responsible for excessive corrosion rates was modified and is operated as recommended.
- Institution building
 - Equipment up-grading in the corrosion laboratory was a major objective of the program. Purchase of an advanced

surface science instrument (ESCA/SAM, electron spectroscopy for chemical analysis) occurred in Phase I.

- Participation of a staff member in an international conference on corrosion inhibition.
- During phase I, the NRC group conducted a seminar-workshop on corrosion and corrosion mechanisms for personnel at the Suez Refinery.

F. Red Sea Fisheries

- The project is an example of a supply oriented R&D activity within the scope of the Egyptian National Development Plan for food security but with no clearly identified marketing or consumer industry group as end-user. Its eventual use as a pre-feasibility study could be "marketed" and attract sponsors for further R&D.
- Institution building
 - Core equipment requested during Phase II for laboratories at Suez and Al Hurghada.
 - Staff training during Phase I

G. Other

No analysis of the New Crops for Arid Zones project is given because it was curtailed early in Phase II.

The Bentonite and Pharmaceuticals projects began in Phase II. Analysis of these is deferred until the end of 1984.

TRAINING/ORIENTATION/STUDY
STATISTICS
October - December 1983

I.	<u>Travel from Egypt to USA</u>	<u>Number of Persons</u>
	o Bentonites	3
	o R&D Management	4
II.	<u>Travel from USA to Egypt</u>	
	o JCC Meeting	7
	o S&T Policy Seminar	1
	o Land Reclamation	4
	o Bentonites	1
	o Biogas	1
III.	<u>Travel from Third Country to Egypt</u>	
	o S&T Policy Seminar	1

Details on these visits are given in the annex to this quarterly report.

ATTACHMENT A

Twelfth Meeting, Joint Consultative Committee Applied Science and Technology Research Program

Egyptian Academy of Scientific Research and Technology,
U.S. National Academy of Sciences/National Research Council

Cairo, Arab Republic of Egypt

November 19-21, 1983

DRAFT RECOMMENDATIONS AND CONCLUSIONS

I. Introduction

The twelfth regular meeting of the Joint Consultative Committee (JCC) for the Applied Science and Technology Research Program was held on November 19-21, 1983 at the headquarters of the Academy of Scientific Research and Technology (ASRT) in Cairo, Arab Republic of Egypt.

Dr. Ibrahim Badran, JCC Chairman and President of the ASRT, was joined by Dr. Gilbert White in making the charge to their JCC colleagues. The challenge is to transform the success of projects from laboratories, pilot plants, demonstration farms and villages into ongoing programs which are self sustaining and which have direct practical impact upon the social and economic development of Egypt. Dr. Abdel Aziz Higazi described the goal as one of "technology transfer for wider use and application".

Dr. White endorsed that theme and suggested the preparation in advance of JCC XIII of a report which would show what each project has accomplished and prospects for application of results in the immediate future.

Dr. Howard Lusk, AID's Associate Director for Human Resources Development Cooperation in Cairo reiterated the theme. He pointed to the current efforts of the U.S. AID Mission and of the ASRT to conduct a "process evaluation" of the Applied Science and Technology Research Program as a normal management activity designed to reveal more clearly "what we are doing well, and what we are not doing well." Evaluation enables AID to work more dynamically in science and technology. This is a logical step in an overall process examining the use of current resources and planning the allocation of future resources.

In a similar vein Mr. John Hurley, Director of the Board on Science and Technology for International Development (BOSTID) of the National Academy of Sciences/National Research Council (NAS/NRC), noted a recently completed internal evaluation of BOSTID's participation in

the applied sciences program in Egypt. This review was a management effort to examine inputs and outputs of the Board's activities in the expectation that the lessons learned will be more widely applicable to other programs.

In a complementary presentation, Dr. Leo Packer, NAS/NRC Resident Program Director in Egypt, offered a conceptual framework for evaluation of applied R&D in this or in similar activities.

II. Overview Presentations

Dr. Mohamed Kamel, President of the National Research Centre, discussed the progress of the Demonstration and of the Research and Development Projects which are the responsibility of the Centre. His theme was continuity, not in the sense that the projects themselves should continue indefinitely but rather from the aspect of continuity of interaction between NRC scientists and end-users in industry and agriculture. Lessons learned from More and Better Food activities and from Biogas Technology must be applied and adapted to other villages in Egypt and must be constantly renewed to sustain development in the original target villages. He invited JCC members to join with the NRC in catalyzing that process.

Dr. A.S. El Nockrashy in his Administrative and Management Report provided an overall picture of the status of project activities under the classification of R&D management, training, consultants, and expenditures. As of September 30, 1983 approximately \$5.6 million of the \$16.3 million contract budget were encumbered. Most contracts have been in force for 1.5 to 2.0 years during Phase II.

Because of the extension of the Program until 30 September 1985, the time has now arrived for an evaluation of the status of projects in order to suggest reallocations of resources.

- For Phase II, JCC recommends fund transfer flexibility in the form of new budget allocations between funding categories, and between dollar and Egyptian pound accounts for the projects when requested by ASRT.
- The JCC urgently requests that ASRT and U.S. AID develop an effective means of expediting materials procurement to serve the short term, most immediate subproject needs.

III. Land Reclamation Project

Dr. Mostafa El-Gabaly, JCC member, gave an introduction to the Land Reclamation project by tracing its origin to the demonstration project on New Crops for Arid Zones. As a result of the initiative taken at JCC-XI a decision was made to: a) perform a rapid reappraisal of Egyptian land reclamation experience taking into consideration lessons learned from other countries, and b) outline under specific Egyptian conditions a new demonstration project to test and evaluate the total system under which new technologies would operate.

A joint group of Egyptian and American specialists in soil, water, irrigation and other technologies relating to land reclamation met in Egypt just prior to JCC XII to examine the scope and methodology of such a study and to make recommendations to the JCC. Suggestions from the U.S. panel are included in Annex I of this report.

