

PB-ABL-913

ISBN 9953-0-72

NARP ANNUAL REPORTS

N A T I O N A L A G R I C U L T U R A L R E S E A R C H P R O J E C T



National
Agricultural
Research
Project

المستورق
البحوث
للأبحاث
الزراعية



November 1970

PD-ABL-913

Annual Report FY 1987/88
Publication #10

**N
A
T
I
O
N
A
L**
**A
G
R
I
C
U
L
T
U
R
A
L**
**R
E
S
E
A
R
C
H**
**P
R
O
J
E
C
T**

NARP Annual Report FY 1987/88



National
Agricultural
Research
Project
المجلس
الوطني
للبحوث
الزراعية



PD-ABL-913

**MINISTRY OF AGRICULTURE
AND LAND RECLAMATION**

Cairo, The Arab Republic of Egypt

**NATIONAL AGRICULTURAL RESEARCH PROJECT
(NARP)**

USAID PROJECT 263-0152

**ANNUAL REPORT
1987**

by
Dr. Ahmed Momtaz

NARP Publication No. 10

Published: May 1988

TABLE OF CONTENTS

	PAGE
ACKNOWLEDGMENT	1
INTRODUCTION	2
Overall Major Accomplishments in 1987	4
Improvement of Research Management	4
Establishment of Research Linkages	7
Improvement of Research Services	9
Major Recommendations	9
APPENDIX I. IMPROVEMENT OF RESEARCH MANAGEMENT	12
A. Administrative Services	12
B. Interdisciplinary Research (IR)	14
C. Integrated Pest Management (IPM)	25
D. Manpower Development and Training	27
E. Mechanization	31
F. On-Farm Trials	33
G. Research Stations	42
H. Research Support Programs	48
I. Seed Program	51
APPENDIX II. ESTABLISHMENT RESEARCH LINKAGES	68
A. International Linkages	69
1. International Rice Research Institute (IRRI)	69
2. International Center for Agricultural Research in Dry Areas (ICARDA)	69
3. Consortium for International Crop Protection (CICP)	70
4. Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT)	70
B. Research Grants	71
APPENDIX III. RESEARCH SERVICES	74
A. Commodities	75
B. Communications and Publications	76
C. Construction and Renovation of Facilities	76
D. Data Services and Analysis	77
E. Library and Information Systems	78
F. Technical Assistance	83

	PAGE
ANNEXES	85
i. Steering Committee	86
II. Ministerial Decrees	87
III. Research Support Program Expenditures	92
IV. Publication List	93
V. NARP Implementation Workshop	94
VI. CID Review	97

ILLUSTRATIONS

Page

TABLES

1.	Summary of Interdisciplinary Research Programs Initiated During Summer 1987	13
2.	Major Constraints in the Nubaria Region	18
3.	IR Programs Developed for 1987-88 Crop Season in the Nubaria Region	20
4.	IPM Practices Submitted for On-Farm Trials, Winter Season	26
5.	Planned Crop-Associated IPM Research Topics Starting in February 1988	26
6.	Academic Students Funded for 1987 in the United States	29
7.	English Testing and Training Summary	30
8.	Summary of On-Farm Research Trials Conducted During Summer 1987	34
9.	Numbers of Winter 1987-88 On-Farm Trials for Crop Commodities per Governorate	36
10.	Trainers for Winter Crops 1987-1988	37
11.	IR/OFR Management Course (First Phase) August 19-October 1, 1987	40
12.	Allocated Research Land for Research Stations	43
13.	ARC Variety Development Programs	57
14.	ARC Breeder Seed Maintenance	59
15.	Foundation Seed Produced by ARC State Farms	61
16.	Registered Seed Produced by Arc State Farms	62
17.	Certified Seed Production Arranged and Supervised by CAS	63
18.	Total Seed Produced, January - December 1987	64
19.	Seed Processed, January - December 1987.	65
20.	Training for Seed Staff, January - December 1987.	67
21.	Proposal Topic Recommendations by the Grants Program Working Group	72
22.	Development Phases for Library and Information System	78

FIGURES

1.	Organizational Structure	3
2.	Project Implementation Matrix	5
3.	Focused Interdisciplinary Research Activities Flow Chart	6
4.	Functional Chart for ARC Research Program and Finance	8
5.	Soil Improvement Project	47
6.	NARP Seed Component Minimal Improvement of Existing Infrastructure	55
7.	Organization of Seed Within ARC	56
8.	Conceptual Drawing of First Floor, ENALS	79
9.	Conceptual Drawing of Second Floor, ENALS	80
10.	The Structure of ENAL	82

ACKNOWLEDGEMENT

This Annual Report for 1987 shows the results and accomplishments of the combined efforts of the staff from the Government of Egypt, Ministry of Agriculture and Land Reclamation, Agriculture Research Center, technical assistance team and United States Agency for International Development in the National Agricultural Research Project (NARP).

I want to acknowledge H. E. Professor Dr. Youssef A. Wally, Deputy Prime Minister and Minister of Agriculture and Land Reclamation, for the support he has given and contributions that he has made to NARP. H.E. Professor Dr. Yehia Hassan and members of the Steering Committee, National Agricultural Research Council and Working Groups have also spent a considerable amount of time and effort in guiding the various programs.

The NARP is an integrated team effort and this Annual Report has been compiled from the various reports submitted by the team members.

Dr. Ahmed Momtaz
NARP Director General

**NATIONAL AGRICULTURAL RESEARCH PROJECT
(NARP)
1987 ANNUAL REPORT
USAID PROJECT NO. 263-0152**

The 1987 Annual Report describes the planning, development, implementation and accomplishments of the NARP programs and activities. These programs and activities were conducted by staff in their efforts to improve and make changes in the operational thrust of the agricultural research system to meet both the goal and the purpose of the Project. These areas of NARP have been developed to help organize the human and financial resources within the Egyptian agricultural community more efficiently and economically.

The National Agricultural Research Project No. 263-0152 was established in September 1985. There is a cooperative agreement between the Government of Egypt's Ministry of Agriculture and Land Reclamation (GOE/MOA) and the United States Agency for International Development (USAID) which states that the *goal* of NARP is to increase agricultural productivity by improving the quality of technologies available to farmers. The *purpose* of the Project is to develop the capability of the agricultural research community to provide a continuous flow of improved appropriate agricultural technology.

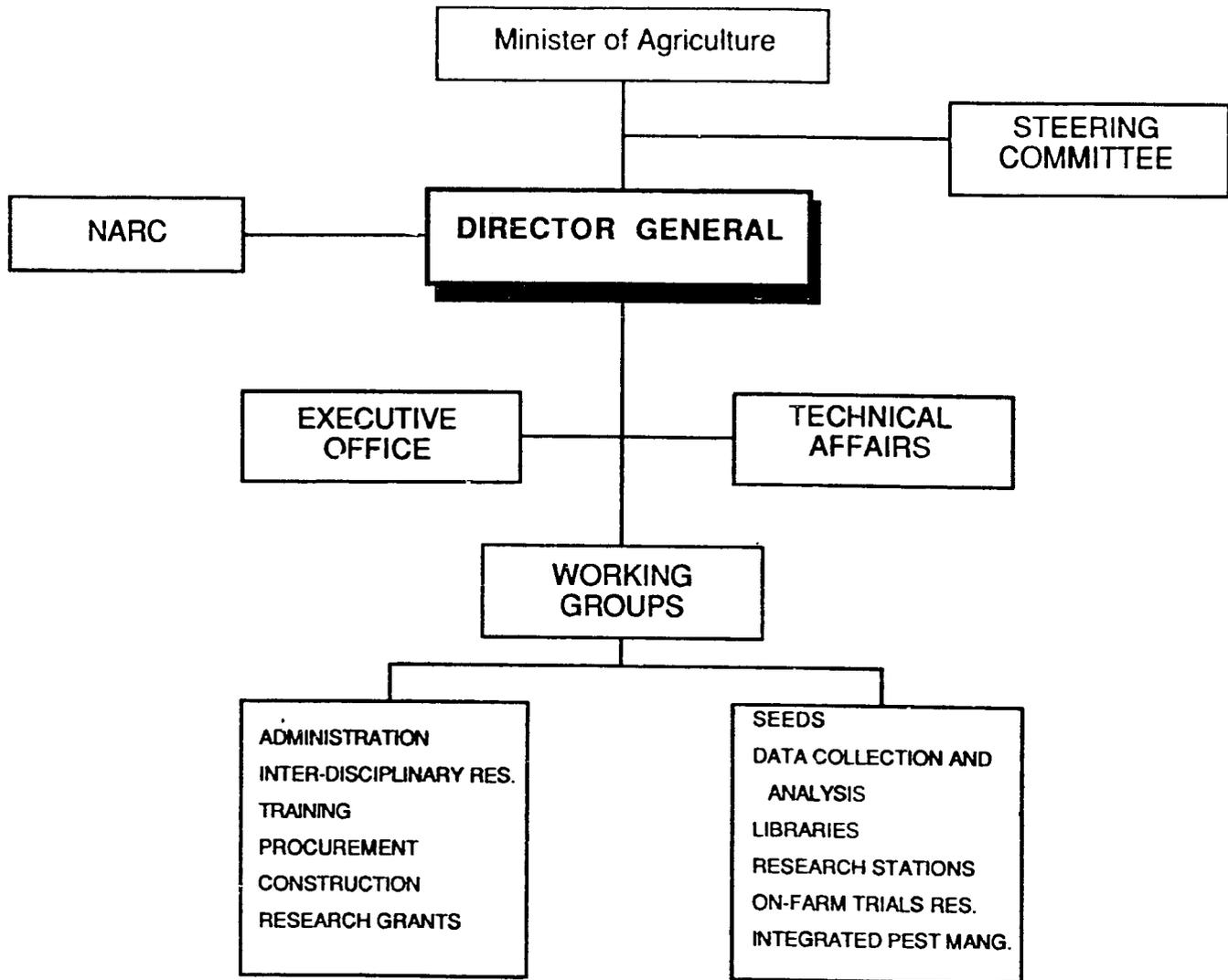
NARP's management, consisting of MOA and Agricultural Research Center (ARC) administrators, and program advisory groups, play the key role in providing overall guidance and direction necessary to meet the MOA's agricultural targets. The organizational structure is shown in Figure 1.

His Excellency, the Minister of Agriculture and Land Reclamation, is responsible for the overall GOE supervision of the Project. The Steering Committee (See Annex I), appointed by the Minister and composed of senior MOA and other governmental officials, is responsible for the overall implementation policy framework of the Project. The National Agricultural Research Council is composed of distinguished senior scientists, academics and managers from both government and the private sector. Its primary role is to advise the Director General on technical aspects of the Project. Ministerial Decrees were issued to appoint Dr. Ahmed Momtaz as the Director General and to establish Working Groups (See Annex II). The Director General directs and provides leadership to the Project while the Working Groups assist the Project managers in the development of technical aspects of the Project. A Working Group is responsible only for technical inputs and does not have responsibility for administrative or financial aspects.

ARC, the implementing agency of the MOA for NARP, facilitates the improvement of research management, technical research execution, and research technology transfer to the farmers' level.

The organizational framework for NARP was established during 1985 and 1986. Part of this organizational framework overlays the existing organizational structure of the ARC which consists of 21 research units

FIGURE 1: ORGANIZATIONAL STRUCTURE



supplemented by 31 research stations, seed technology and an Extension Service. The organizational framework helps in the developmental process to assist in improving and institutionalizing a change in the agricultural research system. This change over the life of the project will involve and utilize decision makers in current ARC positions. The strategy is "that changes in the research system must be formulated and agreed to by parties who will remain in the ARC system after NARP ends".

A project implementation matrix begun in 1987, integrates program operations into the existing organizational structure and is being utilized in the implementation phase of NARP as an integral part of the Research Support Program (RSP) and the Research Support System (RSS). This matrix as seen in Figure 2 links the RSP and the RSS to use them as catalysts to facilitate overall system changes.

It was decided that annual RSP plans will contain verifiable targets or incremental improvements in management, program and financial areas. These improvements strengthen the existing agricultural research system of the ARC so as to provide a continuous flow of improved technologies. The RSS is designed to serve as the mechanism for change and accomplishment of NARP goals.

This matrix will be modified as the dynamics of NARP changes in the process of integration between the program operations and the current ARC organizational structure. Through training aimed at improving planning, execution, research methods and increasing professional competence, senior management will be better prepared to integrate program changes in the system. This will help them carry out their primary responsibilities as policy makers and strategic planners for the ARC.

OVERALL MAJOR ACCOMPLISHMENTS IN 1987

A summary is given in this portion of the report on the overall major accomplishments of this year. More complete program and activity descriptions are shown in Appendices I through III. The accomplishments are shown in the three major areas to:

1. Improve research management;
2. Establish research linkages; and,
3. Improve research services.

Improvement of Research Management

Program management provides the administrative structure for the accomplishment of research objectives and achievement of research goals. A management system framework was defined for planning, implementing and monitoring processes for the overall activities of NARP.

