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APPLIED SCIENCE AND TECHNOLOGY RESEARCH IN EGYPT

SEMIANNUAL REPORT

January 1979 - June 1979

Contract No. AID/NE-C-1474

Project No. 263-0016

Board on Science and Technology
For International Development

Commission on International Relations

National Academy of Sciences-National Research Council

NATIONAL ACADEMY OF SCIENCES

Washington, D.C.

This is the third semiannual report of Contract AID/NE-C-1474, Applied Science and Technology Research in Egypt, covering the period January 1979 - June 1979. The report has been prepared by the staff of the National Academy of Sciences-National Research Council for the Agency for International Development.

CONTENTS

I

EXECUTIVE SUMMARY

In late March 1979, the Third Meeting of the Joint Consultative Committee (JCC) for the Applied Science and Technology Program was held at the Academy of Scientific Research and Technology (ASRT) in Cairo, Egypt. The program is jointly funded by the governments of the Arab Republic of Egypt and the United States of America, with a U.S. contribution of approximately $8.1 million and L.E. 895,000 from the Agency for International Development. Participation of the National Academy of Sciences-National Research Council (NAS/NRC) is made possible under contract AID/NE-C-1474. (A summary report of the Third JCC Meeting may be found in Annex A of this document.)

Among the other major activities for the January-June 1979 reporting period were:

-- Initiation of research and development (R&D) management training workshops at the Denver Research Institute, Denver, Colorado. Thirteen participants from Egypt came to the United States for the first workshop on R&D management methods. The participants included senior scientists, engineers, and technical-administrative persons from ASRT, NRC/Cairo, the Petroleum Research Institute, and the Faculty of Agriculture of the University of Cairo.

-- Visits by U.S. panels to Cairo for the demonstration projects on biogas technology and new crops for arid zones.

-- Visits by a U.S. panel to Cairo for the R&D projects on phosphate ore beneficiation and corrosion; visits to Cairo by an advisor for the projects on wool wax recovery and Red Sea fisheries.

-- Continuation of the More and Better Food Project with selection of the two villages where field trials will be conducted for the nutrition and farm systems activities.

-- Initiation of detailed project review and evaluation studies as part of Phase II planning.

II

INTRODUCTION

In May 1975, the Academy of Scientific Research and Technology of the Arab Republic of Egypt (ASRT), the United States National Science Foundation (NSF), and the United States National Academy of Sciences-National Research Council (NAS/NRC) jointly conducted a workshop on science and technology policy, research management, and planning in Egypt. From that workshop came a series of recommendations that led the ASRT and the United States Agency for International Development (AID) to enter in March 1977 into a formal program agreement to strengthen the management of research and development (R&D) resources in science and technology directed toward implementing Egypt's development goals. Both ASRT and AID invited the NAS/NRC and the NSF to join with them in this endeavor. The joint task is identified as the Applied Science and Technology Program.

Activities began in May 1978 with the first meeting of a Joint Consultative Committee (JCC) in Cairo. For purposes of program funding and administration, the effort is divided into two periods, Phase I, from October 1978 to October 1980, and Phase II, which, if approved, will continue until October 1983.

This is the third semiannual report of the Applied Science and Technology Program. It was prepared by the staff of the Board on Science and Technology for International Development (BOSTID) of the NAS/NRC under its contract AID/NE-C-1474 and covers the period January 1 - June 30, 1979. It relates those activities for which NAS/NRC is contractually responsible to program elements of:

-- Policy Planning and Management;

-- Research Project Support;

-- Demonstration Project Support; and

-- Planning for Phase II.

Activities under the further program elements of (a) science and technical information systems and (b) equipment procurement (including equipment maintenance and repair) are reported separately by NSF under the terms of its participating agency agreement with AID. Additional information for the January - June 1979 reporting period is found in the following annexes to this report:

Annex A: Third Meeting, Joint Consultative Committee, Applied Science and Technology Program, Cairo, May, 1979

Annex B: Participants, First R&D Management Workshop, Denver Research Institute, June 18 - July 7, 1979

Annex C: Travel for Program Planning, R&D Management and Technical Consultation

III

PROGRAM HIGHLIGHTS

A. Policy Planning and Management

1. Third Meeting, Joint Consultative Committee

The Joint Consultative Committee held its Third Meeting on March 28-29, 1979, at the Academy of Scientific Research and Technology in Cairo. The accomplishments of the program were reviewed and future initiatives were recommended. A report of the third JCC meeting, previously sent to AID/Cairo by the ASRT, is attached (Annex A).

2. Research and Development (R&D) Management Education

The implementation of the R&D management education component of the ASRT-NAS/NRC program began with the signing on May 1, 1979, of a contract between the NAS/NRC and Denver Research Institute (DRI) of Denver, Colorado. Under the terms of this contract, which runs through April 30, 1980, four workshops will be held at DRI in the areas of management methods, technical economics, technology assessment, and R&D marketing methods. Following the completion of these four workshops, related courses will be given in Cairo, with the participation of DRI and Egyptian staff.

The first workshop, R&D Management Methods, was held June 18 - July 7, 1979, and was designed for senior staff, laboratory directors, and program coordinators of the ASRT and NRC. Thirteen participants attended (see Annex B). The workshop focused on contemporary R&D management practices, with special emphasis on planning, organization, control and evaluation. Topics included participatory planning, staff development,

evaluation of personnel, marketing, feasibility studies, proposal preparation, report preparation, information services, and control theory.

In addition to the formal training at the workshop, the participants were afforded the opportunity to visit various U.S. universities and institutions for further observation and study (see Annex C).

3. Resident Advisor: National Research Centre

Helmut H. Weldes arrived in Cairo on January 1, 1979, to assume his position as Senior Resident Adviser to the Egyptian National Research Centre (NRC/Cairo) for the Applied Science and Technology Program. Dr. Weldes appointed as his Administrative Assistant M. H. Comaa. With a background in electronics and nuclear engineering, Mr. Comaa brings to the position his experience of twenty-five years with the United Nations. The staffing of the Senior Advisor's office was completed with the addition of Miss Hoda Amin Kamel as bilingual secretary and Mostapha Said Bilal as driver-messenger.

Following discussion with the directors and senior staff of the NRC/Cairo, Dr. Weldes outlined a suggested Management by Objectives, Management by Results - Incentives System adapted to meet the special needs of NRC/Cairo and to aid in strengthening the planning and management of R&D activities.

Dr. Weldes has been actively involved in Phase II planning and attended the planning sessions in Washington in June.

To facilitate and simplify the process of airline ticketing and the payment of per diem and local expenses, an Egyptian pound account was established under the administrative management of Dr. Weldes.

4. Resident Advisor: Academy of Scientific Research and Technology

During the early months of 1979, H. Guyford Stever and A. M. Abou El-Azm continued to discuss how the need for a resident advisor at the ASRT might best be resolved. On the one hand the advisory position was perceived as requiring a person who could work with the Academy president and other cabinet-level statesmen on Egyptian science policy planning. The NAS/NRC sought for one year to recruit from the United States a scientist/engineer of broad experience to fill such a role. Unfortunately, it was not possible to find a candidate who could devote the required time to that important task.

A second perspective of the advisory task role is that of a scientist/engineer to work within ASRT on R&D grant management, relations with universities, scientific and technical manpower assessment, and resource planning related to national development priorities. Several candidates for this set of activities were identified and interviews begun.

At the close of the reporting period, NAS/NRC recommended to Dr. Abou El-Azm that the recruitment of a resident advisor to the ASRT be deferred to Phase II of the program.

B. Research and Development (R&D) Projects

1. Evaluation of Egyptian Phosphate Ores

In early April 1979, a three-member panel of U.S. scientists and engineers met with Egyptian counterparts from the Ore Beneficiation and Chemical Processing Laboratory of NRC/Cairo to discuss the R&D work program for the Egyptian Phosphate Ores project and to review equipment

needs. The laboratory capability includes mineral dressing, ore beneficiation, and applied chemical technology in dealing with Egyptian phosphates for fertilizer manufacturing. The U.S. panel included:

James E. Lawver, Technical Manager, International Minerals & Chemical Corporation, Bartow, Florida

James R. Lehr, Senior Scientist, National Fertilizer Development Center, Tennessee Valley Authority, Muscle Shoals, Alabama

Owen W. Livingston, Director, Fertilizer Technology Division, International Development Center, Muscle Shoals, Alabama

A fourth U.S. panelist, Douglas W. Fuerstenau, Chairman, Department of Materials Science and Mineral Engineering, University of California, Berkeley, was unable to join the group in Egypt for the April project planning sessions; Dr. Fuerstenau is expected to visit the laboratory in October 1979.

Egypt, with a population exceeding 40 million persons and a population growth of 1 million per year, is faced with the tremendous task of increasing efficiency and productivity on its limited agricultural lands. With only 3 percent of the total land area of the country currently in crops, new fertilizer types, compositions, and grades are required, with special emphasis on providing phosphorus and potassium. The NRC/Cairo Ore Beneficiation and Chemical Processing Laboratory has undertaken a major R&D program to assist industry in the assessment of phosphate fertilizer production so essential to Egyptian agriculture. The program, entitled, "The Evaluation of Egyptian Phosphate Ores for Wet Process Phosphoric Acid and Phosphate Fertilizer Production," consists of three interrelated steps:

-- Laboratory assessment of technological beneficiation problems on a variety of phosphate ores from the Nile Valley and eastern and western deserts;

-- Pilot-plan design studies of beneficiation of the ores based upon laboratory results; and

-- Laboratory technical and economic studies of chemical processing of beneficiation ores to produce products suitable for fertilizers.