The basic areas of agreement growing out of discussion by the Egyptian and American groups are the following:

1. Appraisal of land reclamation experience is an important priority for Egyptian development strategy.
2. An evaluation of old and recent reclamation projects is an essential undertaking for the ASRT to:
 - Provide guidance for policy makers
 - Identify constraints in the implementation of projects
 - Highlight promising new technologies and system approaches
3. The scope of work and the methodology for the study should be broadly based to allow the widest diversity of experience to be reviewed. It should include technological, economic and financial factors but should not emphasize analysis of these to the exclusion of social and political factors.

Particular attention should be given to the use and analysis of all recent land reclamation studies in order to benefit from their experience. This would have the added benefit of allowing a relatively short time scale for completion of the study.

The American group suggested that technological factors in past land reclamation experience in Egypt may not be as important as institutional constraints in mitigating against the full realization of project goals. An understanding from a broadly interdisciplinary perspective of these constraints in examining questions of when, where and how any further development takes place is desirable. In order to be useful to the Egyptian Government and to the international investment community, both public and private, the results of the effort must be perceived as being fully objective, widely inclusive and free of bias.

Organization of an independent study by the ASRT should be done through a small group with diverse skills and experience. A broad and representative advisory panel would approve study plans, monitor progress and review findings. U.S. consultants and advisors may be requested when needed. The JCC recommends that emphasis must be placed on the testing and evaluation of the complete techno-economic and socio-economic system in which new technologies are applied in Egypt.

IV. Science and Technology Policy Studies

The JCC received reports from Dr. I.H. Abdel Rahman and Dr. Essam Galal on two parallel efforts undertaken during the third year of the S&T Policy Studies Project and on the corresponding seminars held in November 1983. Several favorable trends were noted with appreciation to all involved:

- The activity received recognition and endorsement by the Egyptian Government including the Prime Minister, the Deputy Prime Minister for Education and Scientific Research, and the Deputy Prime Minister for Production and Petroleum,
- The degree of participation and commitment from the scientific and technical community exceeded all expectations,
- The sectoral group plans to continue its activities, particularly through science and industry, and science and agriculture annual conferences,
- The interactive group has been invited by the Ministry of Electricity to participate in discussions for technology transfer between the Egyptian and French governments.

The following post Seminar III activities are envisioned:

A. Finalization of a National Technology Policy Statement

Taking into account the comments and views expressed during the 1983 National and International Seminars, the ASRT will use the existing technology policy studies to produce a draft document to be entitled "Technology Policy Statement", which will reflect the general consensus position discussed in the two seminars. The draft document is expected to be completed before the end of December 1983.

B. Follow-up activities

1. Continuation of the interactive approach studies in selected sectors of the national economy in order to explore the practical policy measures which will help in the process of actual implementation.
2. Carrying out specialized studies which aim at formulating the action-oriented and impact-producing measures (organizational, legislative etc.) required for the implementation of the Technology Policy Statement.
3. For the purpose of assuring the widest range of consultations, the specialized studies will utilize the services of U.S. and other experts to the extent which will provide the fullest possible access to information on the measures and experiences of other nations in pursuit of technological development and self-reliance. The Egyptian policy studies group

will invite, through the JCC activity, the participation of high-level science and technology policy consultants during the next phase of formulation and implementation.

4. The JCC will continue to review the S&T Policy Activities at its regular meetings. The project may continue provisionally until June 1984. Its possible extension or modification will be examined within the limits of allocated funds.

V. Management Implications of the 5 Year S&T Program

The JCC received with appreciation a thorough background report on the administrative structure and operating procedures for the 5-Year S&T Program of the ASRT given by Dr. Aboul Fatouh Abdel Latif.

Informal discussions have been held to consider in what ways projects within the 5-year S&T program might usefully link with the R&D management project. These discussions will be continued and be reported in an appropriate manner to the JCC.

VI. Research and Development Projects

A. Phosphate Fertilizers

The JCC received a report from Dr. Refaat Boulos, principal investigator of the phosphate fertilizer project, in which he outlined the significant accomplishments of the activity, particularly with respect to ongoing contracts, liaison with industry, and continuous operation of the ore beneficiation pilot plant. He noted that the acid conversion unit had not yet been placed in operation due to late arrival by one year of some equipment. Thus he asked that the phosphate project be granted an additional year (i.e. 1984) to complete its work, with allocation of funding for specialized equipment for the pilot plant.

The assigned subcommittee recommended increasing the Phase II Equipment request budget to \$62,000.

B. Wool Wax

A very encouraging report was received from Dr. A. Kantoush, principal investigator for the wool scouring and wool wax recovery unit installed at the Misr Beida Dyers plant near Alexandria. The increased value per year of wool tops produced and of the wool wax recovered should be double the invested cost of the new installation. Additional savings will result from a greatly decreased volume of waste products, conservation of energy, and improved environmental impact of the new process.

The JCC members congratulated Dr. Kantoush on the accomplishments of his group. Although the scientific content is modest, the economic and other returns are immediate. The project is an example of the

success which can and should be multiplied throughout Egypt with the imaginative application of R&D.

A final project report will be provided well before the April 1984 meeting of the JCC.

C. Corrosion in Petroleum Refineries

An encouraging report on the results of the corrosion studies was presented to JCC members. Activities which were included are monitoring of corrosion in the Suez refinery, study of metal corrosion in sulfide environments, study of the failure of Egyptian reinforcing and structural steels and operation of the highly sophisticated surface science equipment (Physical Electronics ESCA, Model 550).

The JCC commended members of the corrosion study R&D group for the work and for its final report.