An improved system of research management was developed to properly identify the constraints of the farmer, to develop an interdisciplinary research (IR) approach to address and resolve constraints and to transfer new

FIGURE 2: PROJECT IMPLEMENTATION MATRIX

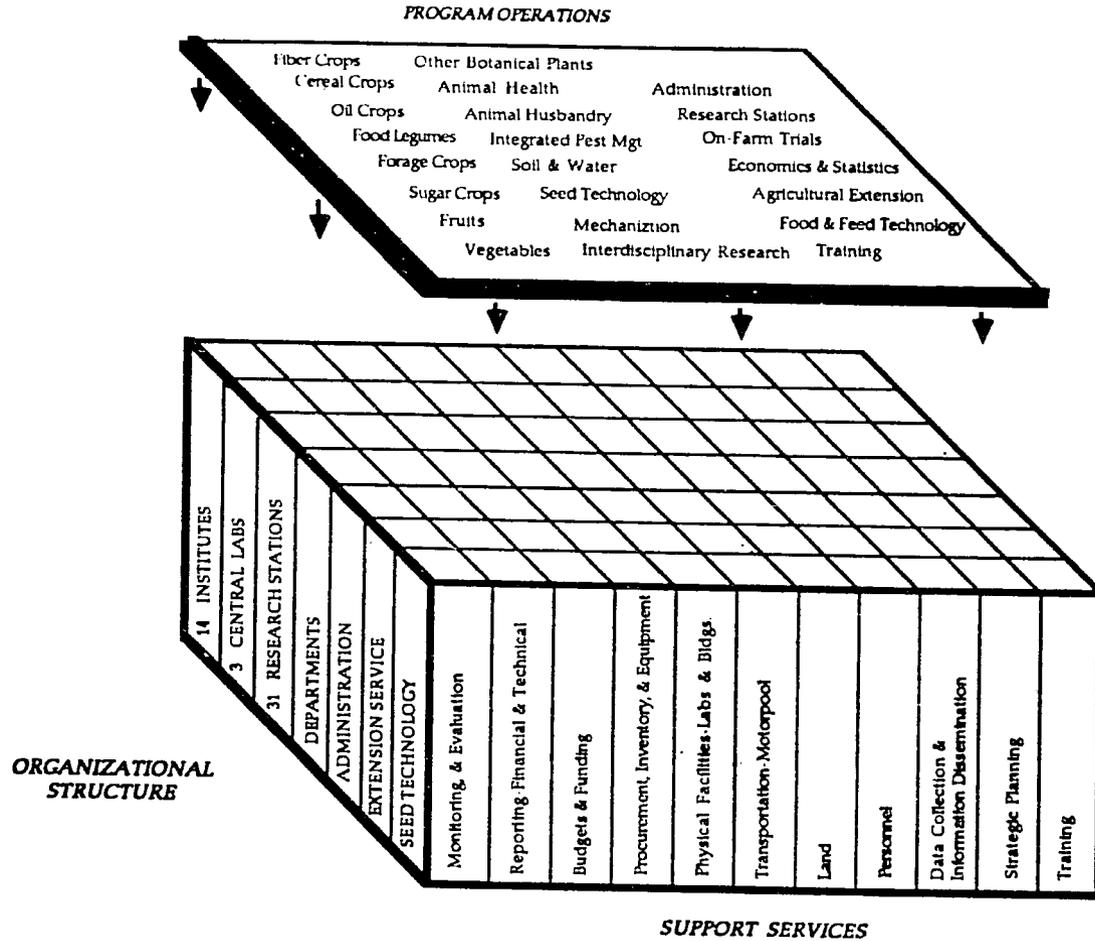
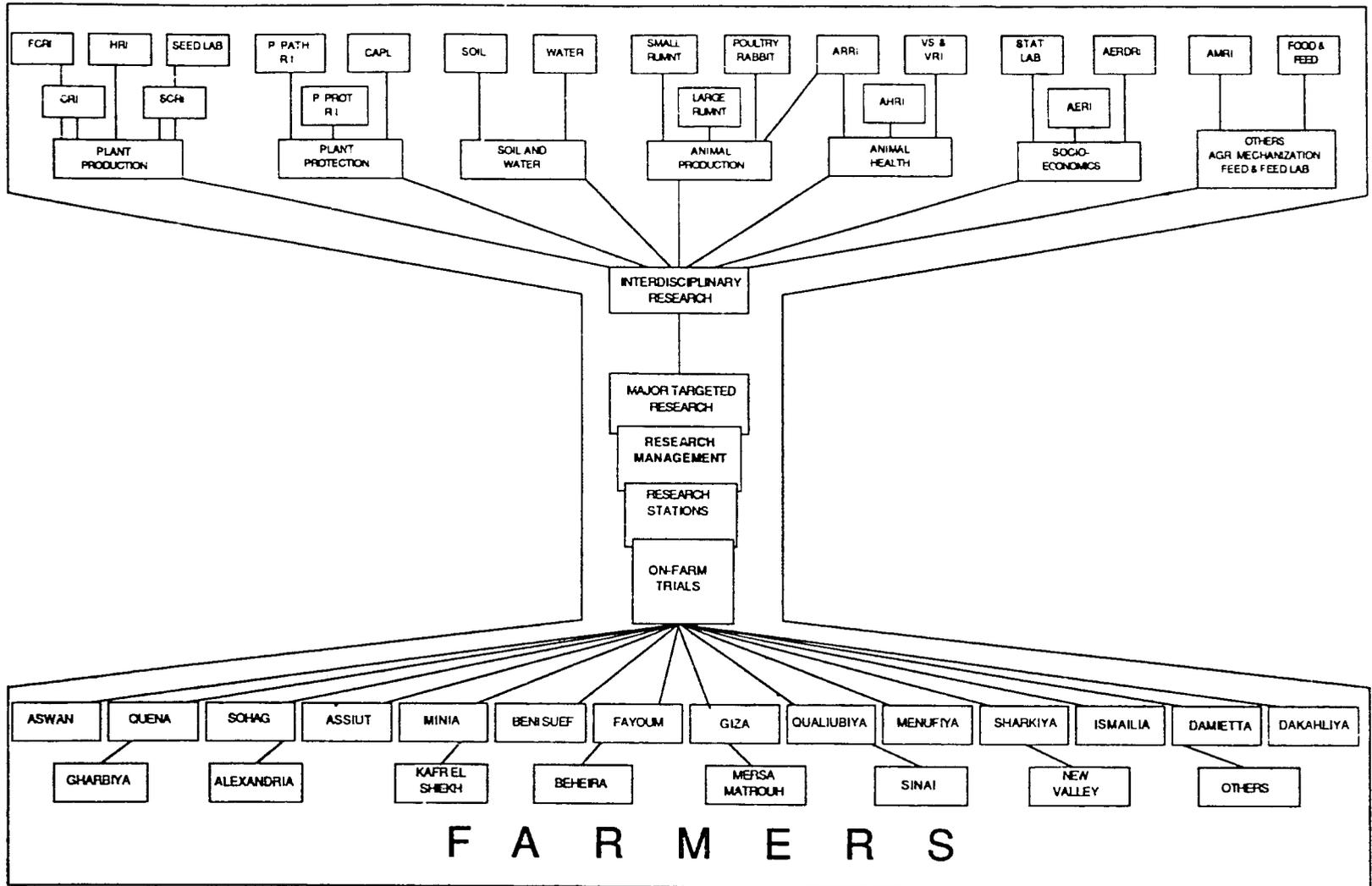


FIGURE 3. FOCUSED INTERDISCIPLINARY RESEARCH ACTIVITIES FLOW CHART



technologies to farmers. In 1987, IR activities involved research teams selected from all disciplines to work in some of the major targeted research areas which is further explained in Appendix I. The research management system was considered to be a reversible hour glass as seen in Figure 3 where the research technology would be developed and adapted at ARC in the institutes and laboratories and then communications would flow back and forth, between and among researchers, on-farm research specialists and farmers.

In order to accomplish appropriate linkages to develop and transfer technology, a system was developed as seen in Figure 4 with the On-Farm Research Program (OFR). A major effort was made to improve on-farm trials and develop an IR/OFR systems prototype which could be institutionalized within ARC. Effective management training was conducted in six training centers to develop OFR technical packages and to develop better linkages between the researchers, OFR specialists and farmers.

In-country training programs especially in the IR and OFR programs became a mechanism for change in research management. Training programs helped increase the linkage and information exchange among and between researchers, on-farm research specialists and farmers. In the training program 511 staff were tested to determine their English skill level and English training helped 305 staff improve their English skills in preparation for study in the United States and for professional development. A Master Training Plan outlined the implementation of the academic, non-academic and in country training for the agricultural staff.

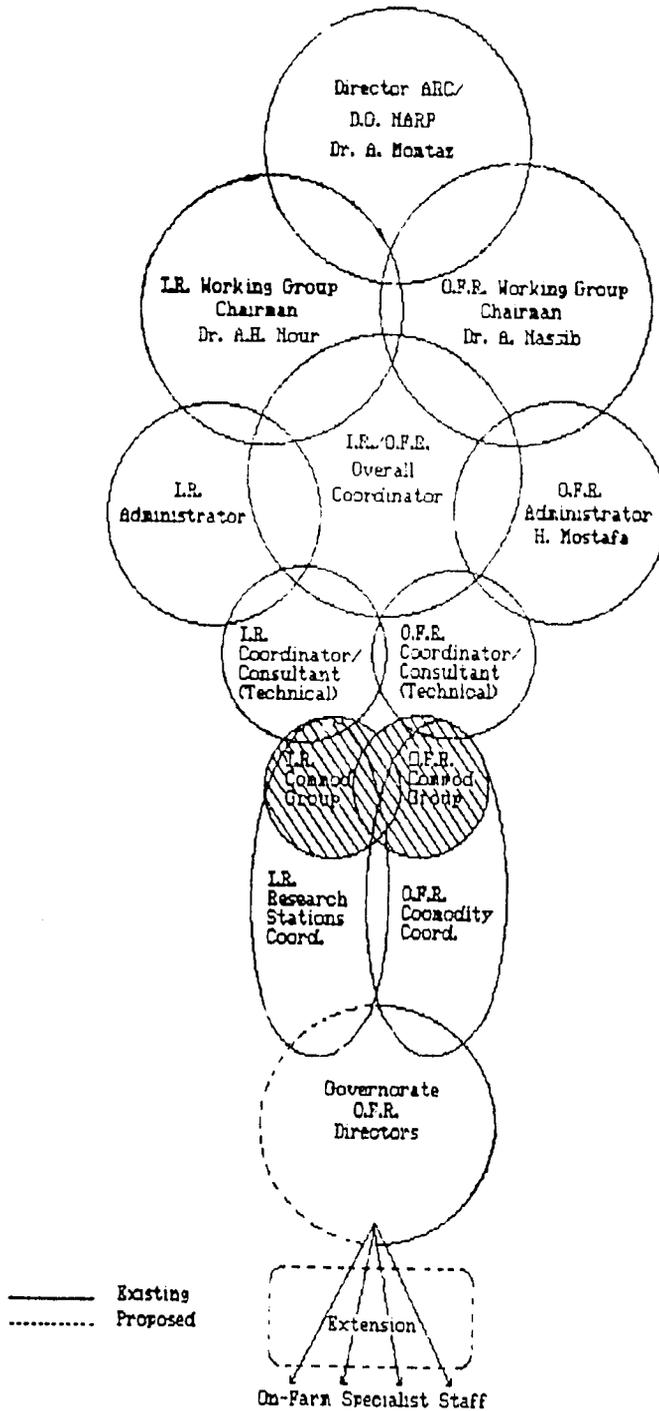
Extensive planning took place in research management. Overall plans were developed in all programs. The seed program staff helped identify and evaluate existing operations and institutions, overall needs and the infrastructure required to fill them. The priorities in research station management were to identify research land for the research stations, land improvement and weed control efforts in the research stations. Mechanization efforts were concentrated on developing and testing approaches for providing appropriate indigenously developed farm machines for local manufacture in the mechanization of small farm holdings in Egypt. In integrated pest management plans were made to introduce more rational and safer use of pesticides, to develop more nonpesticidal disease, pest and weed management tactics and to integrate the results into practical packages for farmers.

Appropriate and administrative financial procedures were studied in order to modify and implement timely financial resources within the research system.

Establishment of Research Linkages

Research linkages were developed this year with international agricultural research centers (IARCs), universities locally and abroad, private and semiprivate sectors and other governmental agencies. The Research Grants Program considered 353 research proposal topics from non-ARC agricultural research institutions in Egypt and from those topics about 200 proposals have been requested. More details about the research linkage

Figure 4. Functional Chart for ARC Research Program and Finance



activities and programs planned and implemented are contained in Appendix II.

Improvement of Research Services

In any research system, services are necessary in the implementation of research. Those functions which are most critical to NARP include facilities renovation, purchasing of commodities, information and communication systems, data service and analysis and technical assistance. Extensive planning in many of the components was necessary before the implementation phase could be started. Commodity lists and specifications had to be developed in many programs for the upgrading of programs and facilities. The Library and Information Systems Working Group spent a lot of effort in planning especially in developing commodity plans. The design of the Egyptian National Agricultural Library System needed to be completed before renovation could begin. Appendix III contains the planning and implementation of activities related to these services for 1987.

MAJOR RECOMMENDATIONS

Each program has areas that can be strengthened or specific recommendations which are needed in 1988. They are summarized as follows.

- Sufficient time must be taken this next year for the study and evaluation of the current management and administrative systems. Increased emphasis should be placed on formulation of workable changes and an increased understanding of why certain program options are chosen.
- Changes formulated in program policy must be well integrated with changes formulated in the management and administrative systems. The system must be continually evaluated and monitored to make changes where needed and to communicate the responsibilities and roles for all staff.
- Sufficient time must be allocated for management and its support organizations to understand and adapt changes in the system. Further analytical study needs to be done on the organizational framework of NARP, to assure that overall system changes will be institutionalized.
- Close collaboration between and among planners and implementors is essential for project success.
- Although a good linkage has already been developed between the IR and OFR programs, program efforts need to be more closely integrated in the future especially if extension programs are added in the project amendment.

- Training sessions must be planned and conducted continually from the top to the bottom of the organization since the system is in the process of reformation. Effective training programs can help institute the changes in the management and research system. Time must be taken to analyze, organize and implement those needed changes.
- As the first realistic step in helping develop a private seed sector, major international assistance over a period of years is urgently needed to establish the supporting government infrastructure.
- The new Egyptian National Agricultural Library System must meet the demands of the research community for information, specifically of the ARC, before extending services to a broader constituency. Therefore although plans call for a wide diversity of services and for preserving Egypt's agricultural history in documents, the first priority is to implement collection development and information services to the ARC.
- Universities both locally and internationally and research programs at ARC must be closely linked to develop mutual benefits of research results.
- Cooperation must continue to establish closer linkages with all international agencies to acquire their support for training, publications, germplasm, scientific visits and cooperative agreements where there can be mutual benefit to all parties concerned.
- Computers are needed with trained staff to process data generated by the project. Use of computers will help also in the monitoring and evaluating process within NARP.
- Additional support staff need to be hired or reassigned from other ARC areas and trained. They would assist in the Administrative Unit of NARP, and in the daily operational functions of implementing the University Grants, Seeds, Training, Library Services and Administration Programs.
- Management of the communication and information dissemination activities should be fully integrated into the present research system by providing technical assistance and training to create a momentum in improving present attitudes about and practices in libraries.