Although assessment of technological beneficiation problems for some Egyptian phosphate ores have been undertaken and other studies are continuing, the panel found that additional equipment was needed and that training for key staff in technical-economic evaluation of both beneficiation and chemical processing was desirable. To achieve highly applicable results, the group needs to use a multidisciplinary approach and incorporate skills from mining engineering, mineralogy, agronomy, and hydrology, as well as from chemistry, chemical engineering, and economics. A strong industry-based, market-oriented focus will be required to integrate the variables of raw material composition and desired fertilizer type.

The joint Egyptian-U.S. group outlined a minimum list of laboratory equipment needs. While equipment is being specified, bids taken, and orders placed, key laboratory personnel will be given training at the International Fertilizer Development Center, Muscle Shoals, Alabama.

2. Wool Wax Recovery, Processing, and Marketing in Egypt

When marketed, raw wool contains from 20 percent to 60 percent by weight of contaminating materials that must be scoured before the wool

can be used in textiles. Scouring with detergents and sodium carbonate in hot water removes an oil soluble group of chemicals termed "wool wax," a water-soluble group of chemicals termed "suint," and ordinary dirt. Wool wax may be separated from the scouring liquor either by centrifugation or by neutralization with sulfuric acid.

Crude wool wax is a sticky material that melts at about 40°C and may be used directly as a softening agent in applications not demanding high quality. More useful and marketable products, however, are obtained when the wool wax is washed, dried, bleached, decdorized, and neutralized in successive steps to obtain neutral wax, technical lanolin, U.S.P. pharmaceutical-grade lanolin, and U.S.P. cosmetic-grade lanolin.

Misr Beida Dyers Company in Alexandria is a public corporation that imports wool from Australia and New Zealand. It is also Egypt's largest finisher of cotton cloth with a capacity (in 1978) of 150 million square meters per year and is at present undergoing an expansion to 200 million square meters. About 8,000 metric tons of wool per year is imported and processed. Only 300 metric tons of crude wool wax are recovered, and these are exported at relatively low prices. With more efficient recovery methods another 300-400 metric tons of wool wax per year could be saved. The projected total (about 600-700 metric tons per year) is a potentially valuable by-product of the wool-textile industry.

Chemists and engineers from the Misr Beida Dyers Company and NRC/Cairo have collaborated in the design of an applied R&D project whose goals are:

-- Developing and testing an improved scouring process that will permit recovery of a consistently high-quality wool wax;

-- Determining markets in Egypt for the increased production of wool wax and assessing potential markets for lanolin; and

-- Investigating the possibilities for economical recovery of the now wasted "suint" and determining a market for the chemicals it comprises.

The wool wax project is a relatively easily applied R&D activity involving laboratory research to define a suitable recovery process, adaptation to continuous operation in the Misr Beida Dyers factories, institution of process and quality-control measures to ensure a high-quality product, and market analysis to undergird sales and build demand. A joint Beida Dyers-NRC/Cairo team has been formed, with the general manager of Beida Dyers as the project manager.

After arrival of some specialized laboratory and developmental equipment and instrumentation, the project is expected to require 18-24 months for its successful completion. During this reporting period, a work plan was prepared and reviewed with the critical assistance of Louis Mizell, International Wool Secretariat, Wool Bureau Technical Center, New York. Mr. Mizell went to Egypt in January at the invitation of the American Chemical Society (ACS) under an agreement for technical cooperation on projects of joint interest to ACS and NRC/Cairo. Gordon Bixler, ACS International Division, accompanied Mr. Mizell on the project design visit and assisted in the preparation of the joint U.S.-Egyptian report for that mission.

3. Corrosion Causes and Control

The corrosion project has two major objectives:

-- Development of corrosion inhibitors based mainly on domestic raw materials, and designed to alleviate problems in petroleum refining; and
-- Establishment of a modern, well-equipped corrosion laboratory at NRC/Cairo, which will be a resource for technical consultation to Egyptian industry on practical problems in metal corrosion.

The project was originally designed to be a three-year activity of the Electrochemistry and Corrosion Laboratory, NRC/Cairo, and to include such sub-elements as:

-- Evaluation of corrosion problems encountered at the Suez Company for Petroleum, development of possible solutions, and testing of these solutions on-steam in the refinery;
-- Basic laboratory studies of pitting corrosion, galvanic corrosion, and special corrosion behavior of Egyptian fabricated steel;
-- Development of corrosion inhibitors from domestic raw materials; and
-- Development and implementation of corrosion-monitoring training courses for both academic and industrial corrosion engineers.

In January 1979, a two-member advisory group from the United States traveled to Egypt for discussions about the corrosion project design and needs for equipment at NRC/Cairo and to help in drawing up a project R&D schedule. The U.S. scientists were Henry Leidheiser, Director, Center

for Surface and Coatings Research, Lehigh University, Bethlehem, Pennsylvania, and Earl Snavely, Jr., Mobil Research and Development Corporation, Dallas, Texas. Also accompanying Drs. Leidheiser and Snavely was Gordon Bixler of the American Chemical Society. It was the joint ACS-NRC/Cairo symposium on applied chemistry in 1977 that originally identified corrosion in petroleum refining as a critical R&D need in Egypt.

During the JCC meeting it became evident that the project was too extensive for a three-year period. Unfortunately, the project director from NRC/Cairo was away from Egypt on sick leave during much of the report period (January - June 1979). In June, however, a decision was made to evaluate the project in terms of those activities having highest priority and greatest opportunity for implementation. A. A. Abdul-Azim, Director of the NRC/Cairo Central Metallurgical Research and Development Institute, undertook, on an interim basis, to assist in the project redesign.

4. Development of Red Sea Fisheries

At its meeting in November 1978, the JCC approved the proposed Development of Red Sea Fisheries project for inclusion in the program, with the recommendation that there be a joint review of the proposal by U.S. and Egyptian experts. The decline of catches from the Mediterranean and the lack of adequate knowledge of Red Sea fisheries potential (especially beyond the Gulf of Suez) make surveys and appropriate commercial development of the area an important component in efforts to fulfill Egypt's food requirements.

Alonzo T. Pruter of the Northwest and Alaska Fisheries Center visited Egypt in early April 1979 to consult with officials and researchers of the ASRT Institute of Oceanography and Fisheries and others concerned with the project. Mr. Pruter, in addition to endorsing the conceptualization and rationale, pointed out that if properly executed the project could serve as a model for fisheries development and proper management of all Egypt's marine and freshwater fisheries. Cooperation among relevant ministries, the commercial fishing industry, and other fisheries projects was stressed. Initial requirements for launching the project (which is to begin by surveying the Foul Bay area) were selection of the principal investigator, formation of a research team, assessment of vessel hire costs, clarification of equipment needs, and reevaluation of budget requirements. The Institute of Oceanography and Fisheries worked on these requirements in May and June, and an equipment request has been transmitted.

C. Demonstration Projects

1. More and Better Food

The Executive Committee for the More and Better Food Program appointed by the Director, NRC/Cairo, continues to meet monthly for coordination of the three major sub-elements of the program. These sub-elements are:

-- Studies of agricultural and animal resources for the two participating villages;

-- Nutrition studies of the traditional diet within the selected villages, particularly for nursing mothers and children from infancy through primary school age; and

-- Food industry projects related to cottonseed oil and the manufacture of Damietta cheese.

The target villages have now been selected. They are Kafr El-Khadra in the Delta and Omar Makram, a new settlement outside the Nile Valley.

Perhaps the most important concept of the More and Better Food project is its multidisciplinary and multidimensional scope. In addition to NRC/Cairo participation, the village and nutritional studies include cooperation from the Governorates and the Ministries of Land Reform, Agriculture, and Health, and the Organization for Reconstruction and Development of Egyptian Villages, as well as representatives from the two villages. Food-technology projects involve the Ministries of Health and Industry and Commerce, the cottonseed oil manufacturing company at Badreshene, and the cheese factory of Misr Dairy Company at Damietta.

Technical progress reports on projects related to the farming system (village studies), human nutrition, refining of color-fixed cottonseed oil, and utilization of low-fat skim milk in cheese manufacturing were presented for the third JCC meeting. Copies of these reports have also been submitted to AID/Cairo by NRC/Cairo and are available either from Cairo or NAS/NRC Washington.

2. The Development and Application of Biogas Technology in Rural Areas of Egypt

Following approval by the JCC in November 1978 for this demonstration project, which is to be managed by the ASRT, an ad hoc NAS panel (now an advisory committee) met in Cairo in January 1979 to work with Egyptian counterparts in elaboration of the project proposal.

Mokhtar El-Halwagi, Head of the Pilot Plant Division of NRC/Cairo, is the principal investigator for the project. Philip R. Goodrich, Department of Agricultural Engineering, University of Minnesota, chairs the three-person NAS advisory committee.