D. Red Sea Fisheries

The JCC received an interim report from the principal investigator Dr. Aboul Fatouh Aodel Latif and commended him for significant progress in the short period of time. The report reviewed social aspects of fisheries communities in the Red Sea Governorate with special reference to the far southern area, results of previous oceanographic and fisheries R&D in Foul Bay, and presented an account of purse-seine fishing in that region. A complete technical report will be submitted to the JCC at its fourteenth meeting in the autumn of 1984.

The JCC noted with concern the delay in approval for the equipment list and directed that joint efforts be made to resolve any outstanding issues.

E. Bentonite Clays

The JCC received an encouraging report of progress for the bentonite clay R&D project from its principal investigator Dr. Adel A. Abdel Azim. The project is progressing according to plan and has been able to compensate for deferred scheduling of training.

The JCC noted with appreciation the efforts of this R&D group and will receive a further progress report at its next meeting.

F. Pharmaceutical Chemicals

The project principal investigator, Dr. M. Fayez, presented the report to the JCC. His principal concerns arise from a smaller allocation of funds for equipment and chemicals than was requested in the original project proposal. Additionally, the long time factors in the procurement process, especially for chemicals, are of serious concern.

The JCC members expressed the desire that the project be given consideration in forthcoming review of resources from the Applied Science and Technology Research Program with the view toward possible reallocation to alleviate the problems.

VII. Demonstration Projects

A. More and Better Food

Dr. Osman Galal reported on the village agricultural and nutritional surveillance aspects of the More and Better Food Demonstration project. JCC members visited Omar Makram village on November 18, 1983.

Appreciation was expressed for the visit and for the continuing progress of activities with special reference to the interaction with the village community.

Concern was expressed about future activities beyond the Phase II period. A planning seminar on options for the institutionalization of R&D for food systems development in Egyptian villages is being considered. It is proposed that this activity, or that an alternative activity be held prior to JCC-XIII with a presentation of conclusions so that advanced planning will continue in a timely fashion.

B. Biogas Technology

Dr. M. El-Halwagi, principal investigator for the Biogas Technology project, presented a comprehensive report. He noted that all activities are essentially on target for the revised time schedule approved by JCC during its meeting in November 1982. The project will be completed in 1984 with the holding in Egypt of an international seminar on biogas technology experience. Because of the importance of the project to Egyptian energy policy, the JCC recommends that links be established between the NRC group and the energy policy planning group.

Members of the JCC commended the biogas technology group and Dr. El Halwagi for their work, noting with pleasure the activities in Omar Makram which they visited and which show promise for further application in Egyptian villages.

VIII. Instrumentation Technology

The report of the Instrumentation Technology Unit was given by Eng. M. Shaloot. Looking toward the conclusion of the Applied Science and Technology Program the JCC recommends that the ITU be incorporated within the regular structure of the Scientific Instrument Centre (SIC). This will necessitate developing and implementing an effective and balanced program, including a competitively structured incentives plan for employees so that their continual loss to industry or emigration abroad is no longer a major problem.

Mr. Falk of the University of Wisconsin submitted a report on the project for Egyptian Instrumentation Technology and Equipment Management.

It is recognized that the procurement effort contains a number of fiscal and time dependent uncertainties. Equipment budgets were established several years ago and now require review to insure optimum utilization of funds and support for the ongoing demonstration and R&D activities. This review is expected to be completed well in advance of the April 1984 JCC meeting.

IX. Standards and Measurements

Dr. K. Heinrich of NBS presented a status report for the entire project covering training activities in the United States, development of the laboratory activities in Egypt and the recent conference on Standards, Measurements, Quality Control and Production for Economic Support and Growth that was held in Cairo, October 29, 30, 1983.

The JCC noted with appreciation the activity and the mutual cooperation between the U.S. National Bureau of Standards and the three Egyptian participating organizations.

The Standards and Measurements teams are requested to coordinate their approach to instrument maintenance and repair activity within the framework of the ITU in the Applied Science and Technology Program.

Looking toward the future, a plan for additional workshops in priority areas such as fire and building research and quality control are desirable activities within the framework of the program plan.

A study of the impact of these workshops on industry, commerce, and the public welfare should be organized by the National Institute of Standards and the Egyptian Organization for Standardization and Quality Control.

X. Scientific and Technical Information System

Dr. V. Slamecka gave a status report on the STI project highlighting the ongoing training, planning, and contracting aspects. The report was received with appreciation for the work of the STI team; it is included as Annex II to this document.

A new system of governance for the project was proposed as follows:

1. The contractor (Georgia Institute of Technology) will be asked to assign a full time, information specialist in Cairo. This will be in addition to the present contractor representative who will be asked to spend at least 50% of his time in Egypt. The action will require approval from the U.S. AID Mission and a formal contract amendment with additional funding.

2. The ASRT President shall designate one qualified person to hold a joint appointment as full-time Executive Director for the STI Project and a nonvoting member of the Governing Body.
3. The STI Governing Body is the interface between the ASRT President, the Contractor and the Information Nodes. The ASRT President is the Chairman of the Governing Body and shall have a Vice Chairman who is fully empowered to act for the Chairman whenever the Chairman is absent.
4. Nodes representatives will be members of the governing body and will express the needs of the user sectors.
5. A full time Egyptian liaison officer will be appointed by the ASRT to manage administrative aspects for the project.

The JCC advises that Georgia Tech shall continuously consult with the Governing Body and shall seek its endorsement of the detailed implementation of the training function.

In addition Georgia Tech should work toward establishing a training capability within the ASRT.

XI. Regional Research Centers

Dr. I. Badran presented a report to his colleagues on "Integrated Regional Development" and the efforts, organized by the ASRT, toward development of regional research centers.

The several steps taken by the Egyptian Academy included:

- Organization of activity at the Delta Governorates with a center in Tanta fully utilizing resources of that region.
- Planning and initiation of activities for a center in the East Delta and Suez region.
- Recruiting of highly qualified coordinators and the development of master planning committees for each region.