APPENDIX I

OBJECTIVE: TO STRENGTHEN THE OVERALL AGRICULTURAL RESEARCH MANAGEMENT SYSTEM, WHICH INCLUDES IMPROVEMENT IN THE MANAGEMENT OF THE ORGANIZATION, RESEARCH METHODS AND PERSONNEL DEVELOPMENT

PROGRAMS:

- A. Administrative Services
- B. Interdisciplinary Research
- C. Integrated Pest Management
- D. Manpower Development and Training
- E. Mechanization
- F. On-Farm Research
- G. Research Stations
- H. Research Support
- I. Seed

I. IMPROVEMENT OF RESEARCH MANAGEMENT

Improved program management is needed to provide the administrative structure for the accomplishment of overall management and research objectives and achievement of goals for the agricultural sector. Improved agricultural research management will help produce a system to improve research methods that can effectively develop interdisciplinary research approaches which will transfer the technology to the farmers. It will provide standard management procedures for all ARC research units including the research stations to develop a systems approach which is oriented to consider relationships of cropping patterns and to incorporate animals into the analyses. Improved seed supply and infrastructure is important to increase crop yields and reduce production costs. Training of staff in Egypt and abroad will produce a system with a cadre of trained managers researchers and support staff.

The major efforts for improving research management in 1987 are included in this section which includes the administrative services, interdisciplinary research, integrated pest management, manpower development and training, mechanization, on-farm research, research stations, research support and seed programs.

A. ADMINISTRATIVE SERVICES

Program management is interrelated with every facet of NARP. It provides the administrative fabric for the accomplishment of research objectives and achievement of research goals. Substantial time and effort has been expended this past year in the development of a management system for NARP and formulating the framework by which the overall activities of NARP will be implemented and monitored.

Significant progress has been made in this area in the specific overall management and monitoring system for the Research Support Program (RSP). In the beginning, the RSP was authorized through Amendment #1 to the Project Agreement. This line item was established to assist in the financing of operating costs for research activities of the ARC. Through Project Implementation Letters # 11, Amendments 1, 2, and 3, required procedures were established for disbursement of local currency costs. The payment and budgetary procedures were partially developed around individual research activities. Numerous people from NARP and USAID have been involved to develop a more acceptable method to finance the RSP. This has been a long and ever-changing process but changes in financing for the RSP has been agreed to by all parties involved.

Three major program purpose statements and associated outputs at the end of the project for the RSP have been formulated. Annual RSP plans will contain verifiable targets or incremental improvements in the overall research management system which are needed to achieve the End Of

Project Status (EOPS) over the life of the project. The three major purpose statements for the RSP are:

1. **Management** - An improved management system that effectively addresses the planning, implementation and evaluation aspects of research.
2. **Program** - An improved system for establishing research priorities within national development objectives.
3. **Financial** - An improved financial management system for budgeting, accounting and reporting of research expenditures.

A package of financial guidelines and instructions for use by researchers receiving funding under the RSP was developed and implemented in this year. This manual included instructions, expenditure definitions and reporting forms. The format of the forms included in the package, became a standardized format for implementation of the Research Grants, Interdisciplinary Research and On-Farm Research Programs of NARP.

The development of the research component amendment to NARP progressed slowly because a detailed justification was required by USAID and both the MOA and USAID must agree to the contents and implementation. This amendment will significantly increase the dollar value to the Grant Agreement and the responsibility of management to achieve the various objectives of NARP. The objectives will be attained by successful implementation of program reforms and prudent utilization of project resources.

Two additional components are currently being finalized which will be added to NARP. They are the technology transfer and policy components. The preparation of a proposed budget (Draft 1) for the technology transfer component was accomplished after lengthy discussion on program management and the development of a scheme to allocate resources between program elements.

As with the implementation of any complex project, the expectations of the working group and individuals involved in the overall management of NARP for this first year, often exceeded the actual accomplishments. The fulfillment of USAID regulations and Conditions Precedent consumed a level of effort and time not anticipated by all parties.

Recommendations include:

Sufficient time must be taken this next year for the study and evaluation of the current management and administrative systems. Increased emphasis should be placed on formulation of workable changes and an increased understanding of why certain program options are chosen.

Changes formulated in program policy must be well integrated with changes formulated in the management and administrative systems.

- Sufficient time must be allocated for management and its support organizations to understand and adapt changes in the system.
- Close collaboration between planners and implementors is essential for project success.
- Careful monitoring is essential for assisting program managers to assure that program objectives are met.
- Further analytical study needs to be done on the organizational framework of NARP, to assure that overall system changes will be institutionalized.

B. INTERDISCIPLINARY RESEARCH (IR)

The goal of interdisciplinary research (IR) is to develop a research management system that will be institutionalized within the ARC. Communication, coordination and cooperation is needed to develop a system from the researchers, from the laboratories and fields of ARC to the farmer and a feed back system from the farmer to the research center. Progress has been made in reaching this goal during the first year of the project in several areas. The first step was to coordinate all IR and on-farm research (OFR) in research development and training. An ARC research proposal form was developed that is now being used for development of all IR, OFR and integrated pest management (IPM) research activities. This form provides standard information on objectives, justification, action plan, experimental and statistical design, literature review and budget which facilitates monitoring the research and developing a computerized system of management.

In 1987 IR focused on developing activities which consisted of research teams selected from the disciplines related to major targeted research areas. The disciplines combined for example the research areas of crop rotation and intensification of field crops, water use efficiency and plant development, soil nutrition and salinity and forage/livestock integration. The ARC research institutes and central laboratories were responsible for providing the specialized research scientists that formed the research teams. The success of IR is directly based on the continual supply of new and revised information which is generated from strong, well organized and well supported disciplinary research being conducted in each research unit within ARC. Equally important are research information sources resulting from strong linkages with international agricultural centers, universities locally and abroad, the private and semi-private sectors and other governmental agencies.

Interdisciplinary research activities resulted in the following achievements.

1. Summer season commodities were developed and implemented for six field and horticultural crops in maize,

sesame, tomato, sweet sorghum, grape, and guava. (See Table 1). More than 10 institutes participated and the team approach was emphasized in conducting these activities.

2. The IR Working Group initiated an IR pilot activity for the new lands area entitled "Integrated soil, water, plant and animal research for new lands". Results thus far have shown the necessity of soil analyses for monitoring electro conductivity (EC), pH, cation exchange capacity (CEC), availability of macro- and micro-nutrients or, in other words, the physical and chemical characteristics of the soil. Equally important is the regular collection and analysis of soil samples for nematode infestation. Competition of weeds in all crops is a major factor in reducing yields both in the new and old lands. The general problems in the new lands of low organic matter, high salt content, sand blast from wind, large bird populations and localized problems of high water table and poor drainage result in questionable economics of attempting to grow some field crops, vegetables, and fruits.
3. As a result of field trips to Nubaria by researchers from all the institutes and information meetings in Giza, major target areas for IR activities have been identified. Table 2 identifies the major constraints.
4. Research activities were initiated in Nubaria at the beginning of winter season with establishment in the field crops of sugar beet, wheat, barley, faba bean, lentil, berseem, alfalfa, safflower, rapeseed, onion. Plans were made to plant experiments of vegetables including tomato, pepper, sweet melon, potato and the fruits which include citrus, apple, pear and grape. Cooperative research activities were also initiated by soil and water researchers with sugar beet and maize on plowing depth and furrow vs. basin irrigation respectively. IPM (Integrated Pest Management) researchers were involved in planning all proposals for crops research. Statisticians serve as team members of all experiments as well as developing cooperative proposals on plot dimensions, harvest area, replication number, etc. A forage evaluation experiment was initiated using invivo and invitro (with sheep) methods at Dokki and Nubaria respectively. Agricultural economists serve as team members on every IR activity and additional studies have been developed for problems on marketing commodities of crops and animals in the Nubaria region. (See Table 3).
5. A manual was prepared for IR and OFR activities which would help the research units in developing a system for research management. This manual outlined the methods and forms which must be used to gain approval for implementation of activities.

TABLE 1: SUMMARY OF INTERDISCIPLINARY RESEARCH PROGRAMS INITIATED DURING SUMMER 1987

COMMODITY	TITLE	LOCATIONS	SUMMARY OF RESULTS
Maize	Increasing maize yields to their economic optimum.	Nubaria Sakha Gemmiza Sids	Results of six locations showed no significant difference in yield of 20,000, 25,000 and 30,000 plants / feddan. Giza 1, Hybrid Th 310 and DC 204 yielded higher than DC 202 and Giza 2 cultivars when averaged over all plant populations at the six Upper Egypt locations. Ranking was Hybrid Th 310, DC 204 yielding significantly higher than DC 202, Giza 2 and Cairo 1 at seven locations in Lower Egypt. Yields were doubled over the check plot using herbicide Brado + Itrazine and one spray was equivalent to two hoeings. Applications of zinc and iron (minor elements) gave slight increased yields over the check plot. Addition of potassium fertilizer gave little or no response over many locations.
Sesame	Production and economic returns of sesame	Shandaweel Minia. Giza Mallawi Assiut, Fayoum Quena Sohag	The nine sesame varieties compared at 11 locations in eight Governorates showed the Ben Moussa location in Minia to produce twice the total yield compared to all other locations. No significant difference was noted among varieties. Chemical treatment of seed only and soil only both produced 27% higher yields than the control plot. The chemical control was against attack of powdery mildew and pollination diseases. Control of diseases is definitely economical.
Sweet Sorghum	Improved production, quality and economic returns of sweet sorghum under stress environments.	Nubaria Giza	Two sweet sorghum hybrids - very early and late - differed by 45 and 120 days from planting to flowering respectively. Advantage for the early hybrid was rapid growth, efficient utilization of inputs, reduced water requirement, good sucrose quality. Advantage of the late variety was much taller abundant production of stalk and yield and good sucrose quality. Bird damage eliminated yield evaluation.

TABLE 1: (Continued)

COMMODITY	TITLE	LOCATIONS	SUMMARY OF RESULTS
Tomato	Improved production, quality and economic returns of tomato with emphasis on heat and cold tolerance, pest resistance and cultural techniques.	El Kanater El Kassassin Sids	<p>The first experiment to evaluate tomato cultivar's resistance or tolerance to heat was developed too late for summer season 1987 but will be conducted in 1988.</p> <p>The second experiment planted during Nili season, has not yet been harvested. The variables are two cultivars, three rates of Nitrogen and two growth regulators applied at flowering.</p>
Grape	Proper timing of harvesting, storing and processing grapes to maintain quality and reduce postharvest loss.	Western Nubaria Company, Sids	The experiment was designed to evaluate two varieties at four locations and six dates of harvest to determine optimum picking times for quality storage, shelf life and decay percentage. Due to delay in funding the research, labor was not available and no data were collected for presentation.
Guava	Proper timing of harvesting, storing and processing Guava to maintain quality and reduce postharvest loss	Western Nubaria Company, Sids	The experiment was to evaluate ten times of harvest and two methods of harvesting - commercial vs. selected hand picking - to compare cost, time, gain, etc. The lack of budget planned for this research prohibited hiring labor to conduct the research. When proposals are approved, funding must be assured to conduct the research.

TABLE 2. MAJOR CONSTRAINTS IN THE NUBARIA REGION

i. Constraints of the farms* in the region and suggestions for research intervention:

A. Shortage of irrigation water in the canals

1. Different crop requirements needed for water available
2. Determine water use efficiency of surface vs. sprinkler vs. drip methods
3. Water quality - mixing canal and pump with drain water sources

B. Non-Efficient drainage system

1. Depth requirement of main and lateral drains
2. Develop method of controlling heavy weed growth in drains
3. Install drain tile in production fields

C. Salinity problems in the soil

1. Design adequate frequency of drainage field
2. Control water table with pumping and drains
3. Proper system and timing of irrigation needed for leaching

D. Lack of organic matter in the soil

1. Determine proper crop rotation for improvement
2. Evaluate differences in volume of root and crown for residue

E. Poor land leveling

1. Evaluate tillage practices to improve maintenance following leveling
2. Evaluate economics and timing of mechanical leveling
3. Use sprinklers and drip methods replace to surface irrigation

F. Heavy infestation of weeds

1. Control weeds during preplant and intercrop mechanical tillage
2. Use supplemental control with selected herbicides
3. Control weed seed sources along roads, canals, etc.

* Collective information from seven small farms (less than 10 feddans), five intermediate farms (less than 150 feddans) and six large farms (more than 500 feddans) (in South and North Tahrir regions plus ARC researchers working in the Nubaria region representing Field Crops, Horticulture, IPM, Soil and Water, Animal Production and Health and Economics Research Institutes. Also Nubaria Research Station and On-Farm Staff from Beheira.