The project will demonstrate the feasibility of introducing biogas technology to the rural areas of Egypt as a renewable alternative source of energy which, through the utilization of human, animal, and agricultural wastes, also provides fertilizer and promotes sanitation. At its meeting in March 1979, the JCC approved the final project proposal* (which reflected the joint Egyptian-American discussions in January) and expressed satisfaction with the initial activities described in the first progress report.*

In the first six months of 1979 the project groups focused on fact-finding and survey efforts, laboratory and bench-scale research, developing prototype models and an experimental digester at the NRC/Cairo, fundamental biological work, and fertilizer evaluation research. Sociological factors were introduced at the start of the project and the two demonstration villages (a "new" village in Tahrir Province and a traditional village in Giza Province) were selected. Plans were also made for a four- or five-person Egyptian team to visit Asia (India, China, Bangladesh, Thailand, and perhaps one or two other countries) to observe the experience gained in the introduction and adaptation of biogas technology to those areas in the past 20 years. It is anticipated that a member of the NAS/NRC advisory committee will join the Asian study survey, which is scheduled for October - November 1979.

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*Document previously transmitted to U.S. AID.

In mid-June 1979, Drs. Goodrich and Harold Capener (Department of Rural Sociology, Cornell University), members of the NAS advisory committee, met in Washington with A. S. El-Nockrashy, coordinator for the ASRT, to review the project's status. The NAS/NRC committee members felt the activity was well on course and stressed the importance of the Asian field study trip. Because of the project's development and the fact that there would be an NAS/NRC committee member on the fall 1979 trip, it was deemed unnecessary to schedule the next meeting of the joint committee for the project before January 1980.

3. New Crops for Arid and Semiarid Zones

In view of the potential importance for Egypt of the development of new agriculture in arid regions, the JCC recommended in November 1978 that a joint Egyptian-U.S. committee review and elaborate on initial proposals for a project on new crops for arid and semiarid zones. An NAS/NRC ad hoc panel chaired by Cyrus McKell of the Institute of Land Rehabilitation, Utah State University, visited Cairo in January 1979 for a meeting with Egyptian colleagues. The meeting was chaired by Yussef Wally, a member of the JCC and advisor to the Minister of Agriculture. The NAS/NRC panel report emphasized that to demonstrate the feasibility for Egypt to introduce new crops under arid land conditions, a high degree of organizational skill, technological innovation, and effective use of land equipment and human resources will be essential, regardless of the potential of the plants themselves.

After consideration of a revised core project proposal and various ancillary proposals at its March 1979 meeting in Cairo, the JCC

recommended an allocation of $300,000 for the project for the remainder of Phase I and an emphasis on nonconventional crops. An Egyptian project executive committee has been appointed, with Dia Al-Din Hassanen of the ASRT as coordinator and M. El-Bankouky of Al-Azhar University as chairman. Institutions with major responsibility for project execution are Al-Azhar University, Ain Shams University, and the Agricultural Research Division of the National Research Centre.

Two sites have been selected for project implementation: Kom Osheim in El-Fayoum Governorate, where the focus will be on cultivation of jojoba, and a site in the New Valley, where euphorbia crops will be grown. Cooperation of both governorates has been noteworthy, and 40 acres for each site have been allocated for Phase I activities, with a view to expanding to 200 acres in Phase II.

In June 1979 the NAS/NRC prepared for the July visit of Adel El-Beltagy (Ain Shams University) of the Egyptian Executive Committee. Dr. El-Beltagy was scheduled to meet with NAS/NRC panel members and with experts on arid land crop development in numerous U.S. institutions for discussion of site development, plant techniques, seed availability and selection, training, equipment, and other project requirements.

D. Phase II Planning

During the third JCC meeting in Cairo in March 1979, an important topic on the agenda was Phase II planning. The key focus for Phase II is on the orderly development and completion of Phase I projects within the basic goal of the Applied Science and Technology Program, that is,

the strengthening of R&D management systems in Egypt. As presented by the ASRT, the strategy for Phase II should be as follows:

-- To complete ongoing activities from Phase I, which include (a) demonstration projects: More and Better Food, Biogas Technology for Rural Development, and New Crops for Arid and Semiarid Zones, and (b) R&D projects: Phosphate Ores, Wool Wax Recovery, Corrosion, and Red Sea Fisheries;

-- To use the criteria approved by the JCC in May 1978 in the selection of new projects;

-- To assure integration and coordination of the Applied Science and Technology Program with other U.S. AID projects;

-- To continue the Phase I projects of R&D management education, equipment repair and maintenance, and science and technology information systems;

-- To establish an Egyptian national scientific and technical information network which will serve effectively a broad base of universities and research institutes; and

-- To continue strengthening the infrastructure of the national research institutes through upgrading of equipment, facilities, training, and access to consultant services.

A more complete description of the work of the JCC on Phase II planning may be found in Annex A, pages 13-16.

Late in June, A. S. El-Nockrashy and Osman Galal traveled to the United States for program management and planning purposes (see Annex C, pages 1-2 for their itineraries). A series of meetings was held at the NAS/NRC in Washington, with staff representatives from the U.S. National

Academy of Sciences, the National Science Foundation, U.S. AID/Cairo, and the Office of Technical Support, AID Bureau of the Near East (Washington). The group reviewed progress of all ongoing projects and the estimates from the principal investigators of project status as of September 1980 (end of Phase I). Based on that information and the ASRT strategy for Phase II mentioned above, the group arrived at a format for the Phase II planning document; this document must be mailed to all JCC members well in advance of the fourth meeting, scheduled to be held in Washington November 8-9, 1979. The rough draft of the document was taken back to Cairo by Drs. El-Nockrashy and Galal for further discussion with project managers and principal investigators at ASRT and NRC/Cairo. This information will then be used by the staff group in preparing the document circulated to the JCC.

That document will present three program options for consideration:

1. A "maintenance level" (i.e., minimum level) program, complete with budget estimates for the proposed three-year period of Phase II (October 1980 - October 1983).
2. An "optimum level" program, also with budget estimates.
3. An array of "improved level" programs will be suggested for JCC discussion. Improved level implies a mixture of ongoing projects plus new activities in Phase II based upon selections from the optimum level program plan. The staff group recognized that it is the JCC itself that should recommend the mix to ASRT and U.S. AID/Cairo.

The goal of the staff group is to complete its work by mid-September 1979 and to reproduce a document and mail it to JCC members by October 5, 1979.

ANNEX A

STAFF SUMMARY REPORT

THIRD MEETING OF THE
JOINT CONSULTATIVE COMMITTEE
APPLIED SCIENCE & TECHNOLOGY PROGRAM

Cairo, Egypt

March 28-29, 1979

Participating Groups:

Academy of Scientific Research & Technology
Arab Republic of Egypt

U.S. National Academy of Sciences-National Research Council

U.S. National Science Foundation

Report prepared by:

Academy of Scientific Research & Technology
Cairo, Arab Republic of Egypt
May 1979

CONTENTS

I

SUMMARY

The Joint Consultative Committee (JCC) for the Applied Science & Technology Project between the Academy of Scientific Research & Technology (ASRT) of the Arab Republic of Egypt and the United States Agency for International Development (AID) held its Third Meeting on March 28-29, 1979, at the ASRT headquarters in Cairo to review progress in the program and to recommend initiatives for the future. Participants in the meeting included the ASRT, the National Research Centre (Dokki), the U.S. National Science Foundation (NSF) and the U.S. National Academy of Sciences/National Research Council (NAS/NRC). Representatives of the U.S. AID Mission in Egypt were also present. (Appendix A gives the Agenda; Appendix B a list of participants and observers).

Conclusions and recommendations adopted by the JCC were as follows:

I. Management Plan

1. The Joint Consultative Committee (JCC) accepted the basic management plan for the Applied Science and Technology Project and recognized that the Policy Planning and Management Committee should include personnel from universities and other R&D sectors.

2. The JCC requested that it be kept informed of the budget and financial implications of the Applied Science and Technology Program. In particular, the Committee should receive a report of the budget requirements and allocations for each element of the Project.

3. Liaison Officers of the Policy Planning & Management Committee to US AID should also act in a similar capacity to the NSF and NAS/NRC.

4. The JCC suggests that the possibility should be determined for reimbursing the ASRT contract support fund of L.E. 30,000 from the NSF pound budget for equipment, materials and supplies for the ongoing ASRT demonstration and R&D projects, and L.E. 20,000 from the NAS/NRC pound budget for the project support office installations at ASRT and NRC.

5. The JCC recognized the need to utilize efficiently the core equipment and other equipment and instrumentation already purchased under the Applied Science and Technology Project and requested that in purchasing additional equipment every effort be made to eliminate duplication. Furthermore, in determining requirements for new equipment careful attention is to be given to matching specifications with the research and development tasks.

6. The JCC noted difficulties caused by per diem rates and their variability over time which presently exist for participant training in the U.S.A. and the Committee asked both NAS/NRC and NSF to seek an early resolution to the problem.

II. Research and Development (R&D) Management Education

The JCC emphasized the importance of the R&D Management Education element of the Applied Science and Technology Project and urged the earliest possible implementation through the proposed contract with the Denver Research Institute.

III. Instrumentation Project

The JCC recognized the importance to the Instrumentation Project of the proposed contract for training programs and equipment purchase assistance with the University of Wisconsin and urged the earliest possible implementation of that proposed contract.