The JCC discussed the imaginative planning and execution of this unique effort. Its potential for accelerating problem solving at the regional level shows great promise for national development. There are no models for S&T related centers of this kind; thus the efforts of the ASRT are pioneering and will have broad interest elsewhere.

The JCC congratulated Dr. Badran for his special attention to this program and asked to be kept informed on the progress.

XII. JCC Meeting XIII

The JCC members agreed to hold the next meeting (JCC XIII) at the headquarters of the National Academy of Sciences in Washington, April 16-18, 1984.

In addition to the regular activity status reports, the background papers prepared and distributed well in advance of the meeting shall include:

- A report on the ASRT S&T Policy Project with: a) the summary technology policy statement, b) the recommended institutional/structural arrangements within Egypt which are needed to maintain Egyptian policy studies, c) an outline of follow-up measures needed to maintain the policy planning function within ASRT and the inputs required from JCC and other resources.
- A status report from the land reclamation group including the study objectives, terms-of-reference, and proposed design plan in detail.
- A staff report on budget reallocations and projections
- The report from the US AID Mission in Cairo on the current evaluation of the Applied Science and Technology Research Program.
- A status report from the US AID Mission in Cairo on the Science and Technology Sector Assessment study.

ATTACHMENT A

ANNEX I

REPORT FROM US PARTICIPANTS
LAND RECLAMATION SEMINAR

The US participants interpreted their charge to be the provision of advice and counsel in the development of plans for a program of assessment of past reclamation experience in Egypt so that constraints can be identified. They appreciate the cordial and effective arrangements that gave them the opportunity to see first-hand several examples of recent reclamation and development efforts. They did not have the opportunity to visit alleged "failures."

Notwithstanding pessimistic conclusions in some past studies, the team is fully convinced of the urgency and need for further major reclamation efforts. They are equally convinced that such efforts can be successful, if they are properly chosen, planned and executed. Thus they wholeheartedly endorse the proposal to make an assessment.

The team wishes to stress the need for a clearly defined and well-delineated objective. They see the objective as providing, from an evaluation of experience, guidelines to Egyptian decision makers for future development efforts. Consistent with this goal, there emerges a clear need for objectivity and credibility. The results of the effort will be ignored unless they are, and are perceived to be, objective. Using the Academy of Scientific Research and Technology as a vehicle for launching the study will lend it its credibility. It is noted parenthetically that a number of issues peripheral to the main task--an assessment of experience--are of great importance to effective land development; they include concerns about adequate manpower and manpower development programs, effective extension services, and pilot farms to test and adapt technologies to new situations. These issues were considered outside the scope of the team's assignment.

The team noted repeated emphasis on the need to introduce new technologies, and the allegation that failure to reach full potential in past efforts was due to technological factors. The team questions these assertions. The team hypothesizes that most past disappointments have resulted from the failure to apply known and available solutions; the team has witnessed the latest technology in operation in recently developed projects. Thus the emphasis in the study must be on identifying those institutional factors that caused the technological failures, rather than on technology per se.

There have been many approaches to the complex and expensive business of land reclamation and there have been many reputations lost in the endeavor. Since the Government of Egypt (GOE)--appropriately, it is believed--is committed to land reclamation, it is proper that a credible study of the revelant features of the past three decades of land reclamation be carried out in so far as they bear upon future planning and implementation of land reclamation in Egypt. Since resources for the study would be limited, it is essential to plan the study very carefully so that only those issues relevant to the provision of useful information to policy makers be addressed. An accumulation of data that do not contribute to the assessment should be avoided.

A number of reports already exists which involve some aspects of land reclamation project evaluation. The evaluation now needed must not ignore these earlier findings, but must include a broader survey of projects and must involve a range of disciplines and interests, so that different points of view are actively considered. This is necessary to develop the fully objective report that is called for.

Accordingly, this ASRT evaluation may appropriately begin by compiling a summary of all projects so far evaluated and listing the perceived constraints to full performance, with some key comments and primary conclusions drawn. Some of these earlier reports may have substantial deficiencies, but still they raise significant questions. Such a compilation will provide a useful background for a fresh evaluation by the Academy evaluation team; it also will provide a means of access to studies and reports which are frequently difficult to identify and obtain.

The team suggests that the ASRT evaluation then proceed by preparing for all land reclamation projects so far carried out in Egypt, including those only recently begun, a summary of the opportunities and constraints which are seen as primary factors affecting the relative success of the projects. In doing this, one must recognize that a technical constraint, such as unreliable water supply or inadequate drainage, may not really be a technical problem but an institutional or economic problem: technology to solve the problem may be available but not have been implemented for lack of suitable institutional arrangements or for financial reasons.

To provide the indepth analysis necessary for better decision making, it will be desirable to select some projects for more complete analysis. The rationale for selecting the ones to be studied should be explicitly documented. Projects to be studied in detail should include some of the latest projects which are already using the most recent irrigation technology. Decisions on future projects should involve analysis of the successes and problems in use of this latest technology. Evaluation of outdated applications of traditional irrigation technologies alone would have limited value to future decision makers.

Technical solutions probably exist for most technical problems which will be encountered, whether they be problems of water delivery, system maintenance, salinization, or water-logging. Adaptation of these solutions to Egyptian conditions may be constrained by lack of suitably trained manpower, costs, administrative procedures, or many other factors. Careful evaluation of these "qualitative" factors will be extremely important in planning for successful future projects.

Thus the study needs to consider some factors which are difficult to quantify, and sometimes even difficult to deal with descriptively. For example, the continuous availability of water, the quality of water management on the farm, the effectiveness of the available inventory of spare parts and especially the quality of extension services could, separately or in combination, explain the success or failure of a project.

The study would give some limited attention to opportunities not adequately addressed by reclamation policies as pursued during the past three decades, such as achieving better integration of cropping patterns in newly reclaimed areas with the total production needs of the country and the products from other farming areas.