- G. Nematode infestations destroying numerous crops
- H. Non-sufficiency in use of fertilizers-macro and micro-elements
- I. Shortage of forage and feed grains for livestock
- J. Diseases of animals related to diet, soil and environment

TABLE 3. IR PROGRAMS DEVELOPED FOR 1987-88 CROP SEASON IN THE NUBARIA RESEARCH STATION

SUBJECT AREA	TITLE	DATE OF INITIATION
Safflower-low moisture	Safflower growth and production farming and supplement irrigation in calcareous soil.	11/1987
Sugar beet	Row spacing, population density and sucrose quality of sugar beet in calcareous soils.	10/1987 and 1988
Water management	The effect of long and short furrows and basins on the efficient use of irrigation water and crop yield of sunflower (summer) and sugar beets (winter).	
Soil plowing depth	The effect of plowing in combination with organic manure and phosphorus application on crop yield of sugar beet (winter) and maize (summer).	10/1987
Soil, water & plant nutrition	Continuous laboratory analyses of cultivated area (18 feddans) for field, vegetable and fruit crops in Nubaria.	9/1988 & continuous
Sweet melon	Improvement of sweet melon production by the application of organic manure and chemical fertilizer.	2/1988
Peppers	1) Preliminary test of some pepper varieties for the new lands. 2) Effect of Potassium application and planting dates on pepper production.	
Tomato	Improved production, quality and economic return of tomato with emphasis on cultural techniques.	2/1988
Potato	Evaluation of some potato varieties for seed production under the environmental conditions of the Nubaria area.	2/1988
Citrus	Evaluation of the optimum quantity of water for citrus seedlings planted in new orchards.	2/1988

TABLE 3. (Continued)

SUBJECT AREA	TITLE	DATE OF INITIATION
Apple & pear	Evaluation of planting distances and pruning systems on apple and pear trees.	2/1988
Animal nutrition	Nutrition studies on forage crops and crop residues to improve feeding systems for Nubaria.	2/1988
Statistics	Estimation of soil variability, convenient plot size and number of replications for important field crops being cultivated in calcareous soils.	4/1988
Cropping sequence	Some measures for increasing crop intensification rate.	4/1988
Water use efficiency	Continuous cropping using a specific rotation for water stress.	4/1988
Crop rotations	Comparative studies on some forms of two and three years crop rotations to concentrate oil, grain and sugar crops in new reclaimed lands.	4/1988
Crop rotations	Rotation emphasizing forage and feed crops.	10/1987
Crop rotations	Influence of exhaustive cereal crop production in new lands.	10/1987
Crop rotations	Influence of exhaustive oil crop production in new lands.	10/1987
Crop sequencing	Timing of tillage, planting, irrigation and harvest for production of three crops annually.	10/1987
Alfalfa	Effect of alfalfa persistency on the germination and yield of the succeeding crops.	10/1987
Onion	1) Effect of some cultural practices on onion bulb production under Nubaria conditions, and	12/1987

TABLE 3. (Continued)

SUBJECT AREA	TITLE	DATE OF INITIATION
	2) Production of onions from seed as affected by plant distribution and density in Nubaria region.	Fall/1988
Soybean	1) Effect of foliar spray with micro-elements on soybean yield;	5/1988
	2) Effect of weed control on seed yield in soybeans.	5/1988
	3) Effect of P ₂ O ₅ and K ₂ O on seed yield of soybeans.	5/1988
	4) Screening for drought resistance in soybeans.	5/1988
	5) Evaluation of selected soybean cultivars for seed yield and different agronomic characters.	5/1988
Maize	Tillage effect on phosphorus and potassium availability, growth and yield of a maize hybrid.	5/1988
Sweet sorghum	Evaluation of cultural practices for production of sweet sorghum in the Nubaria region.	5/1988
Sorghum	1) Determination of plant population and fertilizer requirements for sorghum in the Nubaria region.	5/1988
	2) Evaluation of drought tolerance for Sorghum cultivars with limited irrigation.	5/1988
Agricultural economics	1) Marketing evaluation of animals and animal products in the new lands area.	5/1988
	2) Marketing of vegetables and fruits produced in the Nubaria area.	5/1988

TABLE 3. (Continued)

SUBJECT AREA	TITLE	DATE OF INITIATION
Integrated pest management	1) Major crop pest, disease and weed survey in the New Lands (Nubaria area).	5/1988
	2) New Lands alfalfa integrated pest management.	4/1988
	3) New Lands sugarbeet integrated pest management.	9/1988

6. Two-year rotation activities were designed and implemented for major crops in Sohag and Assiut Governorates. The title of the IR is "Maximizing Production of Major Crops in the Assiut and Sohag Governorates". One site of five feddans was chosen in each Governorate and the Undersecretaries of these two Governorates will coordinate the IR activities with technical support from an IR team from the Shandaweel Research Station. The objectives of these experiments are:

- To apply the best technological package of practices to winter crops of wheat, and faba beans and summer crops of cotton and maize;
- To involve all relevant research disciplines as an interdisciplinary team to design the research trial, collect soil, plant, water samples, socio-economic and agronomic data and harvest;
- To summarize and report findings to research institutes, on-farm research staff, extensionists and farmers; and,
- To formalize an IR system for developing and transferring technology from central and regional research agricultural directorates of on-farm research and extension staff to the farmer encouraging feedback information from farmers to researchers.

Preliminary results from the Assiut location support the practice of establishing cotton ridges in the wheat crop for ease of irrigation, better weed competition and gain of three weeks between wheat harvest and planting cotton by no-till on the ridges. A lesson learned at the Sohag location was the importance of timely harvest of cotton, proper tillage of the heavy soil and uniform seeding depth of wheat using the wet method. Lack of this combination of practices by the farmer resulted in poor stand establishment, thus a marked reduction in yield potential. A pronounced difference can also be noted in the two locations in good water distribution at Assiut where the soil was laser levelled and Sohag which could not be levelled because of late harvest of cotton.

7. An IR/OFR trial which includes a survey was developed with all five sections of the Animal Production Research Institute in two villages in Kafr El Sheikh. The objectives of the coordinated research trials are:

- To introduce new technologies on the utilization of crop residues for ruminant feeding using treatment and supplements;
- To distribute improved breeds of poultry, sheep and goats,
- To follow-up the performance of previously developed crossbreeds of cattle and buffalo; and,

- To provide improved sires of buffalo and AI (Artificial Insemination) and ET (Embryo Transplant) for cattle.

The pilot villages will be located in the Kafr El-Sheikh Governorate.

C. INTEGRATED PEST MANAGEMENT (IPM)

IPM research is needed to introduce more rational and safer use of pesticides, to develop more nonpesticidal disease, pest and weed management tactics and to integrate the results into practical packages for farmers.

The overall objective is to develop a system whereby new tactics for managing pests, diseases, weeds and pesticides, along with existing procedures will be integrated across plant protection disciplines as packages of practices that become part of the total management program by crop. The results must be practical for use by farmers.

In the ARC the Plant Protection Research Institute, the Plant Pathology Research Institute, the Central Agricultural Pesticides Laboratory and staff of several other units conduct plant protection research. Also several universities especially Cairo University and the University of Alexandria, conduct IPM research while private enterprise engages in pesticide sales.

The accomplishments of the Working Group in 1987 were mainly achieved by cooperating with other programs such as the Interdisciplinary and On-Farm Working Groups and programs. Practices planned with OFR research are shown in Table 4. Research topics developed for crop-associated IPM pilot activities for wheat, tomato and citrus are shown in Table 5. Research topics proposed for the New Lands IR programs in Nubaria concerned implementing a survey of most significant pests, diseases and weeds and IPM programs for alfalfa and sugar beet .

More balanced program emphasis was sought in solving Egypt's plant protection problems relevant to the national importance of specific biological constraints to crop production. In particular, plans were developed to increase the level of activity for weed control and management of losses from birds. Additional objectives addressed, which will receive considerably more attention, are:

- Institutional strengthening;
- Plant protection diagnostic units;
- Crop loss surveys;
- Economic injury levels; and,
- Quarantines.

Table 4: IPM Practices Submitted for On-Farm Trials, Winter Season

Crop	Trial Practices		
	Insects/Mites	Diseases	Weeds
Potato	2	1	1
Tomato		1	1
Wheat	1	1	1
Citrus	2	1	
Sugarcane	1		1
Onion/Garlic	1	1	1

Table 5: Planned Crop-Associated IPM Research Topics starting in February 1988

Crop	Research Topics
Wheat/Barley	<ul style="list-style-type: none"> Wheat/barley disease resistant lines Identifying races of pathogens Chemical control of diseases Population dynamics of wheat aphids Biological control agents of aphids Wheat/barley aphid resistant genotypes Resistance of wheat varieties to insect pests Monitoring insecticide resistance in aphids Preventing losses from birds Control of wild oats
Tomato	<ul style="list-style-type: none"> Varietal resistance to blights and mildew Varietal resistance to wilts Developing varieties resistant to viruses Varietal resistance to root knot nematodes Varietal resistance to <i>Orobanche ramosa</i> Compatibility of pesticides used on tomato
Citrus	<ul style="list-style-type: none"> Bait sprays to control Mediterranean fruit fly Integrated control of citrus scales Studies on whiteflies attacking citrus Natural enemies of citrus insect pests Integrated control of phytophagous mites Survey of citrus tree borers Spray oils in citrus IPM Reduction of postharvest losses from fruit rots.

Preparation began for ARC staff training and short term technical assistance in:

- Weed management;
- Bird damage management research;
- Computerized modeling of pests, diseases, weeds and pesticide/environment; and
- Pesticide management.

Significant progress was achieved in this first year considering the diversity of disciplines interacting together and the variety of activities attempted. ARC staff participation was greatest and most enthusiastic for crop-associated IPM pilot projects, and for interdisciplinary research, suggesting that these avenues hold much promise for improving integrated pest management. Better planning and management is needed in IPM, from the conception and early schedule and budget development of research topics to integration of activities among disciplines.

D. MANPOWER DEVELOPMENT AND TRAINING

Manpower development and training in the agriculture sector is critical. Egypt's future will depend on having highly organized programs with trained managers, scientists and technicians who can develop and implement improved technology.

The principal objective of the training component of the NARP is to provide adequate opportunities to improve management systems development and applied or adaptive research methods. In addition to strengthening the managerial and technical capacities of staff, training will produce personnel who are better prepared to work with individuals and groups of farmers to conduct on-farm research.

Considerable progress has been made in the overall planning and early implementation of manpower development and training in 1987. The following major areas were involved:

- A significant amount of time and effort was spent by the Training Working Group to write the Master Training Plan which contained a complete description of the training process, objectives, planned out-of-country and in-country training activities, justification, and implementation and evaluation procedures. The Plan was approved by USAID in the last part of September and fulfilled the Training Condition Precedent.
- A summary of the 5 year in-country training plans was submitted in the Master Training Plan which outlined over 50,000 opportunities for in-country training. The Annual In-Country Plan approved by the Training Working Group and submitted by the Director General

to USAID in December contained the specific plans and proposed budget for FY 87-88.

- A Request for Proposal (RFP) which reflected the training needs designed for out-of-country training in the Manpower Development and Training Plan was prepared, approved by USAID and advertised in November in the Commerce Business Daily. Responders must submit their proposals by February 29, 1988.
- Thirty-eight academic trainees supported in previous USAID projects continued their degree programs in the United States under NARP. Approximately \$2 million USD of the training budget will help these trainees complete their training. Considerable coordination was needed with USAID concerning the students' grades, training programs, need for extensions and additional program costs in their programs. Information concerning the trainees, are contained in Table 6.
- Four trainees traveled out of Egypt to attend short term training in their speciality areas. Drs. Nabil El-Mowelhi, Imam Allam, Mohamed Sharaf and Engineer Ragaa Abdel Hadi attended conferences in the United States.
- English testing in-country was provided for 511 trainees and English training was provided for 304 trainees. USAID agreed to provide training for advanced and Pre-TOEFL classes while a separate contract with American University in Cairo (AUC) provided training for the beginning and intermediate classes. A computerized system was designed to provide current information on the trainees' names, institutes, training dates and scores. See Table 7 for the summary which shows the total number of people who have been trained to the end of 1987.
- On-Farm Research In-Country Training in theory and field practicum for 486 staff was a major achievement in training and a model of cooperation between staff of the Working Groups of Interdisciplinary Research, On-Farm Research and Training; and the staff from the Center for Management Development (CAMD), six institutes, and MOA and USAID personnel. The IR/OFR training is not only training staff but it is developing a system where researchers, OFR specialists and Extension can work with the farmers in technology transfer. This training also provides a model for designing other types of in-country training. A more complete description of the training is contained in the On-Farm Research section, I F.
- The Manpower Development and Training Plan, NARP Publication No. 8, was issued in November.

A system has been started that can be followed throughout the Project. However, this component is complex and requires cooperation from many staff members and organizations within NARP. Recommendations include:

TABLE 6: ACADEMIC STUDENTS FUNDED FOR 1987 IN THE UNITED STATES

NAME	UNIVERSITY	SPECIALTY	DEGREE
Abdel Ghani M. Abdel Ghani	U. Wisconsin	Genetics	PhD
Abdel Moez Abdalla	Michigan State University	Limnology	PhD
Abdel Rahman El Gamal	Auburn University	Fisheries	PhD
Ahmed Ibrahim El Demery	Auburn University	Aquaculture Economics	PhD
Ahmed Mahmoud El Miniawy	U. California	Agricultural Economics	PhD
Ahmed Mahmoud El Shirbini	Auburn University	Fish Breeding & Genetics	PhD
Ahmed Zaki Abdel Halim	U. of Wisconsin	Field Crops/Forages	PhD
Emad Zaki El Hawary	U. of California	Policy Analysis	PhD
Fatma El-Nemaki	U. Michigan	Fisheries	PhD
Fawzy Hashem	U. Maryland	Soil Microbiology	PhD
Galal A. M. Mahgoub	U. Wisconsin	Agronomy	PhD
Gamal Osman El Naggar	Auburn University	Aquaculture	PhD
Hussein Abdel Moniem Hebicha	Auburn University	Aquaculture Economics	PhD
Ibrahim El Shistawy	Auburn University	Fisheries	PhD
Mohamed Abu Zeid El Nehrawy	U. of Wisconsin	Forage Breeding	PhD
Morsi Ali Fawzi Morzi	U. of Wyoming	Applied Statistics	PhD
Moustafa Abdel Latif Bedeir	Oregon State University	Applied Statistics	PhD
Moustafa Azab Moustafa	U. of Wisconsin	Agronomy	PhD
Noaman Maher Noaman	Montana State University	Plant Breeding	PhD
Osama Ahmed Mourtaz	New Mexico State University	Plant Biotechnology	PhD
Safwat Sidhom Awad Sidhom	Oregon State University	Ag. Economics	PhD
Sami Reda Saber Sabry	Montana State University	Wheat Plant Breeding	PhD
Sami Zaki Moussa	U. of Arizona	Econ/ Fishery	PhD
Shaaban Kotb	U. Maryland	Algae Microbiology	PhD
Tarek Mohamed Khalil	North Carolina State Univ.	Ag. Economics	PhD
Aboul Magd Abdel Hamid	Auburn University	Fisheries	MSc
Al Walid Abdel Mohsen A. M. Mohamed	Auburn University	Fish Biology	MSc
Gouda Youssel El Naggar	U. Idaho	Mechanization	MSc
Hamid Hashem Ibrahim	Auburn University	Basic Fisheries	MSc
Ismail Abdel Hamid Radwan	Auburn University	Basic Fisheries	MSc
Mahmoud Ali Rizk	Auburn University	Limnology	MSc
Mahmoud Salah Eldin M. Madkour	Auburn University	Civil Engineering	MSc
Mohamed Alaa Eldin Abdel A. Awad	Auburn University	Fish Diseases	MSc
Mohamed Ali Hussein Morsy	Auburn University	Fish Diseases	MSc
Mohamed Mahmoud Ebeid	Auburn University	Limnology	MSc
Sami Abdel Hadi M. El Ghamrini	Auburn University	Aquaculture	MSc
Taheya Abdel Aty Abdel Aty	Auburn University	Soil and Water	MSc
Youssef Hassan Haggag Ashwa	Auburn University	Fish Parasitology	MSc