IV. More and Better Food

The JCC received and approved the second progress report of the More and Better Food Demonstration Project.

V. Bio-Gas Technology

The JCC received and approved the first progress report of the Bio-Gas Technology Demonstration Project.

VI. New Crops for Arid and Semi Arid Zones

The JCC stressed the importance and the high priority for Egypt of the Arid and Semi Arid Zones Project and recommended that:

1. The AID, NAS/NRC and NSF consider the allocation of $300,000 for Phase I implementation.

2. The funding from the Applied Science and Technology Project Number (263-0016) should be restricted to nonconventional crops.

VII. Phosphate Ore Project

The JCC received and approved the first progress report of the Phosphate Ore Project.

VIII. Corrosion Project

The JCC received and approved the project proposal for implementation of the Corrosion Project.

IX. Wool Wax Project

The JCC received and approved the project proposal for implementation of the Wool Wax Project.

X. Red Seas Fisheries Project

The JCC received the report and noted the status of the Red Seas Fisheries Project.

XI. Science and Technology Information

The JCC received the report and noted the status of the Science and Technology Information Project and urged the earliest possible implementation of the proposed contracts.

XII. Project Evaluation Guidelines

The JCC received a report on Phase I project evaluation and recommended that:

1. In addition to the contractually required evaluation which AID will conduct, the JCC itself will make a self-evaluation of the projects in the Applied Science and Technology Program.

2. The guidelines for the self-evaluation include, but are not necessarily limited to, those stated in the Project Grant Agreement (Number 263-0016) between the Government of Egypt and the U.S. Agency for International Development.

3. The support staff in Egypt and the U.S.A. should prepare a report for the Fourth JCC Meeting well in advance of that meeting so that report may be studied and commented upon by the individual members.

XIII. Planning for Phase II

The JCC requested that a summary report be prepared jointly by a committee of the NAS/NRC, NSF, AID, ASRT, and NEC and be submitted to

the JCC members at least one month before the Fourth Meeting. The report is to emphasize:

1. Achievement of Phase 1.
2. The evaluation report (Recommendation XII, No. 3).
3. Priorities for Phase II.
4. Budgetary estimate for new and ongoing projects.

XIV. Technology Innovation

The JCC recognized the importance of work arising from the NAS Advisory Committee on Technology Innovation and requested that a report be submitted at the Fourth Meeting suggesting possible links to the Applied Science and Technology Program.

XV. Fourth JCC Meeting

The JCC agreed that its Fourth Meeting will be held in Washington, D.C. on November 8-9, 1979.

II

INTRODUCTION

The Applied Science & Technology Program is the result of an intensive discussion and planning effort undertaken by the Academy of Scientific Research & Technology (ASRT) and representatives of the United States scientific community together with officials of the U.S. Agency for International Development (AID) and focused upon the desire in Egypt to strengthen its national research and development (R&D) management capabilities and utilize its R&D resources in solving critical economic and social problems. The discussions began in 1975 at the time the U.S. National Academy of Sciences/National Research Council (NAS/NRC) and the U.S. National Science Foundation (NSF) joined the ASRT in holding the Workshop on Science and Technology Policy, Research Management and Planning. By late 1977 the Applied Science & Technology Program plan had been outlined in detail and approved for two years (Phase I) by the Government of Egypt and the United States of America.

The Agreement includes six basic elements:

1. Policy Planning and Management of R&D;

2. Demonstration projects, multidisciplinary in scope, directed to priority areas of development;

3. R&D projects also directed to priority areas;

4. Scientific and technical information systems;

5. Procurement of scientific instruments and equipment; as well as training in their maintenance and repair; and,

6. Planning for years 3, 4 and 5 (Phase II).

A contract between AID and NAS/NRC was signed in December 1977 for the implementation of elements 1, 2 and 3. An interagency agreement between AID and NSF for elements 4 and 5 was completed in 1978. All Egyptian and American parties are jointly responsible for element 6, Phase II planning. The time period for Phase I has been continued until October 1, 1980, with US$8.1 million and Egyptian Pounds 895,000 allocated by AID for those activities. This report covers the activities of the Third Meeting of the Joint Consultative Committee (JCC) held in Cairo, March 28-29, 1979. It summarizes project activities up to that time but more compl accounts of the individual projects are given in separate semi-annual reports prepared by the NAS/NRC and the NSF.

III

REVIEW OF ACTIVITIES

A. Policy Planning and Management

1. Senior Advisors:

The formal program ageement for Applied Science & Technological Research directs the NAS/NRC and the ASRT to select two senior advisors for service at the ASRT and the National Research Centre (NRC/Cairo). Senior advisors are to work with the Egyptian and American participating organizations and with the AID Mission in Cairo in the implementation of all elements of the program. As of January 1979 one of the senior advisors, Dr. Helmut Weldes, was in residence at NRC/Cairo. The senior advisor for the ASRT had not been selected by March 1979.

2. Research and Development Management Education

At the recommendation of the JCC, the NAS/NRC was asked to implement a management training program consisting of courses, workshops and seminars with the Denver Research Institute (DRI) which included the following major elements:

-- Research and Development (R&D) management methods for senior staff, laboratory directors and program coordinators.

-- Technical economics for senior scientists and engineers from the Egyptian National Research Centre (NRC/Cairo), other ASRT associated institutes and laboratories of the ministries of the Egyptian government.

-- Research Marketing methods for senior scientists and engineers of the divisions and laboratories of the NRC/Cairo.

-- Technology assessment training for senior staff from ASRT, NRC/Cairo, deans of engineering and/or science from Egyptian univiersities and senior policy-level officials in science related ministries.

Initially, the training activities are to be accomplished as a two step process: (a) Three week seminars and workshops at the Denver Research Institute for a core group of 8-10 persons, and (b) Two week courses at the NRC/Cairo for larger groups of 40-50 Egyptian participants.

The JCC at its Third meeting in Cairo asked NAS/NRC to expedite contractual arrangements for the DRI program with the view toward initiation of the first seminar/workshop in Denver by early May 1979. (Note: The actual starting date was June 18, 1979).

3. Proposed Management Plan for the Applied Science & Technology Program

A management plan was proposed by the ASRT which, under the overall guidance of the JCC, would provide for:

-- An Egyptian policy planning and management committee responsible to the President of the ASRT,

-- Executive committees in Egypt responsible for detailed technical and management of individual demonstration and R&D projects (i.e. More and Better Food, Bio-Gas Technology, Wool Wax, Phosphate Ores, Corrosion, Equipment, Scientific and Technical Information and eventually Arid Zones and Red Sea Fisheries),

-- U.S. panels to assist in detailed technical and management aspects of the projects (detailed above),

-- Liaison officers from the ASRT and NRC/Cairo who would have administrative oversight of the projects with AID/Cairo. (Note: The Liaison Officer for the ASRT is Dr. A.S. El-Nockrashy and the Liaison Officer for NRC/Cairo is Dr. Osman Galal).

In approving the management plan the JCC suggested the following additions: (a) the Egyptian Policy Planning and Management Committee should include representatives from Egyptian universities and other R&D sectors as well as the ASRT and NRC/Cairo, (b) a report on the budget and finanical implications of the program (both dollars and Egyptian pounds) should be given to the JCC as soon as possible, (c) the Liaison Officers from the ASRT and NRC/Cairo to AID/Cairo would serve in a similar capacity to NAS/NRC and NSF, and (d) reimbursement to the ASRT contract support fund of L.E. 50,000 from the NSF pound budget for equipment, materials and supplies for ongoing research projects and L.E. 20,000 from the NAS/NRC pound budget for cost of office installations and support to the senior resident advisors.

B. Demonstration Projects

1. More and Better Food

Preparations for the More and Better Food Project began even before the formal agreement was signed between the Government of Egypt and the AID for the Applied Science & Technology Program. ASRT assigned project execution to NRC/Cairo where a group was formed to prepare the detailed project plan under three basic R&D elements:

(a) Village studies: The village group includes representatives from NRC/Cairo, Ministry of Local Governorates, Ministry of Agriculture, Ministry of Land Reform, and the Organization for Reconstruction & Development of Egyptian Villages. After completing an overall survey of Egyptian Villages, two were selected: Kafr El Khadra (Dakahlia) and Omar Makram (Tahrir).

- The village group, together with other parties specializing in agriculture and animal resources, are engaged in collecting base line data on the source and characteristics of the food grown in the region of the villages.

- Views have been exchanged during meetings with the governors and authorities of villages under study to facilitate the implementation of improved agricultural practices.

- During Phase I (until 1st October 1980), data will continue to be collected and further studies made on agricultural and animal resources for the purpose of developing these resources.

(b) Nutrition Studies: The first activity undertaken was a general survey of traditional meals and analysis of various diet compositions locally produced for primary school children in Egypt. Participants in the study are: NRC/Cairo Food Laboratory and the Nutrition Institute of the Ministry of Health.

- In its second status report the group included ways and means of collecting data on nutrition and health as well as implementation in the two selected villages.

- During Phase I, detailed studies of the food and health situation in the two villages will take place and projects will be executed relating to the types of malnutrition observed. Additionally, studies are being made of meals offered in schools.