In selecting evaluation procedures, consideration should be given to methodology that is respected by GOE and, at the same time, recognized by international agencies such as World Bank, OECD, FAO, and USAID. This would assure that the study would be credible to a large number of agencies. The ASRT should insist on this matter. The importance of economic analysis is recognized but the results of such analysis should be reviewed in the light of the financial, social and political realities of Egypt. The results of economic analysis should not be emphasized to the exclusion of other issues, such as food sufficiency, unemployment, living space, or water utilization. The study should consider the problem of how similar future evaluations could be facilitated and recommend routine monitoring procedures to be implemented on all projects.

It seems worth emphasizing that, insofar as it is deemed necessary to adopt so-called "new technology" in future reclamation projects, the evaluation should examine carefully how such technology is incorporated into the fabric of the economy. Whether it consists of sprinkler and drip irrigation, or laser levelling for furrow or basin irrigation, selection of a technology requires consistent decisions in the economic, land-tenure, and socio-political spheres. The evaluation should examine how well such decisions have been integrated and implemented in the past. Modern technology can be less forgiving of mistakes than simpler technologies. For example, sprinkler and drip irrigation require readily available spare parts, access to mechanical skill and continuous water supply. Careful examination of some of the more recent reclamation projects may give important clues as to how well the institutional system is adapting to the needs of the technological systems.

If the proposed study is to achieve its purpose, it must be as thorough and complete as time and resources permit; it must be as objective as human limitations allow and it must be as credible as possible. Such a study must, of necessity, be the result of full-time activity of a small group, with diverse qualifications. In order that a wide range of expertise and points of view be represented, the suggestion is offered that a "consultative panel" of Egyptian experts be appointed by the Egyptian Academy of Sciences. This body would examine the plan of work and, it is to be strongly hoped, endorse it. It would also meet at intervals with the working group to review progress and help maintain objectivity and perspective. Upon review of the final report by such a body, one could hope for wide acceptance of the major conclusions.

An evaluation such as has been proposed, conducted under the aegis of the Egyptian Academy of Scientific Research and Technology could make an extremely important contribution to land reclamation in Egypt and serve, as well, as an example for the appropriate melding of technology and public policy.

Dr. J. A. Allan
School of Oriental and African Studies
University of London

Dr. Wilford R. Gardner, Head
Department of Soils, Water and Engineering
University of Arizona

Dr. Robert M. Hagan
Department of Land, Air and Water Resources
University of California

Dr. Jan Van Schilfgaarde, Director
U.S. Salinity Laboratory
U.S. Department of Agriculture

November 19, 1983

ATTACHMENT A

ANNEX II

GEORGIA INSTITUTE OF TECHNOLOGY
School of Information and Computer Science
Egyptian National STI Project
ASRT, 101 Kasr El-Aini, Cairo
Tel. 28135

TRANSCRIPT OF REMARKS TO THE JCC
by Dr. V. Slamecka
November 20, 1983

Mr. Chairman, Ladies and Gentlemen:

Once again we have the privilege of reporting to this distinguished group on the status of the STI Project.

To refresh your minds: the project has two phases, the first of which was a two-year systems analysis and design study completed in December 1981, the second (current) is the implementation phase. The system design phase recommended, in a nutshell, the development of a sector-based, distributed network of selected public information services, supported by an infrastructure which would incorporate the Network management and governance, and coordinate the development of manpower, information markets, technical support, and performance evaluation. The design and its implementation plan were examined and approved by a multinational committee in 1982, and the three-year implementation program began in November 1982, one year ago.

The implementation phase consists of a broad and complex number of activities which have, roughly, the following goals: in year 1, the institutionalization of the Network; in year 2, establishment of public information services; and in year 3, strengthening and extending the Network and its services. The infrastructure-building activities interface with these goals throughout the 3-year period.

Against this background we would like to offer you a progress report, at the end of the first year, on the status of the following components: the Network, its information services, the development of markets, manpower development, and the infrastructure.

Status of the Network

First, the status of the Network. Five information service "nodes", each located in a major agency or institution of this sector, were selected in summer 1983. Three of these (agriculture, industry, and science) have already engaged in information-related activities; two (energy, and health care) start from level zero.

The current status of this nascent Network is fragile, in that each sectoral node is prepared to commit itself to the Network only after its host organization executes a formal agreement with the ASRT, in which the mutual responsibilities of the two parties are made explicit and official. All the nodes are looking toward the ASRT to cement the Network.

Meanwhile, the Contractor's Egyptian staff, with assistance from NIDOC, has been doing its best to keep the five nodes together: by training the managers and personnel of the nodes, taking the managers on a study trip to observe U.S. and Spanish information services, by regular Sunday meetings with managers, by jointly planning with them sectoral services and marketing, by site preparation, by mutual visits to each node, staff training, meetings with heads of the host organizations, and by similar efforts. Unless, however, the relationship with the ASRT is formalized, the Network will become unglued.

Information Services

Let us proceed to discuss the development of information services. Our strategy is to introduce public information services as rapidly as possible. In view of the delivery schedule for information technology to the nodes, this dictates that we start with services that do not rely on local computer facilities. Accordingly, we plan to inaugurate, in as many of the nodes and some other organizations that are prepared to work with us, a U.S. database search service and foreign document delivery. This service has been tested in one of the nodes (NIDOC), and the plan is to introduce it in January as a Network-wide service. All nodes are undergoing, since August 1983, extensive staff and site preparation for this service.

As regards Egyptian database building, we have formulated an Egyptian task team for the design and development of the Egyptian bibliographic database. The task group includes, naturally, available expertise from the Network nodes; but because the financial relationship between the ASRT and the nodes has not yet been clarified, these experts and their managers wish to have such a clarification before participating in the task group. If this effort can begin shortly, we expect to have the database development completed before the delivery of computer facilities next summer.