TABLE 7: ENGLISH TESTING AND TRAINING SUMMARY

INSTITUTE	NUMBER OF TRAINEES				
	TESTED	TRAINED			
		Elementary	Intermediate	Advanced	Pre-TOEFL
Field Crops Research Institute	96	12	2	1	
Fiber Crops Research Institute	25	7	6	1	
Sugar Crops Research Institute	17	12	1	1	
Horticulture Research Institute	21	14	8	2	1
Animal Production Research Institute	25	5	6	2	
Animal Health Research Institute	15	2	6	4	2
Veterinary Serum & Vaccine Res. Institute	13	3	4	2	4
Animal Reproduction Institute	12	2	2	2	
Soils and Water Research Institute	14	9	2	8	5
Plant Pathology Research Institute	15	6	8	1	2
Plant Protection Research Institute	11	7	3	5	2
Ag. Mechanization Research Institute	14	6	1	1	1
Agricultural Economics Research Institute	24	14	4	2	4
Extension & Rural Development Institute	14	4	4	2	
Central Agriculture Pesticides Laboratory	14	12	1		1
Central Laboratory for Food and Feed	5	2	2		
Central Laboratory for Ag. Statistics	1	1			
Central Organization for Seeds	122	40	19	2	2
On-Farm Trials Department	3	1			
Administrative Unit	5	1		2	
Data Collection and Analysis	20	4			
Library & Information	25				
TOTAL	511	164	79	38	24
GRAND TOTAL TRAINED					305

- Staff need to be assigned to the Training Working Group and trained to perform the daily activities needed to implement necessary programs.
- The system of providing training must be carefully monitored and can most effectively be handled through the use of computers to compile the amounts of data that will be generated on the trainees and programs.

Effective training programs can help institute changes needed in the management and research system. Time must be taken to understand and analyze needed changes.

- Close collaboration will be needed with other Working Groups in providing training to improve the management and research system.

F. MECHANIZATION

Lack of commercial-style machinery development is a serious constraint for the proper development of farm mechanization and local production of farm machines in Egypt. Indigenous development of farm machines has proved highly effective in fostering local machinery manufacture in the South and Southeast Asian countries.

A similar approach of providing appropriate indigenously developed farm machines for local manufacture can prove quite effective in the mechanization of small farm holdings in Egypt. Since research and development is almost non-existent in the local farm machinery industry, it is important that the public research institutions devote special attention to developing marketable farm machines for local manufacture in the country. For this reason, a proposal was finalized for setting up a commercial style Machinery Development Program at the Agricultural Mechanization Research Institute (AMRI).

A number of seminars and discussions were organized at different research institutions to provide greater understanding of the machinery development process for commercial production. Design assistance was also provided to a number of research institutions and manufacturers in improving and modifying the machines being developed by them.

The following studies and tests have been conducted to help in the development of suitable machinery for Egyptian farm conditions.

- A proposal with appropriate survey forms was developed for assessing the type of threshers preferred by farmers and local machinery manufacturers;
- Comparative studies were undertaken to assess the economics of harvesting cotton mechanically and by manual methods;

- Studies were undertaken to assess the effect of tillage depths with different tillage equipment and for determining power requirements for mechanizing potato production;
- The development of a thresher for flax continued to make progress with the completion of a second prototype machine which is scheduled for tests during the coming season;
- Field tests were carried out to compare different types of seed drills and maize harvesting machines;
- Tests were conducted for assessing the performance of a self propelled reaper for harvesting soybeans;
- An experimental thresher is being developed with separate straw chopping knives;
- Tests were conducted on three different self propelled reapers; and,
- Two improved 1.2 meter wide IRRI reapers were received from the Philippines which will be evaluated for harvesting wheat and paddy during the next seasons.

Achievements in other important areas are as follows:

- Plans for improving research capabilities in agricultural mechanization have been finalized and are being executed. There is a need for expediting the execution process so that adequate attention could be devoted to the development of many urgently needed machines.
- The NARP procurement lists for farm and laboratory equipment were finalized. Specifications of equipment for the machinery design drafting office, machinery test and evaluation facilities and prototype machinery fabrication were developed.
- Four technical sessions were organized to solicit problem-oriented research proposals for NARP Grant support in the Agricultural Mechanization area which are now being processed.
- A proposal for establishing central facilities for repair and maintenance of a wide range of ARC laboratory equipment, vehicles, tractors, machinery and buildings was developed and approved for inclusion in the amended NARP proposal. Work was also initiated for improving the interim facilities at ARC for automobile repairs and maintenance.

Inadequate staffing and procedural problems are the two major constraints in the execution of the agricultural mechanization research programs and they need special attention at this stage.

F. ON-FARM TRIALS

Prior to NARP verification trials were conducted with several replications with six or more variables. These important trials were generally conducted by ARC researchers on the Research Stations or in very selected farmers fields where they were managed by the researcher. On-farm research trials have no more than one or two replications with no more than 2 or 3 variables so that the farmers can distinguish the difference in the results. The trials should also be easily managed by Governorate on-farm research specialists under the supervision of ARC researchers.

In the 1987 summer season, a major effort was made to develop an IR/OFR systems prototype which can be institutionalized within the ARC, easily managed and affordable at the conclusion of NARP. Table 8 provides a summary of trials conducted using principles related to the systems prototype.

The OFR trials conducted during the summer cropping season provided an opportunity to understand the programming environment in the Governorates. The system needed to be modified to overcome some of the programming constraints. Because of this experience, it was possible to have 536 winter crop OFR trials, representing eight field crops, ten horticultural crops and two sugar crops ready for the 1987-88 winter season as well as preliminary plans for the 1988 summer crops OFR trials. The winter crops on-farm trials conducted are given in Table 9.

After evaluating the experiences in the 1987 summer season it was concluded that an intensive management training course was needed. A course was planned and implemented to develop appropriate procedures for conducting good trials as well as to strengthen a linkage relationship between the ARC researchers at Giza and those in the Research Stations throughout Egypt. Linkage relationships were also well established between the researchers and the Governorate OFR specialists. The researchers developed OFR technical packages and they were also trained as subject matter specialists. After their training as trainers these researchers provided training for the On-Farm specialists in six different locations to conduct and manage the on-farm trials for the 1987-88 winter crops. The Interdisciplinary Research and On-Farm Research Management Course involved 113 researchers as given in Table 10 who served as trainers for 323 trainees in technical subject matter. Table 11 summarizes the number of trainers and trainees, number of trials designed and conducted and types of crops and disciplines represented by location of training.

A winter crops field practicum course followed the classroom training. Some of the trainers from the classroom training plus other researchers nominated from the Research Institutes provided training in the field during the growing season. They represented 20 different commodity crops and 7 subject matter disciplines.

TABLE 8: SUMMARY OF ON-FARM RESEARCH TRIALS CONDUCTED DURING SUMMER 1987

COMMODITY	TITLE	LOCATIONS		SUMMARY OF RESULTS
Maize	Effect of recommended practices vs. farmers' practices for three improved and one farmers' variety	13 Governorates and 23 Locations		Three improved and one farmer varieties were compared by recommended vs. farmer practices at 23 locations in 13 Governorates. The farmer's practices were equal to or better than the recommended practices for improved and farmer varieties for seven of 23 locations. The improved cultivars ranked DC 204 (first), Giza 2 (second), Kamak (third) and Farmer varieties (fourth). The farmers have adopted improved varieties at several locations and yield averages were higher than local varieties.
Sesame	Recommended varieties, fertilizer application and population density vs. farmer practices.	Ismailia Tel El Kibir Arish Abou Soier	Quena Taramasa Al Mana Al Nomien Dandara	The commercial variety Giza 32 was compared using the recommended vs. farmer methods at five and three locations in Quena and Fayoum respectively. The recommended package produced 17% higher yield (6.05 ardabs/feddan) than the farmer method (5.17 ardab/feddan). Equivalent increase was recorded for Assiut locations and the variety Giza 32 yielded 25% higher than variety Giza 25. Average yields were over two ardabs/feddan more in Quena compared to the other Governorates.
		Assiut Bakor Dekran Al Boura Tassa	Fayoum Toon	
Soybeans	Recommended practices of Potassium and minor elements on improved varieties.	Gharbla El Dalgamon Berna	Menoufia Menouf Soubrabass	Results of 60 units Nitrogen, 22.5 units Phosphorus compared to these rates with 48 units Potassium in forms of Sulphate and Chloride resulted in 10% and 12 % increases respectively with the latter applications.

TABLE 8: (Continued)

COMMODITY	TITLE	LOCATIONS	SUMMARY OF RESULTS
Soybeans	(continued)	<p>Assiut Tassa Al Badra</p> <p>Quena Al Taramsa</p> <p>Kafr El Shlekh Abou Badawy</p>	Addition of the minor elements iron and zinc both resulted in increased yield over the checkplots in all Governorates. Later C4 varieties were higher yielding than the variety Crawford.
Maize and French Bean Intercropping	Row configurations when intercropping maize and french bean for optimizing yield potential.	<p>Sharkia Qubba</p>	Results of intercropping french beans with maize no matter what intra - and inter-row spacing showed large reduction in total yield compared to maize in solid stand. Therefore the recommendation is for maize alone in production.
Cottonn-Onion and Cotton-Garlic Intercropping	Comparison of plant populations and levels of Nitrogen on yields of the two crops cotton-onion and cotton-garlic.	<p>Kaliubia Kafr Moussa Al Sakania Kaha</p>	Cotton populations of 70,000 plants/feddian gave consistently higher yields than 105,000 plants/feddian and neither showed an effect on garlic. Nitrogen level of 90 units/feddian and 25 thousand plants/feddian was better than 60 or 105 units N and 15 or 35 thousand plants/feddian. Onion responded best at the 105 units of N application.
Tomato	Determine economic returns to farmers using recommended vs. farmers' practices.	<p>Ismailia Fayoum</p>	The three varieties were sown during the Nili season and results are not yet available since harvest is still in progress. Delayed funding caused delay in purchasing required seed, thus the late initiation of the study.

TABLE 9: NUMBERS OF WINTER 1987-88 ON-FARM TRIALS FOR CROP COMMODITIES PER GOVERNORATE

Governorate	CROPS																		** Total Trials	Govern. OFR Specialist Staff***
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII		
Alexandria	2			4		1												7	8	
Kafr El-Sheikh	5	2	1	6	2									10		5		2	33	25
Beheira	4			2	8		2	4			2					5		5	32	69
Damietta	2			2	8											2			14	14
Dakahlia	7	11	2		8				2		2								32	71
Menoufia	4				8		1	2		15			3						33	40
Sharkia	6	7		2	8		2			15						5	10		55	45
Gharbia	5		2		8	4	1	4			2	3	6		5				40	46
Qalubia	2	11	2		8		2			20	4		3						52	35
Giza	2						2	2	3	30		2							41	8
Beni Suef	5		1		8		2		1			2							25	22
Fayoum	3			2	8		1												14	17
Minia	4		1		8														13	21
Assiut	4		1		8			2								5	5		25	20
Sohag	5		3		8										6				22	38
Quena	4				8								3		4	5	5		29	11
New Valley	2																			0
Ismailia	2			2	6		2			38	4	2							56	6
Mersa Matrouh	*1			3															4	0
Sinai	*1			2															3	0
Aswan	2														2				4	4
Total No. Trials	72	29	14	16	120	6	16	14	6	118	8	12	12	16	12	33	25	7	536	500

CROP KEY

I	Wheat	XI	Tomato
II	Crop Int.	XII	Potato
III	Onion	XIII	Banana
IV	Barley	XIV	Sugar Beet-only marketed in Kafr El Sheikh
V	Forage	XV	Sugar Cane
VI	Flax	XVI	Faba Bean
VII	Citrus	XVII	Lentil
VIII	Deciduous	XVIII	The farmer cannot market this crop You must pay for the harvest or omit the trial from the farms.
IX	Garlic		
X	Cucumber		

- * Triticale instead of wheat.
- ** Numbers of trials for specific Governorates based on importance of the crop in the Governorate.
- *** Some Governorates have disproportionate numbers of staff for requested numbers of trials. Plans to overcome this constraint are being developed to train Extension staff for OFT management, especially for fruits and vegetables as well as some field crops.