(c) Food Industry: Two projects are simultaneously in progress with the cooperation of production sectors:

- Cottonseed Oil Processing: One of the major problems that faces the oilseed processing industry is the refining of the crude solvent extracted oil to improve its color and general market acceptability. It is a common practice that oil requires several refining operations to reach an acceptable color. This naturally results in a marked increase in the refining losses.

  The project started in June 1978 with a research team from the Fats & Oils Laboratory and the Pilot Plant Testing Unit (both of the NRC/Cairo), as well as representatives of the Badrachin Oil Factory. There are three steps in the work: bench, pilot plant, and full scale (factory) treatment of the oil.

  The bench scale studies at NRC/Cairo in the Fats & Oils Laboratory have been completed. Conditions for treatment of 1.5 kg sample of crude, color-fixed oil to reach a photometric color value of 17-19 (compared to 110 for factory refined) have been elucidated.

At the Pilot Plant scale tests are to be made first on a 15 kg and later a 50 kg batch in refining kettles similar to those of the Badrachin factory. The 15 kg refining kettle has been designed and fabricated.

For the final (full scale) testing a consultant will be needed to assist in scale-up design and operating procedures.

Two reports on the cottonseed oil processing activities are available at NRC/Cairo.

- Problems of Manufacturing Cheese from Low-fat Dried Milk: There is in Egypt a shortage of locally produced fluid milk for manufacturing of the "Damietta cheese," a soft cheese product preferred in the local market. Some producers have substituted imported low-fat dried milk for a part of the ordinary fluid milk in the cheese making process but this has often resulted in a product of somewhat different taste, texture and moisture content. Dairy specialists from NRC/Cairo and the state-owned Misr Milk Company have cooperated in studying the problem since December, 1978. Preliminary findings have been reported but an optimum solution to the problem has not yet been found. Work at the pilot plant stage (NRC/Cairo) continues.

2. Bio-Gas Technology for Rural Development: The Bio-Gas Technology project was approved by the JCC in November 1978 as one of the demonstration projects under the Applied Science & Technology Program. Its implementation has been assigned to the Pilot Plant Division of the National Research Centre/Cairo but the ASRT, through the R&D Division, maintains the management responsibility. The objective is production and use of methane as a renewable energy source for a "typical" Egyptian rural village from human, animal and agricultural wastes.

A first step in the process is the construction at the NRC/Cairo Pilot Plant of a digester to demonstrate feasibility of methane generation. A wide review of similar R&D efforts is being made including experience in India, Pakistan and the People's Republic of China. Results of the initial efforts of the Bio-Gas group were presented to the JCC.

3. New Crops for Arid and Semi-Arid Zones: The ASRT presented a concept paper to the second JCC meeting for a demonstration project on new crops for arid and semi-arid zones of Egypt. The JCC requested that the concept be refined in greater detail and focused upon a more limited range of agricultural products at one or two specific locations. In January 1979 a U.S. panel met in Cairo with a group of Egyptian scientists to review various options.

At the third JCC meeting in March 1979 options for an arid zones project were presented and discussed. While suggesting that an allocation of U.S. $300,000 for Phase I implementation be made available, the JCC directed that a new proposal be prepared stressing work on non-conventional crops (i.e. jojoba, guayule, etc), in not more than two locations.

C. Research and Development Projects (R&D Projects).

1. Beneficiation of Phosphate Ores for Fertilizer Production:

Egypt continues to face a shortage of high grade sources of phosphate ores, however, extensive reserves of low-grade phosphates are available for use in fertilizer production.

The project's aim is, in cooperation with the industrial sector, to study in the pilot plant the technological problems in upgrading phosphate ores, production of phosphoric acid, and utilization of waste products.

In November 1978, the JCC approved the R&D project. The research team submitted its first progress report at the March 1979 session of the JCC.

A group of three U.S. specialists visited Cairo to assist the research team in reviewing the R&D plan and its implementation. Its recommendation was to limit the initial work to two or three ores and to carry the effort through a pilot plant stage in such a manner that production problems may be determined, analyzed and, wherever possible, solved prior to attempting larger scale ore beneficiation - chemical processing tests.

2. Scouring of Wool Wax Project:

At present, no industry for the reclaiming of wool wax exists in Egypt; From the 8000 metric tons of raw wool imported annually about 700 metric tons of high quality wool wax could be processed. Although some 350 metric tons are recovered as low grade material, it is exported at very low prices. Refined wool wax in the form of lanolin and other derivatives are imported at high prices for pharmaceuticals, cosmetics, and other consumer uses.

This R&D project is aimed at developing methods to begin the production of high purity wool wax at the Beida Dyers Factory to fill domestic requirements in pharmaceutical, soap making and other industries.

The JCC, during its Third meeting, approved a project proposal and implementation plan as submitted jointly by NRC anb U.S. scientists who came for this purpose. The equipment needed for the project was chosen and Wisconsin University (contractor for assistance in procurement) is developing the specifications for purchase.

3. Corrosion in Petroleum Refineries:

The project is designed to produce corrosion inhibitors from local raw materials suitable for petroleum refineries in Egypt. Also, a specialized laboratory at NRC/Cairo to solve problems in this field for the benefit of the production sectors is to be created. Participants in the design of this project are scientists from NRC/Cairo and U.S. who visited Egypt in January 1979. The project proposal was submitted and approved by the JCC in its Third Meeting in March 1979.

4. Development of Red Sea Fisheries:

Exploitation of Red Sea fisheries is done mainly in the Gulf of Suez and south toward Ghardaka. Possibilities for the exploitation of areas south of Ghardaka appear very promising.

The project is designed to explore the Red Sea area as a rich source of fish. Remote sensing technology as well as on-site sampling methods are to be used.

The first two years are to develop base-line data and to discover regions of abundance as well as to explore possibilities for a fishing industry at the southern part of the Red Sea (Bernis and Foul Bay). Phase II will cover other parts of the Red Sea and the Gulf of Suez, as time allows.

The JCC, at its 2nd Meeting in November 1978, approved a Red Sea fisheries project. An expert visited Cairo in March 1979 to decide with the Egyptian team the requirements of the project and to prepare a plan of operation. The U.S. expert stressed the importance of the work particularly as it is a study aiming at establishing, developing, exploiting new resources on the Red Sea Coast.

D. Scientific and Technical Information Systems Project:

The goals of Phase I are:

-- Planning and designing an information network capable of providing S&T information services at the national level to universities, research centers, and research institutions of various Ministries, and,

-- Training of key personnel to carry out duties in various fields of information and documentation.

During Phase II the network is to be completed. The NSF will be responsible for contracting the project's two components.

An invitation for contract bids was issued to American institutions. Two bids were received for the planning and designing component and eight bids for the training component.

On February 22, 1979 two committees of U.S. and Egyptian parties (NSF, Federal Agencies, Universities, Industrial Sector and ASRT) were formed to study the proposals submitted from various organizations.

E. Instrumentation Technology

Training for Maintenance and Repair:

1. Scientific Instruments:

- $2.1 million was committed for the purchase of instruments required for the "More and Better Food" project, materials testing and maintenance and repair. The University of Wisconsin is the organization preparing the specifications for these instruments.

- NRC/Cairo has completed preparatory studies for the layout plan of the laboratories to accommodate the equipment, particularly the electrical requirements, air conditioning, benches, drainage, etc.

  Necessary equipment was specified for the following projects:

  Bio-Gas, Phosphate, Wool Wax, Corrosion, and Red Sea Fisheries. University of Wisconsin was requested to complete the purchasing procedures.

  Some equipment for the scientific and technical information project including 6 microfich readers and copier, has also arrived in Cairo.

2. Training in the Maintenance and Repair of Scientific Equipment

Special courses in electronics-training were held at the American University in Cairo for engineers and researchers from NRC/Cairo, the Scientific Instrumentation Center (SIC) and the Universities. A total number of 150 attended the first phase. A choice from that group will be made of those who are to attend training courses abroad on repair and maintenance of scientific equipment.

A repair and maintenance training program at Wisconsin University and at the National Institutes of Health has been developed for groups of trainees from the above institutions. Specialized courses were prepared for eleven trainees to start in April 1979 for a period of three to six months. Requests for permission to participate in the repair and maintenance courses have been submitted to:

NRC/Cairo	4 trainees	Cairo Univ.	1 trainee
SIC	2 trainees	Minia Univ.	1 trainee
Assiut Univ.	1 trainee	Tanta Univ.	1 trainee

F. Planning for Phase II.

In the agreement signed between ASRT and AID for the Applied Science & Technology Research Program, the principal parties are to develop joining the program for years 3, 4 and 5. (Phase II).

During the Second JCC Meeting, the following time table was suggested:

March 1979 (3rd JCC Meeting)

- Approval of the Criteria for Phase II
- Establishing priorities for Phase II projects

November 1979 (4th JCC Meeting

- Review Phase II planning.
- Further discussion and evaluation of the proposed projects.
- Approval of Phase II format and plan of operation.

March 1980 (5th JCC Meeting)

- Final approval of Phase II projects.
- Approval of Phase II planning and execution report.

During the 3rd JCC Meeting, ASRT Presented a working paper for Phase II planning based on the following:

- Present achievements of Phase I.
- Expected achievement of the projects by the end of Phase I.
- Strengthening ASRT's role as a responsible organization and coordinator between between various science and technology sectors to deal with critical problems in accordance with the agreement.