With respect to these computer facilities, a very careful study of information technology trends has been made in the first half of this year and reported, in a two-day seminar, to the nodes. The RFP for computer systems was drafted in April, and finalized by an Egyptian technical committee in August. Over 75 vendors have requested the RFP, and we expect an Egyptian-U.S. evaluation of the bids to start in December. Given this schedule and assuming an early institutionalization of the STI Network, we are looking toward summer 1984 for the computer delivery and installation. A parallel effort to select and arabize database software facilities is underway.

Finally, extensive staff training accompanies the development and introduction of Network services. Since the start of this project in November 1982, a range of courses, seminars, workshops and roundtable sessions has been held, extending from two to twenty days, and attended by some 120 persons, most of whom come from the sectoral nodes.

Manpower Development

Let us continue with remarks concerning the important topic of manpower development for the information service sector. The long-term strategy relies, of necessity, on formal and degree programs of instruction. Even though we (the Contractor) have tried--for two years--to induce one Egyptian university to develop an appropriate, efficient degree program, we have not been successful. Very recently, another university has communicated to us informally its desire to establish a 2-year postgraduate certificate program in information systems and services.

The short-term manpower development strategy consists of three parallel efforts: emergency training of core staff at nodes by contractor; occasional training associated with certain events such as computer vendor training; and the establishment of a national program, or center, for information career training. The last-named activity is by far the most extensive and far-reaching, and I would like to spend a minute or two on it.

A very careful selection process of the Egyptian subcontractor--involving a public solicitation, independent evaluation, in-house evaluation, all with full Egyptian participation and continuous opportunity for executive intervention--was completed by July, and a subcontract negotiated, approved, and executed in October. At present the subcontractor is in the midst of detailed planning of the center whose program of courses (1 executive, 4 professional, and 4 paraprofessional) is opening next January.

To give you a flavor of the attention to this planning effort, I'd like to relate to you the words of one of the U.S. consultants to this program. He is Dr. Aman, an Egyptian who is dean of the information science faculty of the University of Wisconsin in Milwaukee. After participating in the planning effort with Egyptian faculty for 3 days, Dr. Aman came to see me and on his own volunteered the comment that the objective and scope of the project, the excellence of the faculty, the complex screening of the applicants, the detailed preparation of instructional materials, the attention to logistic details, the preparation of tools for monitoring and evaluation of students as well as faculty, and the trainee follow-up procedures are all unequalled in any training program in this region. I should add that Dr. Aman has been responsible, for example, for the development of the Arab Documentation Centre in Tunis.

Unfortunately, in the early advertising of this training program and without our knowledge, the subcontractor has used less than good judgment with respect to giving credit for the sources and resources of this program. We have communicated our sentiments to the subcontractor, and I understand that the more recent advertisements correct the impressions of the earlier ones. The incident is regrettable, of course, even though none of us have had any knowledge of the subcontractor's intentions.

Infrastructure

Finally, the last category to report on is the development of the Egyptian infrastructure for the Egyptian STI program and system. The importance of this area is crucial, and we continue emphasizing it at every JCC meeting and in contractual correspondence. I would like to imply the status of this area indirectly by urging most sincerely the following: FIRST, the establishment of the organizational framework necessary to provide Egyptian executive management of the Network; SECOND, the establishment within this framework of senior executive positions, both career and advisory, both full-time and part-time; THIRD, the identification and appointment to these positions of appropriate individuals; and FOURTH, the delegation to these persons of an increasing range of responsibility and authority.

This Egyptian Network management organization must gradually take over the Contractor's planning and coordinating functions, and assume Network management and direction. The Contractor of course must interact with this organization and its staff, initially in a tutorial mode, later in a consulting mode, both in Egypt and the U.S.; but the time remaining for such an interaction is already suboptimal.

Summary

In summary, Mr. Chairman, the STI project design and its implementation plan continue to provide a viable goal and an adequate mechanism for the development of the Egyptian National STI Network. The effort has now entered a critical stage, in that further progress and ultimate success depend on giving the Network and its public services an Egyptian institutional structure, delegating to it managerial responsibility, and providing it with flexible administrative apparatus. The two parallel actions that are strongly indicated are: 1) concluding formal agreements between the ASRT and the respective sectoral agencies, and 2) institutionalizing and staffing an Egyptian entity for Network coordination and management.

Thank you very much.

ATTACHMENT A

ANNEX III

AGENDA

Twelfth Meeting, Joint Consultative Committee
Applied Science and Technology Research Program
Egyptian Academy of Scientific Research and Technology (ASRT)
National Research Center (NRC/Cairo)
U.S. National Academy of Sciences/National Research Council (NAS/NRC)

ASRT, 2nd Floor
101 Kasr El Aini Street
Cairo Egypt

Saturday, November 19, 1983
Morning Session

9:30 a.m.	Welcome	Ibrahim Badran
	Response	Gilbert White Chairman, U.S. Panel
	Remarks	Howard Lusk Associate Director AID-Cairo
		John Hurley, Director NAS Board on S&T for Int'l Development
9:45 a.m.	NRC Status Report	Mohamed Kamel Director NRC
10:00 a.m.	Administrative Management Report	A. S. El Nockrashy General Coordinator Applied S&T Program
10:15 a.m.	NAS/NRC Report and General Overview	Leo Packer NAS/NRC Resident Program Manager, Cairo
10:30 a.m.	Break for Coffee	
10:45 a.m.	Land Reclamation Joint Group Report and Discussion	Coordinators Gilbert White Mostafa El-Gabaly
12:30 p.m.	Luncheon honoring JCC members	

Afternoon Session

2:30 p.m.	Management Implications of 5-Year S&T Program of ASRT	A. Adel Latif
3:30 p.m.	Technology Policy for Egypt Summary Report Comments, Discussion and Recommendations	Ibrahim Helmy Essam Galal Ibrahim Badran Gilbert White
5:00 p.m.	Adjourn	