TABLE 10: Trainers for Winter Crops 1987 - 1988

Crop	Name of Trainer
Wheat	Abdel Latif Eissa
Wheat	Abdel Rahman Hashem
Wheat	Mamdooh El Shami
Wheat	Mohamed Iskandar
Wheat	Moussa Guirguis
Wheat	Raafat Mitkees
Wheat	Sayed Khalil
Food Legume	A.Boria
Food Legume	Hamdi Aziz
Food Legume	Helmi Farrag
Food Legume	Mohamed A. Rizk
Food Legume	Mohamed Wahid Hassan
Food Legume	Sanad Riad Salib
Forage	Abdel Hamid Tounis
Forage	Abdel Sahie E.D. El-Shahawy
Forage	Abdel Shaafie
Forage	El Sayed Ismail Mohamed
Forage	Farouk Metwalli
Forage	Gamal Ali Ramadan
Forage	Gamal Samy Mechaiel
Forage	Ibrahim Hanna
Forage	M.Abdel Gaffar Harfous
Forage	Mohamed Abou El Magd
Forage	Mohamed Hafoush
Forage	Nabil Sawiris Maawad
Forage	Salah Abdel Hadi
Citrus	Abdalla Soualam
Citrus	El Hafdi Nasser
Citrus	Latif fahmi
Citrus	Magdy Naguib
Citrus	Mohamed El Hadi
Citrus	Mohamed El Sabah
Citrus	Mohamed Hussein
Citrus	Mohamed Shorbagy
Citrus	Moustafa Nokrashy
Citrus	Salama Aid Salam
Citrus	Sameih Sayed
Citrus	Sami Mousstafa
Deciduous	El Gharib Sheble El Bana
Deciduous	Enayat Abdel Aziz
Deciduous	Mohamed Abdel Fattah
Deciduous	Mohamed Halil
Deciduous	Mohamed Makarem
Deciduous	Mohamed Mekalim
Deciduous	Mohamed Zaki
Deciduous	Naguib Sami Guirguis
Tomato	Adel Metwalli
Tomato	Ahmed Zein
Tomato	Wedad Shawki
Banana	Ahmed Moustafa
Banana	Hamdi El Nasser

(Cont'd)

TABLE 10: (Continued)

Crop	Name of Trainer
Banana	Mahmoud Miaz
Banana	Mahmoud Riad
Cucurbit	Abdel hakim El Shami
Cucurbit	Hamdi El Dawini
Cucurbit	Hassan Shabeen
Cucurbit	Mohamed Shoushl
Cucurbit	Sami Abdel Moneim
Onion	Awad El-Said
Onion	Fathi Abdel Gaber
Onion	Magdy Henry
Onion	Mohamed Youssef Mohamed
Sugarcane	A.I.Allam
Sugarcane	Ahmed Abu-Dooh
Sugarcane	M.A.Hassan
Sugarbeet	Ibrahim El Gadawi
Sugarbeet	Mahmoud Ahmed El Manhaly
Sugarbeet	Moustafa A. Farag
Garlic	Abbas Zaki Osman
Garlic	Abdel Moniem Mohamed
Garlic	Sherifa Foda
Potato	Ahmed Fayed
Potato	Monier Zaki Abdel Hak
Horticulture	Mahmoud Hamdi
Barley	Farid Azzer
Entomology	Abdel Fatah Hashem
Entomology	Aida El Hakiem
Entomology	Ekram Helmy
Entomology	Fathi Abdel Aziz
Entomology	Fawzy Hyder
Entomology	Kobaise Kassem
Entomology	Mahmoud Assem
Entomology	Nabil Mohamed Abde El Salam
Entomology	Samia Mohamed Abd El Samad Nada
Entomology	Sultan Foda
Economic Analysis	Mahmoud Ahmed Said
Economic Analysis	Mohamed Sultan
Economic Analysis	Monier Foda
Pathology	Ahmed Basiour
Pathology	M.Y.El-Sawah
Pathology	Sayed Abbas Eid
Soil & Water	Ezzat Naguib Gingi
Soil & Water	Fawzy El Tohami
Soil & Water	Wagdy Nazeir Dimian
Weeds	Ali Abdel Hadi
Weeds	Hafez Taha Al-Marsafy
Weeds	Kassem Ghoneim
Weeds	Mohamed El Msry
Weeds	Mohamed Elian
Statistic Analysis	Dawlat El Sergani
Statistic Analysis	Gharib Abdel Raouf
Statistic Analysis	Louis Ibrahim

(Cont'd)

TABLE 10: (Continued)

Crop	Name of Trainer
Statistic Analysis	Louis Ibrahim
Statistic Analysis	Sayed Nasr
Statistic Analysis	Tamoun Abdel Karim
Crop Intensification	Adel Aziz Mohamed
Crop Intensification	Ahmed Sabry El Gamal
Crop Intensification	Ahmed Said Kamil
Crop Intensification	Kamal Imam El Zhabak
Crop Intensification	Mohamed Nour Sheerif
Oil seeds	Ahmed El Khafouri
Oil Seeds	Mohamed Atel Auzin Sallah

TABLE 11: IR/OFR Management Course (First Phase) August 19 - October 1, 1987

Training Centers/ Governorates	No. of Trainers	No. Of Trainees	No. of Trials Designed/ Modified During Training (1)	No. of Trials Conducted Winter Season	No. Different Field & Horticultural Crops	Trainer Opportunities as Trainees (2)
EL Kanater - 8/19-20 Train the Trainers	5					45
Shandaweel - 8/24-27	22		22			22
Aswan		1		4	2	
Sohag		26		22	4	
Quena		2		29	6	
Sids - 8/31 - 9/3	21		24			21
Assiut		9		25	6	
Fayoum		0		14	4	
Beni Suef		10		25	7	
Minia		15		13	3	
El Kanater - 9/7-10	22		23			22
Giza		11		41	6	
Menufia		25		33	6	
Qalubia		22		52	8	
Sakha - 9/21-24	23		25			23
Kafr El Shiekh		11		33	8	
Dakahlia		33		32	6	
Gharbia		27		32	6	
Damietta		8		14	4	
Ismailia - 9/14-17	22		23			22
Ismailia		9		56	7	
Sharkia		30		55	8	
Sinai		0		3	2	
Mamoura - 9/28 - 10/1	25		27			25
Beheira		33		32	8	
Alexandria		6		7	3	
Mamoura - 9/30	3	19				
ARC - Giza - 10/7	6	41				
Total	149	338	144	549		180

(1) Trials developed between Trainers and Trainees for zonal modifications

(2) Actual total different trainers were 133. Some staff were present at more than one location.

An evaluation of the management courses for the winter crops showed that the following recommendations were important for future training.

1. Training should be increased from 4 to 5 days.
2. Each lecture period should be increased from 30 minutes to 45-50 minutes, but the small group interactive format should be retained.
3. Training should be included for conducting effective field days for OFR trial farmers, neighboring farmers and selected extension staff.
4. OFR trial farmer participation should be included and emphasized in the training courses.
5. Participants should be encouraged to stay at the training centers for the whole training.

An ARC research activity planning form was created to help in the development of an effective research system. This instrument gives direction for both IR and subsequent OFR technical package development as well as OFR trials management.

The OFR Working Group was active in coordinating the programming efforts of the OFR Management Team under the direction of Dr. Abdallah Nassib, Working Group Chairman. Eng. Hussein Mustafa is the General Director and Dr. Omar Shehata is the Overall Coordinator in the OFR program. Each have assigned technical support staff to help them in coordination efforts.

The preliminary plans of the OFR animal component have been developed. Village surveys and subsequent OFR trials will begin during the first quarter of 1988.

The success of the program in 1987 can be attributed to the fact that there has been a total team effort to develop an effective system to manage whatever number of OFR trials are needed to have technical packages ready for transfer by extension staff to farm families. The design of the training program made it possible to not only provide technical subject matter and OFR trials management skills development but also to create a natural environment for strengthening the linkage relationships between the ARC researchers, staff in research stations and the Governorate OFR specialists.

It is important to continue with the process now being employed to develop a model which will further develop, test and modify the IR/OFR prototype system. This will insure effectiveness for having a continuous flow of appropriate agricultural information and technology for the Egyptian farm families that will maximize net farm profit and optimize productivity.

In 1988 it is recommended that annual IR/OFR trial plans be developed. There should be an increased emphasis to develop research, OFR specialist and Extension linkage relationships. Computers need to be used to record data and provide analysis to insure rapid information feedback to researchers and OFR specialists which is used to develop technical packages for transfer to farmers by extension. The reliability of technical packages must be increased.

G. RESEARCH STATIONS

The purpose of the ARC research stations is to provide a desirable environment so scientists can conduct innovative and purposeful applied research on agricultural problems in the local area. To achieve this goal requires many major "inputs" such as capable and motivated personnel, soil, water and land improvement, construction of new or renovated facilities, purchase of commodities, and training.

Research stations in Egypt have been strategically located to solve agricultural problems of the area. Some research stations conduct research on only two or three commodities, while others are located in areas with a highly diversified production of livestock and crops. Resources, including research and support staff, infrastructure and financial support, vary considerably. Some stations are overstaffed while others are understaffed. All stations lack sufficient operating funds; however those stations previously involved in donor supported projects have better facilities than the others. The infrastructure was significantly improved at the research stations associated with the Rice Research and Training Project, Egyptian Major Cereals Improvement Project (EMCIP) and the Poultry Improvement Project. Still, many of these new facilities need additional equipment and to date they are not being efficiently used.

On all research stations, except for the four former EMCIP stations, the land belongs to the General Authority of Agricultural Production. Currently field researchers do not always have control of land suitable for plot trials, farming schedules (such as date of planting, irrigation frequency, timing of cultural practices or period of harvest), or access to equipment and other production inputs. The State Farm manages these lands from its institutional interests rather than putting research as the highest priority. Therefore, a request has been made to delineate certain areas of land to be used exclusively for research (excluding cotton acreages) at each research station. Meetings were held with the Animal Production, Horticulture and Field Crop Institutes to determine their needs for research land. It was recommended by Dr. Ismail Darrag and the Research Station Working Group that the following areas be set aside for research: Field Crops, 2673 feddans, horticulture, 775 feddans, and animal production, 192 feddans, making a grand total of 3640 feddans. See Table 12. A precise description of each piece of land requested has been compiled.

Improper water management has been identified as one of the major factor affecting agricultural productivity in Egypt. Drainage is of immediate importance to reverse the effect of water logging and salinity contamination. Proper and efficient use of irrigation water is one of the most important management practices needed in Egypt. Soil and water are the basic requirements for conducting plant research in field and horticultural crops. If significant research results are to be obtained from field experiments, productive soils (free from water logging, salinity spots, etc.) and a reliable irrigation system, including good drainage, are necessary. A program for increasing the quality of 3500 feddans of research station land has been proposed.

TABLE 12: ALLOCATED RESEARCH LAND FOR RESEARCH STATIONS

Regional Stations	Areas/Feddan			
	Field Crops	Hort. Crops	Animal Production	Total Area
NORTH DELTA:				
Sakha:				
Nataf 1, 2	1000	-	30	1030
El-Serw 1	100	-	20	1020
Mehalet Mousa	-	-	50	50
Kerda	-	-	10	10
MIDDLE DELTA:				
Gemmeiza	300	-	30	330
Korashela	-	20	-	
Sers El-Laian	11	-	-	
Zarzoura	40	10	-	50
EAST DELTA:				
Ismailia	100	-	-	100
Kassasin	-	60	-	60
GREATER CAIRO:				
Bahteem	100	10	-	110
Gezirat El-Shaer	-	60	5	65
Kanater	-	70	-	70
Kaha	-	40	-	
FAYOUM:				
Tania	30	-	-	30
Kom Osheem	-	20	-	20
ALEXANDRIA:				
Borg El-Arab	-	-	7	7
Noubaria	100	50	-	150
Sabahia	15	45	-	60
South Tahrir	-	65	-	65
El-Mamoura	-	150	-	150
El-Montazah	-	50	-	50
MIDDLE EGYPT:				
Sids	200	50	30	280
Mallawi	100	15	10	125
UPPER EGYPT:				
Shandaweel	200	15	-	215
Mataana	100	30	-	130
Komombo	100	-	-	100
GIZA:	55	15	-	70
NEW VALLEY:				
Kharga	12	-	-	12
DRY LAND:				
Marsa Matrouh	10	-	-	10
TOTAL	2673	775	192	
GRAND TOTAL				3640

Sakha Research Station has been selected for land improvement priority. It's size, the number of researchers, the number of research activities, the excellent physical facilities and the strategic location in an important cropping area, places it in the first priority for land improvement. Figure 5 shows the proposed construction of the underground drainage system at Sakha. The drainage pipes must be buried approximately two-to-three meters below ground level depending on the soil and underground water level, and along parallel lines 20 meters apart. Collector pipe lines running perpendicular to the drainage pipes are needed every 235 meters. All lines are installed with a prescribed slope so drainage water will flow by gravity. Inspection sites are installed every 220 meters along each collector pipe line. Each drainage pipe is surrounded with an envelope material for five centimeters.

On several of the research stations weeds constitute a major limitation for producing meaningful research data. Since this is such a serious problem on most of the research stations, a concentrated strategic effort is being formulated to control them. A multidisciplinary weed control committee has been appointed and preliminary work plans have been designed with a proposed 6 year budget. Weed control research will be conducted on all research stations over the next six years. The control program must be institutionalized and closely adhered to each year.

Communication between the research station scientists and their respective sections in Cairo and other research units is of paramount importance. Improved telephone service could increase the efficiency of paying bills, posting receipts, and keeping all scientists and administrators informed on the progress of the various research programs. A survey was made concerning the telephone service to 25 of the research station sites. It was found that 5 stations (20%) had no telephone service, for 3 stations (12%) service was rated as poor or very poor, and for 8 stations (32%) service was rated as only fair. Nine stations (36%) reported satisfactory telephone service. Meetings were held with the ARENTO telephone company and research station directors to determine the feasibility and cost of obtaining a telecommunication system, with data transfer capability at selected stations. It is recommended that a minimum of two national telephone lines be installed at every station.

A proposed management system for germplasm storage was drafted and reviewed by several involved administrators and scientists. Dr. Bill Gregg, TA Seed Specialist, revised and improved the first draft and has accepted the responsibility of developing the germplasm seed repository system.

There was considerable cooperation and interaction between the research station management area and interdisciplinary research and on-farm research. Much of the planning in these areas was done jointly as was the monitoring and evaluating of field activities.

The Research Station Working Group has discussed and approved a research station management model. The following describes the model.

Station Director's Responsibilities

The successful operation of a research station depends not only on its continued funding, but also on the innovativeness of the director and his staff. Station directors must be impartial, frugal, cooperative, scientifically astute and perceptive to the needs of the scientists.

Station directors should be given a clear, consistent and complete directive to administrate their stations. All scientists must cooperate with the station director and his appointed assistants in developing and conducting their research projects. In this model the research station director would be responsible for all resources on the station (land, water, facilities, vehicles, supplies, labor, etc.).

- A. Maintenance of all station facilities such as the offices, laboratories, housing, animal sheds and other buildings.
- B. Record keeping.
 - 1. Annual budget;
 - 2. Operating plans;
 - 3. Land use plans;
 - 4. Expandable supplies, gasoline, oil, fertilizer, pesticides, etc.; and,
 - 5. Current inventory of equipment and supplies.
- C. Personnel
 - 1. All station workers and support help;
 - 2. Joint responsibility with respective institutes for professional staff housed or working full time directly on the station.