Using the ASRT's planning paper as a reference document the following goals were suggested for Phase II:

1. More and Better Food

   - Continuation of the projects in agriculture, animal resources and nutrition at Kafr El Khadra (Dakahlia) and Omar Makram(Tahrir) villages.

- Selection of two other villages, collecting data and preparing the plan of operation.

- Completion of both the cottonseed oil and the dried milk cheese projects during Phase I in order to start new industrial projects of certain priorities such as canned food and the production of protein rich food.

- Preparing specifications for the purchase and importation of pilot plants for the oil industry.

2. Bio-Gas Project for Rural Development

The project should seek to become operational in two pilot villages, one in the Nile Valley and a second in the New Community area.

3. New Crops for Arid and Semi-Arid Zones

To move ahead with the installation of test sistes at the selected areas in Kafr Oshim and the New Valley. Furthermore, studies should include new areas as well as new crops.

4. Completion of the following R&D projects:

- Phosphate ores.
- Wool wax.
- Corrosion Project.
- Red Sea fisheries - within the areas south of Bernis and Foul Bay, the fish population and distribution outlined with initiation of appropriate follow on activities.

5. R&D Management Education:

Completion of the training activities and providing follow-on technical assistance for:

- Policy planning and management.
- Technical economics.
- Research marketing.
- Technology assessment.

During Phase II specialized units in these fields will be strengthened both at ASRT and N RC based on the activities during Phase I.

6. Scientific and Technical Information Systems

The implementation stages necessary for establishment of a scientific and technological information service network linked with a foreign information center, including the importation, construction and use of the necessary equipment. This will strengthen the Egyptian National Information and Documentation Center (NIDCC) with literature and technical reports as required for National Research and Production Sectors.

7. Maintenance and Repair of Scientific Instruments.

Extending the training courses for engineers and technicians for repair and maintenace of scientific equipment to include other Universities (Phase I covers only Cairo, Assiut, Tanta and Minia Universities); establishing workshops for the maintenance and repair at places where trained personnel exist, and importing the necessary equipment required for various projects.

Phase II may also include new R&D projects selected in accordance with the criteria approved during the JCC meeting in May 1978, taking into consideration:

- Requirements of the Egyptian National Development Plan.
- Solving priority problems.
- Supporting Research & Development sectors with their requirements to enable them to function efficiently.
- Suitable for the application of the new techniques in scientific management with regard to directing scientific capabilities in various specialized fields.
- Availability to users and the guarantee that the results are transfered to them.

The ASRT presented the following projects to be included into Phase II planning:

- Upgrading the capabilities of the Petroleum Research Institute by providing it with pilot plant equipment to enable it to solve industry problems.

- Upgrading the capabilities of the National Institute of Standards by providing it with necessary equipment and technical technical assistance to carry out its role in serving national production sectors.

  Establishing a Computer Center at Alexandria University.

- Geophysical mapping of Egypt.

- Water quality studies on the Nile River and Lake Nasser.

- Establishing regional scientific instrument centers.

In addition the ASRT wishes to include certain programs in Phase II for the purpose of creating and strengthening the future development of technology in Egypt. These might include:

- Scholarships for scientists:

  Study and training program of one year in the United States for young specialists in essential production fields in projects contracted for by the ASRT. An appropriation of one million dollars per year for a period of five years is suggested as an appropriate level of effort.

- Specialists in modern technology:

  One of the main duties of ASRT as an organization responsible for coordinating and supporting research is to introduce modern technology to solve national problems and to prepare trained specialists. One example is the introduction of remote sensing technology as an activitity of the ASRT. A center has now been developed to serve not only various national sectors but also other countries in the region.

  It is considered necessary to develop similar expertise in modern technologies and to supplement the present specialized centers in order to follow-up the latest developments in the fields of medical and biological engineering, space technology, radiation and electronics.

  The Academy proposes a training program for 3-4 persons in various fields of technology for a period of 3-6 months in the United States. The plan should include the travel of five groups per year for a total period of ten years at a cost estimated at $500,000 a year.

Agenda

Third Meeting

Joint Consultative Committee

APPLIED SCIENCE AND TECHNOLOGY PROGRAM

Egyption Academy of Scientific Research and Technology (ASRT)

National Research Center (NRC)

U.S. National Academy of Sciences/ National Research Council (NAS/NRC)

U.S. National Science Foundation (NSF)

ASRT Conference Room, 101 Kasr El Eini Street, Cairo, Arab Republic of Egypt

March 28-29, 1979

Wednesday, March 28, 1979 — SESSION I

9:30-10:30 — Welcome : Dr. A. M. Abou-El-Azm, President, ASRT

Remarks : Dr. Guyford Stever, Chairman, U.S. Panel

Dr. Victor Rabinowitch, Director, Board on Science and Technology for International Development, NAS/NRC

Mr. Roger Dayon, Head, Africa & Asia Section, Division of International Programs, NSF

Mr. F. Oleson, Deputy Director, U.S. AID Mission/Cairo

10:30-11:30 — Overview of the Program

Dr. M. Kamel, Director, NRC

Management Plan

Dr. A. S. El Nockrashy, Director, R&D Programs, ASRT

11:30-12:30 — Progress Reports : Demonstration Programs

- More and Better Food, Dr. Osman Galal, NRC
- Bio-Gas Technology, Dr. M. M. El-Halwagy
- New Crops for Arid and Semi Arid Zones, Dr. H. Samir Abd-El-Rahman

12:30-15:00 — Lunch

SESSION II

15:00-16:00 — Progress Reports : R&D Projects

- Introduction
  Dr. A. S. El-Nockrashy, ASRT
- Phosphate Ores
  Dr. Aziza Youssef, NRC
- Corrosion
  Dr. A. A. Abdel Azim
  Central Metallurgical Research Institute, NRC
- Wool Wax Recovery
  Dr. A. M. Kantoush, NRC

16:00-17:00 — Progress Reports : Information & Instrumentation

- Instrumentation Repair and Maintenance Training
  Dr. Nabil M. Saleh, NRC
- S&T Information Services
  Dr. A. M. Gad, National Information and Documentation Center

19:00-21:00 — Reception offered by Mr. D. S. Brown, U.S. AID Mission Director

Thursday, March 29, 1979

SESSION III

9:30-11:30 — Status Report : R&D Management Education

Mr. J. Davenport, NAS/NRC

Planning for Phase II

Dr. A. S. El-Nockrashy, ASRT

Project Evaluation Guidelines

Mr. J. Davenport, NAS/NRC

U.S. AID Comments

Mr. J. Riley, U.S.AID/Cairo

11:30-12:30 — Executive Session for Preparation of Conclusions and Recommendations

SESSION IV

12:30-14:30 — Discussion of Conclusions and Recommendations

15:00-17:00 — Luncheon offered by : Dr. Abou El-Azm
Closing remarks : Dr. Abou El-Azm

List of Participants, Invited Guests and Observers

Third Meeting

Joint Consultative Committee

APPLIED SCIENCE AND TECHNOLOGY PROGRAM

Cairo, Arab Republic of Egypt March 28-29, 1979

Egyptian JCC Members

Dr. A.M. Abou El-Azm
President, Academy of Scientific Research & Technology

Dr. M. H. El-Nashar
President, Assiut University

Dr. M. M. Hafez
Counsellor, Academy of Scientific Research & Technology

Dr. H. Handy
Vice President for Research
Cairo University

Dr. Y. Wally
Assistant to the Minister of Agriculture

U.S. JCC Members

Dr. H. Guyford Stever
International Consultant

Dr. George Bugliarello
President, New York Polytechnic Institute

Dr. Mary E. Carter
Director, Southern Regional Laboratory
U.S. Department of Agriculture

Dr. Helmut Weldes (Ex-Officio)
Senior Resident Advisor, National Research Centre

Egyptian Advisors

Dr. Mohamed Kamel
Director, National Research Centre

Dr. G. Abd El-Samei
Vice President, Academy of Scientific Research & Technology

Egyptian Advisors (continued)

Dr. M. B. Fayez
Vice President, Academy of Scientific Research & Technology

Dr. A. Abdel-Latif
Secretary-General, Academy of Scientific Research & Technology

Dr. F. M. Ramadan
Secretary General, National Research Centre/Cairo

Dr. Y. M. Housain
Head, Science Policy Unit, Academy of Scientific Research & Technology

Dr. A. F. Rizk
Head, Technical Office of the President
Academy of Scientific Research & Technology

Egyptian Program Liaison Directors

Dr. A. S. El-Nokrashy
Head, R&D Division, Academy of Scientific Research & Technology
Liaison, Academy of Scientific Research and Techology with the U.S. Agency for International Development, U.S. National Academy of Sciences/National Research Council and the U.S. National Science Foundation.

Dr. O. Galal
Head, Technical Office of the Director, National Research Centre/Cairo
Liaison, National Research Centre/Cairo with the U.S. Agency for International Development, U.S. National Academy of Sciences/ National Research Council and the U.S. National Science Foundation.