Sunday, November 20, 1983

Morning Session

9:30 a.m.	Final Project Reports	
	- Phosphate	R. Boulos
	- Wool Wax	A. Kantoush
	- Corrosion in Petroleum Refineries	A. El-Hosary
10:15 a.m.	Progress Reports	
	- Red Sea Fisheries	A. Abdel Latif
	- Bentonite	A. Abdel Azim
	- Pharmaceuticals	B. Fayez
10:45 a.m.	Demonstration Projects	
	- More and Better Food	O. Galal
	- Biogas	M. El-Halwagi
11:15 a.m.	Project Discussion	
12:00 Noon	Instrumentation Technology	M. Shaloot, ASRT Cairo E. Falk, U Wisconsin Madison
12:15 p.m.	Standards & measurements	A.F.Dawoud, NIS Cairo K. Heinrich, NBS Washington
12:30 p.m.	Scientific & Technical Information System	A. Abdel Baset V. Slamecka
12:45 p.m.	Lunch	

Afternoon Session

2:00 p.m. Supporting Projects
 Discussion

2:30 p.m. Status Report on Regional Ibrahim Badran
 Research Centers

3:00 p.m. Executive Session
 Preparation of Conclusions
 and Recommendations

5:00 p.m. Adjourn

Monday, November 21, 1983

1:30 p.m. Executive Session
 Discussion of Conclusions
 and Recommendations

5:00 p.m. Adjourn

ATTACHMENT A

ANNEX IV

List of Participants, Invited Guests, and Observers

Twelfth Meeting
Joint Consultative Committee
Cairo, Egypt

November 19-21, 1983

Egyptian JCC Members

Dr. Ibrahim Badran
President, Academy of Scientific Research and Technology (ASRT)
Ex-Minister of Health, President, Cairo University

Dr. Abdel Aziz Hegazy
Counselor, ASRT
Ex-Prime Minister, Prof. Faculty of Commerce and Economics
Cairo University

Dr. Hassan Ismail
Counselor, ASRT
Ex-President ASRT, Minister of Education, President, Cairo
University

Dr. Mostafa El Gabaly
Counselor, Minister of Agriculture
Ex-Minister of Agriculture and Land Reclamation
Prof. Soil Science, Alexandria University

Dr. Mohamed El-Kassas
Professor of Botany, Cairo University, and Counselor, ASRT
President Bureau of Environmental Council

Dr. Ibrahim H. Abdel Rahman
Ex-Minister of Planning
Now Advisor to the Prime Minister

U.S. JCC Members

Dr. Gilbert White
Institute of Behavioral Sciences
University of Colorado

Dr. George Bugliarello
President, Polytechnic Institute of New York

Dr. Mary E. Carter
Associate Administrator, Agricultural Research Service
U.S. Department of Agriculture

Dr. James Hillier
International Consultant

Dr. Leo S. Packer (ex officio)
NAS/NRC Resident Program Director in Egypt

Egyptian Advisors

Dr. Mohamed Kamel
Director, National Research Centre (NRC/Cairo)

Dr. M. B. E. Fayez
Vice President, ASRT

Dr. A. F. Abdel Latif
Vice President, ASRT

Dr. Yehia Kabil
Cultural Counselor and
Director, Education Bureau
Embassy of Egypt in Washington

Dr. Essam Galal
Advisor to the President, ASRT

Dr. A. S. El Nockrashy
Director, International Secretariat, ASRT and
General Coordinator, Applied Science and Technology Research Program

Dr. Osman Galal
Head, Child Health Laboratory, ASRT and
Director, National Institute of Nutrition

Egyptian Principal Investigators and Program Monitors

Dr. Adel Abdel Azim
Director, Central Metallurgical Research and Development Institute
Principal Investigator, Bentonite Clay Project

Dr. Fouad Sobhy
Director, Organization for Standardization and Quality Control

Dr. M. El Halwagi
Head, Pilot Plant Laboratory, NRC/Cairo
Principal Investigator, Biogas Technology Project

Dr. A. A. Hosary, and
Dr. Talaat Saber, Co-Principal Investigators
Corrosion in Petroleum Refining

Dr. A. A. Kantoush
Principal Investigator, Wool Scouring and
Wool Wax Project

Dr. Refaat Boulos
Principal Investigator
Phosphate Ore Project

Eng. M. Shaloot
Instrumentation Project Director, ASRT

Eng. Fouad Ragheb
Manager of Procurement ITU

Mr. Ahmed Abdel Basset
Information Systems Technology Project Director, ASRT

Dr. M. H. Fadl
Program Monitor, Science and Technology, ASRT

Dr. Dia Hassanien Ali
Program Monitor, Science and Technology, ASRT

Dr. Hatem Mohamed Ali
Program Monitor, Science and Technology, ASRT

Dr. Nabil Saleh
Supervisor, MBF Testing Laboratory, NRC/Cairo

Dr. M. Kassem
Supervisor, MBF Testing Laboratory, NRC/Cairo

Dr. Ahmed Naguib
Head, Central Administration, Centralized Research
Councils, ASRT

Agency for International Development

Dr. Howard Lusk
Associate Director, Human Resources Development Cooperation
USAID Mission in Cairo

Dr. Robert Mitchell
Head, AID, Science and Technology Division
USAID Mission in Cairo

Dr. Sherif Arif
Science and Technology Division
USAID Mission in Cairo

National Academy of Sciences

Mr. John Hurley, Director
Board on Science and Technology for International Development

Mr. Jay Davenport
Senior Officer, Egypt Program, BOSTID

Mr. Augustus Nasmith, Jr.
Staff Officer, Egypt Program, BOSTID

National Bureau of Standards

Dr. Kurt Heinrich
Chief, Office of International Relations

National Institute of Health

Mr. Howard Metz
Head, Biomedical Engineering and Instrumentation Branch

Georgia Institute of Technology

Dr. Vladimir Slamecka
School of Information and Computer Science

University of Wisconsin (Madison)