Section Head Responsibilities on Research Stations

Research institute staff located on the research station have responsibilities to both the research station and the institute section directors. All technical research plans should be discussed, outlined and approved by the section director. Research plans that will be conducted on the station may be an Egypt wide production problem or local in scope. Likewise a copy of these plans should be given each year or season during the planning phase to the research station director with request/estimates for land, labor, equipment, approximate dates of planting, irrigating, cultivating, harvesting, special needs, etc.

If the institute maintains a lab on the research station, it is the institute's responsibility to equip and supply their labs. General building maintenance should be the responsibility of the station director if funding is provided per this model.

If a research section at a station has more than one person employed, one individual should be appointed as the section head for that particular research section. That selected individual should be given the authority to

organize and administrate his/her research unit. The section head would be the main individual to interact with the station director.

Each individual scientist must have a clearly defined project outline and be responsible for conducting the research in a scientific manner so meaningful data are obtained. Data from field and/or laboratory experiments should be discussed with the section head and the station director. Summary information should be given to the station director at his request. Copies of all annual reports from research units should be provided to station directors. Every scientist should have the opportunity to visit with the station director about his/her accomplishments and constraints.

Regional Research Station Directors' Responsibilities

The 31 ARC research stations have been consolidated into 10 regional stations based on their ecological, agronomical and environmental proximity. A regional station director has been appointed for each of the ten units. The regional director is administratively responsible for preparing and implementing annual operational plans and budgets for the regional unit. The regional director must work very closely with the Directors of the Research Stations in the planning and conducting of research and management of the stations. The regional directors must strive to utilize all the station's resources to the best advantage possible. He/she must assist station directors in maintenance programs and make monthly assessment of progress toward stated objectives. He/she must motivate personnel and be willing to delegate authority to station directors to accomplish planned outputs.

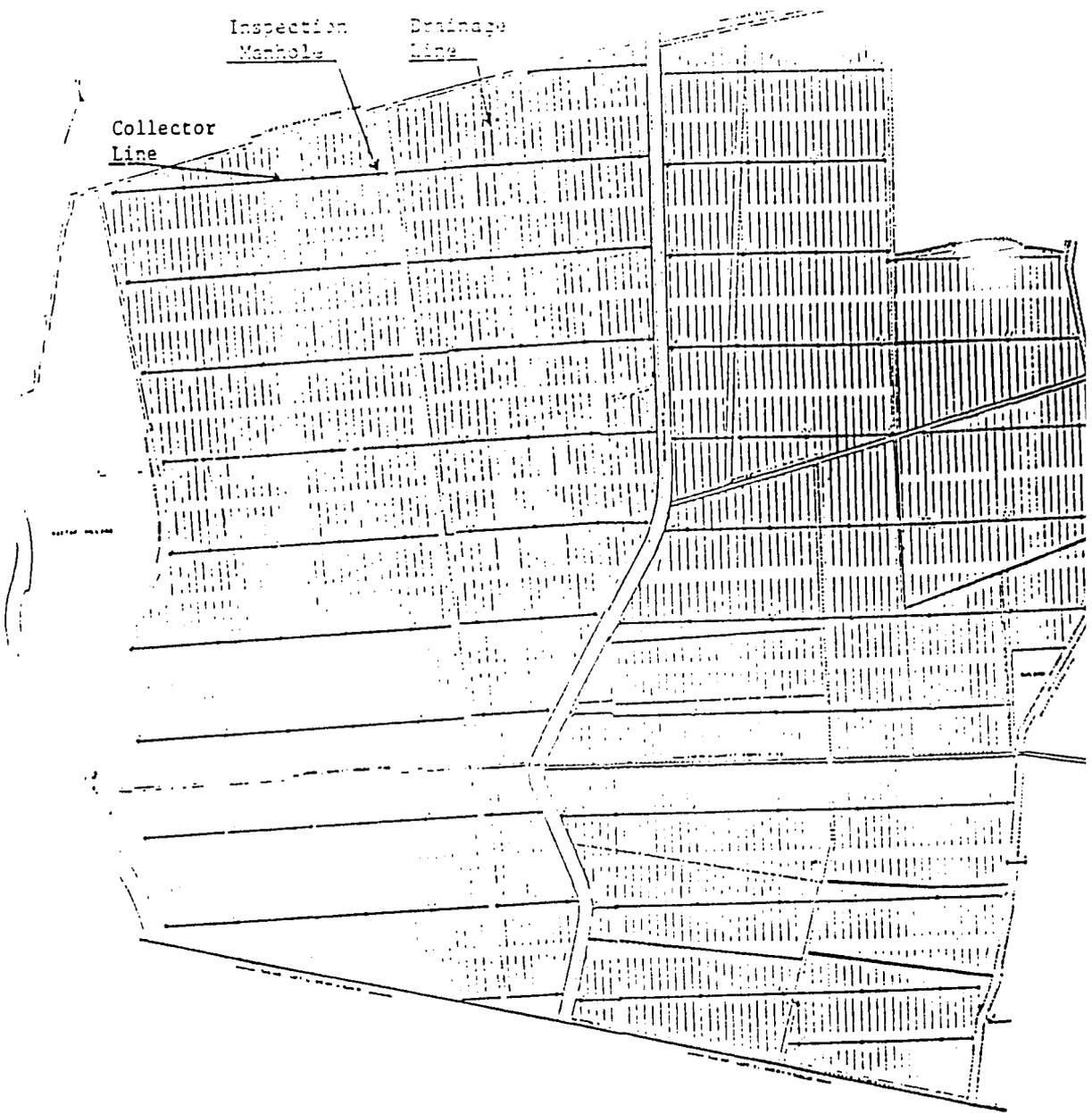
Director General of the Research Stations Responsibilities

The final authority for all operations at the stations rests with the Director General. The Director General must work with each regional director and station director in preparing and implementing annual operating plans and budgets. He must constantly consult with all station directors in determining equipment, and assess progress toward stated research objectives. He must delegate authority to the regional and station directors to spend funds needed for the operation and maintenance of their respective stations.

The Director General must maintain good communication with the ARC's senior management and with colleagues in other institutes.

All funds, ARC, grants, special appropriations, etc, allocated to the research stations should be administered through the Director General's office. All grant funded projects that use the various research stations should pay an overhead percentage. The actual percent will need to be agreed upon by a committee of institute directors.

**FIGURE 5. SOIL IMPROVEMENT PROJECT
DRAINAGE GRID**



SAKHA

BEST AVAILABLE COPY

Financial Consideration

To finance the complete operation of the station, the percentage of funds currently in Institutes and budgeted for that purpose would be transferred to the research station budget. The amount transferred would depend on size of the research projects, area involved, labor requirement, equipment used, utilities needed, etc. Projects funded by donors would likewise have to allocate funds for the basic operation of the station. A precise formula for changes in the present system to implement the above mentioned system would be determined by an Institute/Research Station committee.

Recommendations

The 31 research stations vary considerably in terms of their research staff, facilities, resources and stage of development. A few have greatly benefited from donor supported projects. Most of the research stations require improvement and up-grading of infrastructure, equipment, and research facilities. It is recommended that ten to twelve research stations should be up-graded in staff, equipment and facilities and become the basic agricultural research centers of excellency. Research activities must be well planned within a multi year concept and the Research Station Director needs to receive a consistent flow of allotted funds.

H. RESEARCH SUPPORT PROGRAM

The Research Support line item under the category of "Services" was authorized through Amendment #1 to the Project Agreement. This line item was established to assist in the financing of operating costs for ongoing research activities of the ARC. The main objective of this research support funding as defined by USAID, was to provide realistic levels of funding support to the ARC to conduct needed research.

Through PIL #11, Amendments 1, 2, and 3, procedures required for disbursement for local currency costs was established. The payment and budgetary procedures were partially developed around individual research activities. A research plan was developed by the ARC around the ongoing research activities. h research unit was asked to identify their ongoing research activities. There were 953 activities identified. A computerized data base system was developed which categorized the activities by field of study, institute, location, strategy, and constraints. This activity became the basis utilized in planning sessions, which dealt with the preliminary development of a priority based tracking system for research activities within the ARC.

Amendment #4 to PIL #11, documents the agreement reached concerning an acceptable method of financing for a RSP. This financing method is based upon two different components. The release of funding is based upon achievement of annual agreed upon changes in the ARC research system

and the fiscal reporting is based upon actual expenditures for research. Three major purpose statements were formulated for the RSP. They are:

- **Management:** An improved management system will address the planning, implementation and evaluation aspects of research;
- **Program:** An improved program system will establish research priorities within national development objectives; and,
- **Finance:** An improved financial management system will determine the budgeting, accounting and reporting of research expenditures.

The outputs in the areas of management, program and finance were determined to be as follows:

1. Management

- Research support planning will focus on national goals and cost effective methodology;
- Implementation status of all approved research proposals will be maintained by computer; and,
- Research monitoring and evaluation will result in realignment or early termination of marginally implemented research proposals.

2. Program

- 100% of the research funded will be within the highest priority of the national development goals.

3. Finance

- Budgets will be developed based on prioritized needs;
- ARC and Institutes will use a computerized accounting system in tracking funds by approved research proposals; and,
- Timely financial reports will meet management needs.

Mutually agreed upon targets will be established and jointly assessed by MOA and USAID on an annual basis.

The accomplishments for the period ending December 1987 included:

- A plan was developed for an improved research management system in the management, financial and program areas;
- An improved system of research management was implemented in six new interdisciplinary research programs and in the on-farm trials to demonstrate viability of the system;

- Two training plans were approved which covered in-country and offshore training;
- A plan was developed for establishment of a Central Service Unit for Maintenance.
- Forty computers were purchased and installed and 35 users were trained in basic computer operations of word processing and spreadsheet techniques;
- Seven people were trained in special techniques for spreadsheet applications for budget development and expenditure reporting; and,
- A computer based system was developed for budget development and cash flow forecasting for the RSP.

The ARC, at the present time, has a basic system to facilitate the development of research from the laboratory to the farmer's field. The research activities of the ARC are primarily discipline oriented research. There are commodity groups in the system that provide the natural environment to encourage multi-disciplinary as well as inter-disciplinary research. In place also are procedures to insure the potential interfacing of researcher to farmers to identify farmers' needs for priority research intervention and, in turn, to provide improved technical packages to the farmers.

The list of commodity groups has been categorized by major program and sub-program areas. This list is in-line with the priority crops as outlined in the MOA Five Year Research Plan. The concept of funding research and utilizing available resources by priority is a system change which the ARC wants to institutionalize. This proposed improvement to the existing ARC research system will assist management and researchers to effectively manage research. Effective funding disbursements will be based on realistic program priorities. The priority programs identified are as follows:

1. Fiber crops
2. Cereal crops
3. Oil crops
4. Food legumes
5. Forage crops
6. Sugar crops
7. Fruits
8. Vegetables
9. Other botanical plants
10. Animal husbandry
11. Animal health
12. Integrated pest management
13. Soil and water
14. Seed technology
15. Mechanization
16. Economics and statistics

17. Agricultural extension
18. Interdisciplinary research
19. Research station facilities
20. On-farm trials
21. Food and feed technology
22. Administration

The research support program expenditures are contained in annex III.

I. SEED PROGRAM

Seed in ARC

ARC's major responsibility in national food security is to develop improved technologies and transfer them to farmers to increase productivity, total national production and farm income; and help secure adequate food supplies at a reasonable cost. Higher-yielding seed is a primary means of fulfilling this responsibility. The end result of many ARC research programs is higher-yielding varieties and seed.

ARC's seed responsibilities, as national research agencies in other countries, includes not only variety development, but also seed technology research, germ plasm maintenance, stock seed development, and multiplications to transfer genetic and plant science technologies to farmers. Constraints of inadequate funding for facilities and staff training have in the past prevented ARC from developing seed's yield increasing potential, organizing seed-oriented research, and delivering to farmers yield increasing technologies that only improved seed can carry. However, the seed component of the NARP will enable ARC to begin the necessary seed emphasis and initiate the first parts of the infrastructure needed to support delivery of higher-yielding technology to farmers through improved seed.

ARC's Role

The private sector is interested in crop seed with commercial potential. For example, an economic volume will be purchased by farmers at a price which allows a reasonable profit. In Egypt this is primarily maize, and some seed of sorghum, sunflower, and alfalfa. The private sector does not supply all the seed needed in any crop. It serves only farmers who can buy seed for cash; lower-income farmers who need help most are not served by the private sector.

To provide the higher-yielding seed input needed to meet all national crop production targets, help farmers produce more at lower per-unit cost and get higher-yielding seed to poorer farmers, the government must provide "non-commercial" crop seed and seed of all crops for poor "non-cash-purchasing" farmers. This is universally accepted as an obligation of government to support social development and secure food supply. Often, national requirements and crop economies require seed to be subsidized. This

means selling seed at less than the cost of production without consideration of profit.

In most countries, government crop research/extension agencies are deeply involved in and committed to seed improvement and supply. In Egypt, several agencies are involved. ARC handles variety development, breeder and foundation seed. ARC State Farms produce most registered seed, with the cooperation of the Central Administration for Seeds (CAS). CAS arranges and supervises production of some registered seed by contract farmers. All certified seed for farmer planting is handled this way. The Egyptian Agricultural Organization (EAO), CAS and ARC process seed. These agencies have performed well considering severe limitations in facilities, equipment and personnel training. Formalized coordination could improve operating cost and time efficiency, improve seed quality, ensure better supplies of seed, support private sector development more effectively and help increase national food production.

ARC is not only deeply involved in seed activities, but is ideally-suited to fill a wider role in coordinating and developing seed, especially as it is sometimes difficult to separate overlapping responsibilities. For example, where does research end and production begin.

ARC/NARP Seed Strategy

Seed is a major input to increase crop yields and reduce crop production costs. It is easy to implement, as farmer technology is not changed but only replaces low-yielding seed with higher yielding seed. It encourages farmers to use other yield-increasing improved inputs. The GOE recognizes the importance of a seed strategy. Their new five year development plan suggests improvement of the seed infrastructure and supply. Means of financing are being sought to identify development needs, beyond available government budgets.

An effective seed supply infrastructure must be in place, to support research and extension activities as well as to help rural economic development, improved crop production, and national food security. To support national agricultural and economic development, ARC must expand its involvement in seed.