Egyptian Project Representatives

1. "More and Better Food"

   Dr. Osman Galal, Head, Child Health Department, National Research Centre/Cairo

2. "Bio-Gas Technology"

   Dr. M. M. El-Halwagy (Principal Investigator)
   Head, Pilot Plant Department, National Research Centre/Cairo

3. "New Crops for Arid and Semi-Arid Zones"

   Dr. H. S. Abd-El-Rahman, Head, Division of Agricultural & Biological Researc
   National Research Centre/Cairo

Egyptian Project Representatives (continued)

4. Corrosion Research

Dr. A. A. Abdel Azim (Consultant)
Head, Central Metallurgical Research & Development Institute,
National Research Centre/Cairo

5. Phosphate Ores and Chemical Processing

Dr. Aziza Yousef (Principal Investigator)
Head, Ore Benefication & Chemical Processing Laboratory
National Research Centre/Cairo

6. Wool Wax Recover, Processing and Marketing

Dr. A. M. El-Borai (Project Manager)
Manager, Misr Beida Dyers

Dr. A. A. M. Kantoush (Principal Investigator)
Head, Division of Textile Research, National Research Centre/Cairo

7. Information

Dr. A. M. Gad
Head, National Information & Documentation Centre

8. Instrumentation

Eng. Ahmed El-Alaily, Director, Scientific Instruments Centre
Dr. M. Saleh, University of Cairo
Dr. Nabil M. Saleh, Division of Chemical Industry Research, NRC

Egyptian Program Managers: Academy of Scientific Research & Technology

Dr. Hatem Ali, Food & Agriculture (Animal Sciences)
Dr. M. Dia El-Din Hassanein, Food & Agriculture (Agronomy)
Dr. M. H. Fadl, Technology Transfer & Natural Resources
Dr. S. Al-Housany, Health & Environment

U.S. National Academy of Sciences

Dr. Victor Rabinowitch, Director, Board on Science & Technology for International Development

Dr. Dorothy Zinberg, John F. Kennedy School of Government & Public Affairs, Harvard University (Representing NAS/NRC Commission on International Relations)

U.S. National Academy of Sciences (Continued)

Mr. Jay Davenport, Board on Science & Technology for International Development Staff Officer for the Program with the Academy of Scientific Research & Technology and the National Research Centre/Cairo

Mr. Augustus Nasmith, Board on Science & Technology for International Development Staff Officer for the Program with the Academy of Scientific Research & Technology and the National Research Centre/Cairo

U.S. National Science Foundation

Mr. Roger Doyon, Head, Africa & Asia Section, Division of International Programs

Dr. Lawrence Edwards, Program Manager, Africa & Asia Section, Division of International Programs

U.S. Agency for International Development

Mr. F. Oleson, Deputy Mission Director, U.S. Agency for International Development, Cairo

Mr. James Riley, Head, Division of Industry, Science & Technology, U.S. Agency for International Development, Cairo

Dr. Sherif Arif, Division of Industry, Science & Technology, U.S. Agency for International Development, Cairo

U.S. Embassy - Cairo

Dr. Addison Richmond, Science Counsellor

U.S. National Bureau of Standards

Dr. Samuel E. Chappell, Office of International Measurement Standards

Annex B

FIRST R&D MANAGEMENT METHODS WORKSHOP

DENVER RESEARCH INSTITUTE

Denver, Colorado

June 18 - July 7, 1979

PARTICIPANTS

1.	Abdel-Azim, Adel A.	Director, Central Metallurgy Research and Development Institute (CMRDI), NRC
2.	Ali, Hatem M.	Manager, Food and Agriculture Program, ASRT; Head, Department of Animal & Poultry Nutrition, NRC/Cairo
3.	Bakr, Ahmed	Professor, Faculty of Agriculture, University of Cairo
4.	Ebeid, Fathy Mossad	Director, Egyptian Petroleum Research Institute
5.	El-Halwagy, Mohamed M.	Head, Chemical Engineering and Pilot Plant Department; Principal Investigator, Biogas Project, NRC
6.	El-Husseiny, Mohamed	Professor of Food Technology, NRC; Principal Investigator, Cheese Project of the More and Better Food Project
7.	El-Naggar, Anas M.	Program Manager, R&D Office, ASRT
8.	Fadl, Mohammed H.	Program Manager, Industry and Technology Transfer; Professor of Pulp and Paper, NRC
9.	Fayed, Sami H.	Program Manager, Environmental Research Projects; Researcher, Water Pollution, NRC
10.	Ramadan, Fahmy	Secretary General, NRC
11.	Saleh, Nabiel A.	Professor of Organic Chemistry, NRC; member of Technical Office and Director's Office; Manager of Scientific Instruments Project
12.	Wassel, Gamila	Professor of Pharmacognosy, Pharmaceutical Sciences Laboratory, NRC/Cairo; Programming Office, NRC/Cairo
13.	Younis, Mohamed I.	Research Associate Professor; Head, Systems and Information Sciences Unit, NRC/Cairo

Annex C

TRAVEL FOR
PROGRAM PLANNING, R&D MANAGEMENT, AND TECHNICAL CONSULTATION

TRAVEL TO THE U.S.A.

NAME	DATES	PURPOSE	PLACE
1. Yousef M. Hussein	June 4 - 16	Planning, ASRT-NAS/NRC Applied Science & Technology Program Preparations for UN Conference on Science & Technology for Development, Vienna, 1979 Science policy research and teaching discussions	Washington,D.C.: NAS/NRC George Washington University National Science Foundation (NSF) U.S. Department of State Office of Technology Assessment Office of Science & Technology Policy Organization of American States New York: New York University, Center for Science & Technology Policy Boston: Harvard University, Program for Science & International Affairs MIT Center for the Study of Policy Alternatives MIT Technology Adaptation Program
2. A. S. El-Nockrashy	June 13 - July 5	Program coordination, Phase II Planning, More & Better Food meeting, Biogas meeting, scientific instrumentation, R&D management training, New Crops for Arid Lands discussion	NAS/NRC, Washington, D.C. NSF, Washington, D.C. Instrumentation Systems Center, University of Wisconsin Denver Research Institute Webster International, Costa Mesa, California Meeting with Dr. McKell in Los Angeles

NAME	DATES	PURPOSE	PLACE
3. Osman Galal	June 13 - July 6	Program coordination, Phase II Planning, More & Better Food meeting, Biogas meeting, scientific instrumentation, R&D management training, New Crops for Arid Lands discussion	NAS/NRC, Washington, D.C. NSF, Washington, D.C. Instrumentation Systems Center, University of Wisconsin Denver Research Institute Webster International, Costa Mesa, California Meeting with Dr. McKell in Los Angeles School of Public Health, University of California at Los Angeles The Nutrition Foundation, New York Nutrition Institute, Tufts University, Boston
4. Helmut Weldes	June 18 - 29	Program coordination, Phase II Planning, R&D management training	NAS/NRC, Washington, D.C. NSF, Washington, D.C. AID, Washington, D.C. American Chemical Society, Washington, D.C. Denver Research Institute
5. M. Kamel	July 11 - 17	Program coordination, Phase II Planning, R&D management training, scientific instrumentation, relations between ASRT/NRC programs and the Joint Working Group for Technology, Research, and Development	NAS/NRC, Washington, D.C. NSF, Washington, D.C. American Chemical Society, Washington, D.C. Department of State, Washington, D.C.

TRAVEL TO EGYPT

PROJECT AND PARTICIPANTS	DATES
1. Development and Application of Biogas Technology in Rural Areas of Egypt	January 8-13, 1979
Philip R. Goodrich, Chairman Department of Agricultural Engineering University of Minnesota	
Harold R. Capener Department of Rural Scoiology Cornell University	
T.B.S. Prakasam Research and Control Laboratory Metropolitan Sanitary District of Greater Chicago	
Augustus Nasmith Professional Associate National Academy of Sciences	
2. Corrosion Cause and Control	January 12-18, 1979
Henry Leidheiser Lehigh University Bethlehem, Pennsylvania	
Earl Snavely, Jr. Mobile Research and Development Laboratories Dallas, Texas	
3. Utilization of Wool Wax	January 12-18, 1979
Louis Mizell International Wool Secretariat Woodbury, New York	
Gordon Bixler American Chemical Society Washington, D.C.	

PROJECT AND PARTICIPANTS	DATE
4. New Crops for Arid and Semiarid Zones	January 16-23, 1979

Cyrus M. McKell, Chairman
Institute of Land Rehabilitation
Utah State University

Theodore Hymowitz
Department of Agronomy
University of Illinois

Lowell Lewis
College of Natural and Agricultural Sciences
University of California, Riverside

John P. Schaefer
President
University of Arizona

Augustus Nasmith
Professional Associate
National Academy of Sciences

5. Joint Consultative Committee Third Meeting	March 24-30, 1979

H. Guyford Stever
Consultant
Washington, D.C.

George Bugliarello
President, New York Polytechnic Institute
Brooklyn, New York

Mary Carter
Director, Southern Regional Research Laboratory
New Orleans, Louisiana

Victor Rabinowitch
Director
Board on Science and Technology for International Development
National Academy of Sciences

PROJECT AND PARTICIPANTS	DATE
6. Evaluation of Egyptian Phosphate Ores and Phosphate Fertilizer Production	April 1-6, 1979
James E. Lawver International Minerals and Chemical Corporation Bartow, Florida	
James R. Lehr National Fertilizer Development Center Tennessee Valley Authority Muscle Shoals, Alabama	
Owen W. Livingston International Fertilizer Development Center Muscle Shoals, Alabama	
Jay Davenport Professional Associate National Academy of Sciences	
7. Development of Red Sea Fisheries	April 1-6, 1979
Alonzo T. Pruter Northwest Fisheries Center National Oceanic and Atmospheric Administration Seattle, Washington	
Augustus Nasmith Professional Associate National Academy of Sciences	
8. R&D Management Training	May 11-18, 1979
Don Evans Denver Research Institute Denver, Colorado	

TRAVEL WITHIN THE U.S.A.