Mr. Edward Falk
Instrumentation Systems Center

Special Observers

Mrs. Nina Vreeland, USAID/Washington
Team Leader, Science and Technology (S&T) Project Evaluation

Prof. Michael Radner, Director, Center for the Interdisciplinary
Study of Science and Technology, Northwestern University, Evanston,
Illinois, USA
Team member, S&T Project Evaluation

Mr. Ross Thomas, Private Consultant, Formerly Deputy Chief Human
Resources, Science and Technology, Bureau for Near East,
AID/Washington
Team member, S&T Project Evaluation

TRAVEL FROM EGYPT

October 1 - December 31, 1983

NAME	DATE	PURPOSE	PLACES VISITED
<u>INVESTIGATION AND EVALUATION OF EGYPTIAN BENTONITES</u>			
1. Adel Abdul-Azim Director, Central Metallurgical R&D Institute (CMRDI), Cairo	October 1-15	Meet with leading U.S. bentonite industries re R&D and marketing of bentonite clays, observe production scale mining operations, study chemical conversion of bentonites	NAS, Washington, D.C. American Colloid Corporation, Skokie, Illinois, and Belle Fourche, South Dakota International Minerals & Chemicals Corp., Mundelein, Illinois, and Colony, Wyoming
2. Tawfik Refaat Boulos, Research Professor, CMRDI	"	Discussions re future training opportunities	Haydn Murray, Project advisor, Dept. of Geology, Indiana Univ., Bloomington, Indiana Colorado School of Mines Research Institute, Golden, Colorado
3. Abdel Kader Atia, Staff Scientist, CMRDI	"	Discussions re R&D Manage- ment workshop to be held in Cairo	Denver Research Institute, Denver, Colorado
		Training on x-ray diffrac- tion methods for classifi- cation of clay minerals (Dr. Atia only)	Department of Geology, Indiana University
		Discussions re mineral beneficiation for project and additional activities for phosphate project (Drs. Abdul Azim and Boulos)	International Fertilizer Developmen Center, Muscle Shoals, Alabama

<u>NAME</u>	<u>DATE</u>	<u>PURPOSE</u>	<u>PLACES VISITED</u>
<u>R&D MANAGEMENT SYSTEMS</u>			
4. Farouk M. Taleb Specialized Research Council ASRT	Oct. 20 - Nov. 13	Attend Workshop on R&D Project Management	Denver Research Institute, Denver, Colorado
5. Abdel Hamid Agha NRC and ASRT Sinai Project	"	"	"
6. Zein A. Shoeb Chairman, Department of Food Science NRC	Nov. 10 - Dec. 11	Attend Workshop on R&D Institute Management	Denver Research Institute, Denver, Colorado
7. Mohamed I. Roushdi Secretary General Petroleum Research Institute	"	"	"

TRAVEL TO EGYPT

October 1 - December 3 , 1983

NAME	DATE	PURPOSE
<u>PROGRAM MANAGEMENT</u>		
1. Jay Davenport Staff Officer, BOSTID	Nov. 10-Dec. 5	Program planning and management, JCC-XII meeting, S&T Policy Seminar
2. Augustus Nasmith Jr. Staff Officer, BOSTID	Nov. 10-23	Program planning and management, Land Reclamation Seminar, JCC-XII meeting
3. John Hurley Director, BOSTID	Nov. 14-23	JCC-XII meeting, S&T Policy Seminar
4. Gilbert White Chairman, U.S. JCC panel	Nov. 16-23	JCC-XII meeting, S&T Policy Seminar
5. George Bugliarello Member, JCC	Nov. 12-23	JCC-XII meeting, S&T Policy Seminar
6. Mary E. Carter Member, JCC	Nov. 15-23	JCC-XII meeting, S&T Policy Seminar
7. James Hillier Member, JCC	Nov. 14-23	JCC-XII meeting, S&T Policy Seminar
<u>SCIENCE AND TECHNOLOGY POLICY MEASURES</u>		
8. A. Rahman National Institute of Science, Technology & Development Council of Scientific and Industrial Research (CSIR) New Delhi, India	Nov. 15-18	S&T Policy Seminar
9. Delwin A. Roy Development Decisions Internatl. Atlanta, Ga.	Nov. 15-18	S&T Policy Seminar

<u>NAME</u>	<u>DATE</u>	<u>PURPOSE</u>
<u>NEW CROPS FOR ARID AND SEMI ARID LANDS/LAND RECLAMATION</u>		
10. J. A. Allan School of Oriental and African Studies University of London London, England	Nov. 15-20	Land Reclamation seminar
11. Wilfred R. Gardner Head, Dept. of Soils, Water, and Engineering University of Arizona Tucson, Arizona	Nov. 15-20	Land Reclamation seminar
12. Robert M. Hagan Dept. of Land, Air and Water Resources University of California/Davis	Nov. 15-20	Land Reclamation seminar
13. Jan Van Schilfgaard Director, U.S. Salinity Laboratory Riverside, California	Nov. 15-20	Land Reclamation seminar
<u>DEVELOPMENT AND APPLICATION OF BIOGAS TECHNOLOGY IN RURAL AREAS OF EGYPT</u>		
14. T.B.S. Prakasam Metropolitan Sanitary District of Greater Chicago Cicero, Illinois	Dec. 23-Jan. 5, 1984	Conduct technical training course on Application of Microbiological and Biochemical Principles to the Design and Operation of Biological Waste Treatment Systems
<u>INVESTIGATION AND EVALUATION OF EGYPTIAN BENTONITES FOR INDUSTRIAL APPLICATIONS</u>		
15. Haydn H. Murray Chairman Department of Geology Indiana University Bloomington, Indiana	Dec. 2-9	Review project progress, examine bentonite activation operations in pilot plant stage, consider techno-economic feasibility