BY NAS/NRC PANELISTS

NAME	DATES	PURPOSE	PLACE
1. George Bugliarello President, New York Polytechnic Institute Brooklyn, New York	February 21, 1979	Planning meeting for Third Joint Consultative Committee meeting	Washington, D.C.
2. Mary Carter Director, Southern Regional Research Laboratory New Orleans, Louisiana	February 21, 1979	Planning meeting for Third Joint Consultative Committee meeting*	Washington, D.C.
3. Harold Capener Department of Rural Sociology Cornell University	June 15, 1979	Biogas Technology meeting	Washington, D.C.
4. Philip R. Goodrich Department of Agricultural Engineering University of Minnesota	June 15, 1979	Biogas Technology meeting	Washington, D.C.
5. John Hurley Deputy Director Board on Science and Technology for International Development National Academy of Sciences	June 28-30, 1979	R&D management workshop evaluation, Denver Research Institute	Denver, Colorado

* H. Guyford Stever is based in Washington, D.C., and thus no travel was necessary for him to attend the planning meeting.

SUPPLEMENTAL TRAVEL

PARTICIPANTS, FIRST R&D MANAGEMENT METHODS WORKSHOP*

Name of Participant and Dates of Travel	Place Visited	Purpose of Visit
1. Abdel-Azim, Adel A. (July 9-10, 1979) Director, Central Metallurgy Research and Development Institute (CMRDI)	Mobil Research & Development Laboratories Dallas, Texas	Corrosion Control Project; Met with Dr. Earl Snavely, member of steering committee
2. Ali, Hatem M. (July 9-14, 1979) Manager of Food and Agriculture Program, Academy of Scientific Research & Technology Head, Department of Animal/Poultry Nutrition, National Research Centre/Cairo	Dr. Wasfy Shindy Los Angeles County Veterinary Service Downey, California	More and Better Food Demonstration Project (animal science aspects)
3. Bakr, Ahmed (July 9-14, 1979) Professor, Faculty of Agriculture Cairo University (ex-Minister of Land Reclamation)	Moisture Utilization in the Semi-Arid Tropics Program (MUSAT) University of California Riverside, California	More and Better Food Demonstration Project (arid lands agriculture)
	Office of Arid Lands Studies University of Arizona Tucson, Arizona	Crops for arid lands, natural resources in arid lands
	Pfizer Genetics, Inc Doniphan, Nebraska	Commercial corn and sorghum seed production
4. Ebeid, Fathy Mossad (July 10-12, 1979) Director, Egyptian Petroleum Research Institute	Energy Laboratory Massachusetts Institute of Technology Boston, Massachusetts	Cooperative project with MIT and PRI
	Chemical Engineering Department Massachusetts Institute of Technology Boston, Massachusetts	Lubricating oils project proposed for Phase II

* See also Annex B

Name of Participant and Dates of Travel	Place Visited	Purpose of Visit
5. El-Halwagy, Mohamed M. (July 8-18, 1979) Head, Chemical Engineering and Pilot Plant Department Principal Investigator, Biogas Demonstration Project, NRC/Cairo	Department of Chemical Engineering University of California Berkeley, California	Biogas Project: biomass fermentation using agricultural wastes
	Department of Agricultural Engineering University of Minnesota St. Paul, Minnesota	Met with Philip Goodrich, member of Steering Committee of Biogas Demonstration Project
	Department of Rural Sociology Cornell University Ithaca, New York	Met with Drs. Capener and Prakasam, members of Steering Committee of Biogas Project
	National Academy of Sciences (NAS) Board on Science & Technology for International Development Washington, D.C.	Biogas Project
	International Bank for Reconstruction and Development Science and Technology Unit Washington, D.C.	Biogas Project
	National Science Foundation Division of International Programs Washington, D.C.	Biogas Project
	The Bio-Energy Council Washington, D.C.	Biogas Project
	Dr. R. S. Mehta, Chairman, Water Pollution Control Broad, Gujarat State University, India (Meeting held at NAS, Washington, D.C.)	Biogas Project
	U.S. Agency for International Development (AID), Bureau for Near East, Office of Technical Support, Washington, D.C.	Biogas Project

Name of Participant and Dates of Travel	Place Visited	Purpose of Visit
6. El-Husseiny, Mohamed (July 10-20, 1979) Professor of Food Technology, NRC/Cairo Principal Investigator for Damietta Cheese project of the More and Better Food Demonstration Project	Department of Food Science University of Wisconsin Madison, Wisconsin	More and Better Food: Damietta Cheese project
	Department of Food Science Michigan State University East Lansing, Michigan	Damietta Cheese Project
	U.S. Department of Agriculture Eastern Regional Research Center Philadelphia, Pennsylvania	Damietta Cheese Project
	Institute of Food Science New York State College of Agriculture and Life Sciences Cornell University Ithaca, New York	Damietta Cheese Project
7. El-Naggar, Anas M. (May 7-12, 1979) Program Manager, R&D Office, Academy of Scientific Research and Technology	National Academy of Sciences (NAS) Board on Science & Technology for International Development Washington, D.C.	As Program manager for the Radiation Biology and Nutrition-related Studies
	Nuclear Regulatory Commission Department of Emergency Preparedness Bethesda, Maryland	" " " "
	Walter Reed Army Medical Center Radio Therapy Department Washington, D.C.	" " " "
	Fermi Neutron Therapy Institute Chicago, Illinois	" " " "
8. Fadl, Mohammed H. (July 9-14, 1979) Program Manager, Industry & Technology Transfer Professor of Pulp & Paper Division NRC/Cairo	Wasfy Shindy Los Angeles County Veterinary Service, Downey, California	As Program Manager ASRT (Technology) made observation and study visits in Los Angeles area and University of California at Riverside

Name of Participant and Dates of Travel	Place Visited	Purpose of Visit
9. Fayed, Sami H. (July 9-14, 1979) Program Manager, Environmental Research Project, Researcher in Water Pollution, NRC/Cairo	U.S. Environmental Protection Agency, Denver, Colorado	As Program Manager, ASRT (Environmental Protection), made observation and study visits
10. Ramadan, Fahmy (July 9-11, 1979) Secretary General, NRC	National Academy of Sciences (NAS) Board on Science & Technology for International Development Washington, D.C.	Program planning visit on NRC projects and Phase II planning (water management and soils)
	U.S. Food & Drug Administration Epidemiology Unit Washington, D.C.	
	U.S. Environmental Protection Agency Office of International Activities Washington, D.C.	
11. Saleh, Nabiel A. (June 11-15, July 9-12) Professor of Organic Chemistry, NRC/Cairo Manager of Istruments Project	Department of Biological Sciences Concordia University Montreal, Quebec, Canada	As NRC/Cairo coordinator for core equipment project, visited U.S. and Canada for observation and study
	International Development Office Ottawa, Canada	Program planning for Phase II (training of NRC/Cairo personnel in instrumentation maintenance and repair)
	Biology Department Ottawa University Ottawa, Canada	" " "
	Biosystematics Research Institute Ottawa, Canada	" " "
	Department of Botany University of British Columbia Vancouver, British Columbia, Canada	" " "
	Instrumentation Systems Center (ISC) University of Wisconsin, Madison, Wisconsin	" " "

Name of Participant and Dates of Travel	Place Visited	Purpose of Visit
11. (Continued) - Saleh Nabiel A.	National Academy of Sciences (NAS) Board on Science & Technology for International Development Washington, D.C.	As NRC/Cairo coordinator for core equipment project, visited U.S. and Canada for observation and study
	U.S. Food & Drug Administration Division of Chemistry & Physics Washington, D.C.	Program planning for Phase II (training of NRC/Cairo personnel in instrumentation maintenance and repair)
	National Institutes of Health Biomedical Engineering & Instrumentation Branch Bethesda, Maryland	
	National Science Foundation Division of International Programs Washington, D.C.	
12. Wassel, Gamila (July 8-17, 1979) Professor of Pharmacognosy, Pharmaceutical Sciences Laboratory NRC/Cairo Member, Programming Office, NRC/Cairo	Radiopharmacy Program School of Pharmacy University of Southern California Los Angeles, California	As member NRC coordinating project committee, More and Better Foods. made observation and study visits
	Department of Pharmacognosy & Pharmacology College of Pharmacy University of Illinois Medical Center Chicago, Illinois	
	U.S. Food & Drug Administration Division of Chemistry & Physics Washington, D.C.	
	U.S. Food & Drug Administration Epidemiology Unit Washington, D.C.	

Name of Participants and Dates of Travel	Place Visited	Purpose of Visit
13. Younis, Mahmoud I. (June 13-15, 1979) Research Associate Professor Head, Systems & Information Sciences Unit, NRC/Cairo	U.S. Environmental Protection Agency Environmental Research Laboratory Athens, Georgia	Observation and study visit under Academy of Scientific Research and Technology.