The ultimate goal is a cost efficient overall national seed program. This incorporates an effective blend of government and private-sector participation, using up-to-date technology, operating efficiently at the lowest effective cost, minimizing losses, and supplying higher-yielding seed of the right kinds at the times when farmers need it. This will increase farm family income, create rural employment opportunities, increase national food production, and reduce dependence on imports.

Primary needs are in depth technological training for staff, and up-to-date cost efficient facilities and equipment. Several decades of low financial investment have resulted in worn facilities and inadequate training, especially of younger staff. As these are put in place and can permit efficient

implementation, improved seed policy, organizational structure, plans, and implementation procedures can be initiated.

The basic strategy is to develop and install the required seed facilities at a cost-efficient size which can maintain truly controlled/identified certified seed at realistic management/technology levels. Such units will be strategically dispersed in each Governorate to provide seed without delay, at minimum operating and transport cost. Effective dispersal of facilities will also increase local farmer income by creating local seed production programs, and promote farmer use of higher-yielding seed through on-farm demonstrations conducted in local seed production fields. Depending on total seed needs, each Governorate will ultimately have one or more seed processing plants and testing laboratories. Existing certification, supervision and distribution offices will be coordinated into an overall system to develop strong seed awareness, supply and use in each Governorate. The entire system will operate with close coordination, support and guidance from the national seed program.

Seed supply will be closely linked to crop research, extension, on-farm demonstration, and agricultural credit.

Government policy is to develop a cost-efficient, operationally effective and cooperative "blend" of government and private-sector operations. Commercially feasible activities will be handled by the private sector, while government will handle development, quality control, and public-support operations.

This strategy will result in an institutionally coordinated seed supply infrastructure which is more sensitive to local farmer needs, reduces national resources invested in seed, increases farmer use of higher yielding seed, increases farm income, creates rural employment opportunities, and increases total national crop production.

The Government budget increased allocations for seed development, but it is still inadequate for the massive needs which now exist. Major upgrading of seed operations cannot be done over a long period of time. All operations must be balanced while they can operate efficiently. The time/sequence flow and interlocking dependency of seed operations does not permit separate upgrading component by component; even at the reduced scale envisioned by ARC in NARP. A complete system is required.

To help develop seed research and the infrastructure by which new technology is transferred to farmers through improved seed, ARC is seeking international assistance. Through NARP, USAID assists seed development by providing in depth seed technology training for a minimal number of staff. Equipment is needed to renew and upgrade basic minimal requirements for facilities in the testing laboratories, processing plants, genetic resources laboratory, cotton seed research/breeder seed laboratory, and in-plant quality control. The small numbers of facilities upgraded and the components involved are only a small part of the total requirements. However, this will initiate the development process in a balanced way which will improve seed supply, help develop seed research and technology transfer and promote private-sector development. The approach of ARC and

NARP is to initiate the minimum cost efficient system which can support development of new technology and effectively transfer it to farmers (Figure 6).

To encourage private sector investment, major incentives and cooperation are provided. Support to the private sector will be formalized in updated policy.

Organization & Infrastructure

Along with improved facilities and staff training, more updated systems of coordination and information flow are needed to achieve maximum supply of quality seed, at the least expense in per-unit cost and national resources. To strengthen the many closely-linked activities carried out by ARC and CAS, the MOA has joined these agencies under the overall umbrella of ARC. This should improve seed research and development, strengthen supply of higher-yielding seed, benefit staff, and facilitate upgrading seed operations. The new technically-oriented organization of seed within ARC is shown in Figure 7.

Achievements in 1987

A broad scope of activities must be identified, established, and closely coordinated to develop a cost efficient and technology effective seed program. Budget support for seed was omitted in the original NARP project. The beginning priorities were to identify and evaluate existing operations and institutions, identify overall needs and the infrastructure required to fill them. A plan was needed for an overall long-range program to meet requirements, fit the existing national system, and operate efficiently in the existing organizational and agricultural environment. Detailed lists were compiled for equipment, spare parts, facilities, facility refurbishment, and essential training during NARP's first year.

ARC's seed supply activities are shown in Tables 13 to 20. The crops for which improved and higher-yielding variety development is maintained are shown in Table 13. To provide stock seed for multiplication, ARC maintains breeder seed of the crops, and number of varieties, shown in Table S-2. Foundation seed produced from breeder seed by ARC-operated State Farms is shown in Table 15. Registered seed--produced from foundation seed, and used to plant certified seed fields produced by ARC State Farms is shown in Table 16. Certified seed, planted by farmers to grow food and grain crops, was produced in the amounts shown in Table 17. Total seed production is summarized in Table 18. Certified seed production is arranged and supervised by CAS while the farmer contract growers produce it. The PBDAC (Credit Bank) finances it and handles distribution and EAO, ARC, and CAS process it. The total seed processed is shown in Table 19.

Training for seed staff during 1987 is shown in Table 20.

Data in these tables was compiled from MOA publications government statistics, and from ARC and CAS specialists and sources.

**FIGURE 6: NARP SEED COMPONENT
MINIMAL IMPROVEMENT OF EXISTING INFRASTRUCTURE**

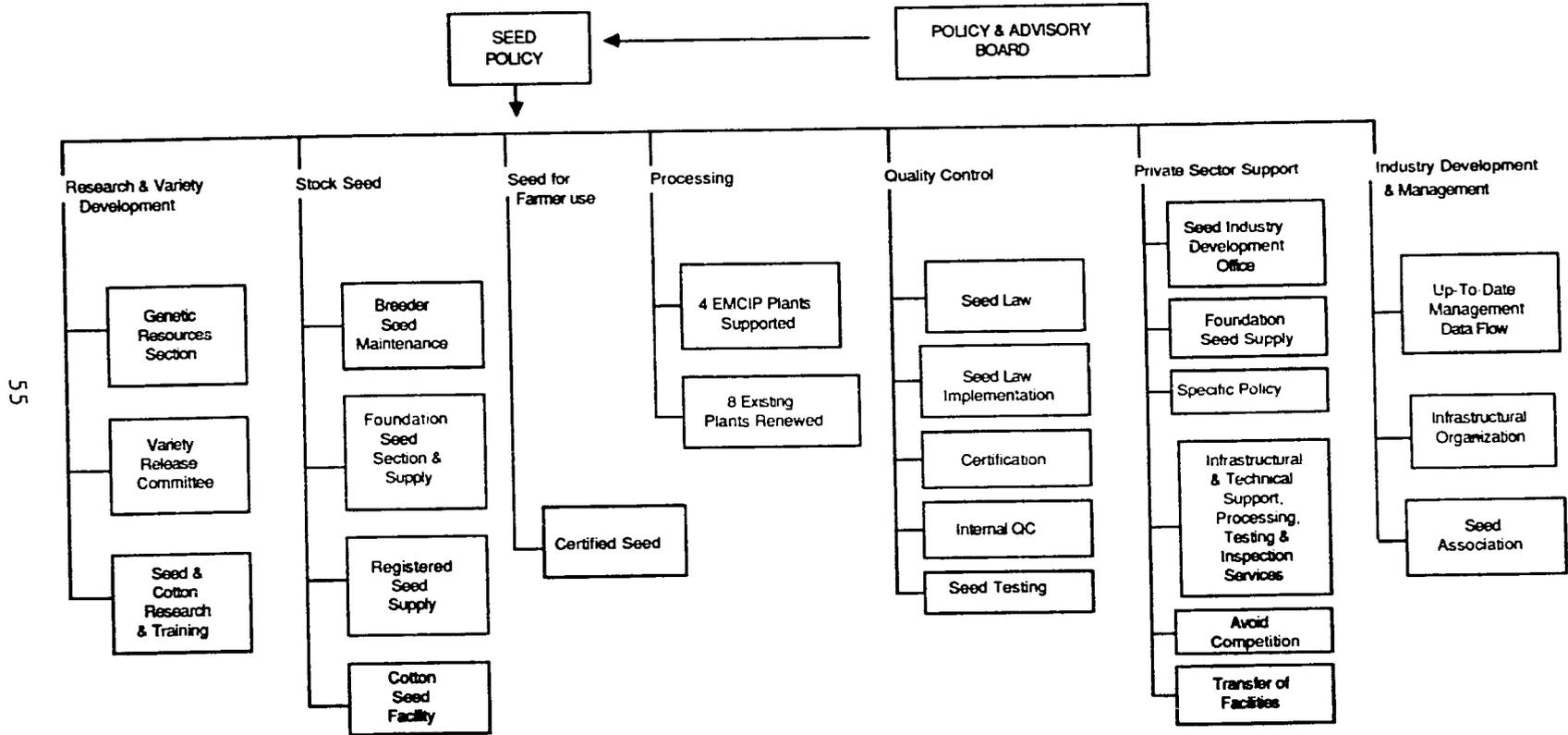
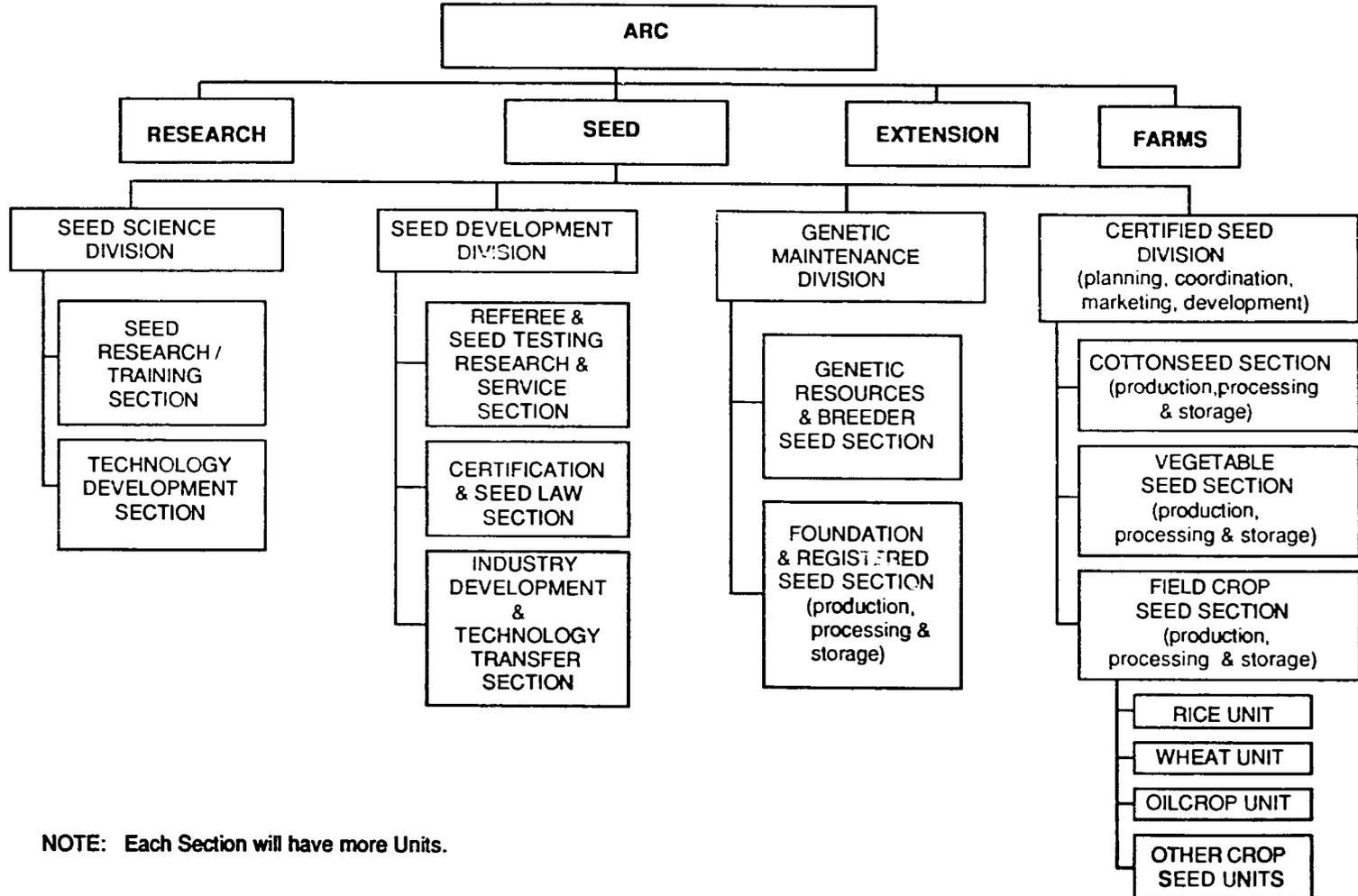


FIGURE 7. ORGANIZATION OF SEED WITHIN ARC



NOTE: Each Section will have more Units.

TABLE 13: ARC VARIETY DEVELOPMENT PROGRAMS

CROP	VARIETY-DEVELOPING UNIT	
	INSTITUTE	SECTION
Artichoke	HCRI	Veg. Prop. Crops
Barley	FCRI	Barley
Bean, broad (faba)	FCRI	Food Legumes
Bean, green (string)	HCRI	Self-Poll. Crops
Bean, dried	HCRI	Self-Poll. Crops
Beet, garden	HCRI	Cross-Poll. Crops
Cabbage	HCRI	Cross-Poll. Crops
Carrot	HCRI	Cross-Poll. Crops
Cauliflower	HCRI	Cross-Poll. Crops
Chickpea	HCRI	Food Legumes
Clover, berseem	FCRI	Forage Crops
Cotton	CRJ	
Cowpea	HCRI	Self-Poll. Crops
Cucumber	HCRI	Cross-Poll. Crops
Eggplant	HCRI	Self-Poll. Crops
Fenugreek	FCRI	Food Legumes
Garlic	HCRI	Veg. Prop. Crops
Jute		
Lentil	FCRI	Food Legumes
Lettuce	HCRI	Cross-Poll. Crops
Lupines	FCRI	Food Legumes
Maize	FCRI	Maize
Mallow	HCRI	Cross-Poll. Crops
Melon & cantaloupe	HCRI	Cross-Poll. Crops
Okra	HCRI	Cross-Poll. Crops
Onion	FCRI	Onion
Pea	HCRI	Self-Poll. Crops
Groundnut	FCRI	Oil Crops
Pepper	HCRI	Self-Poll. Crops
Potato	HCRI	Veg. Prop. Crops
Radish	HCRI	Cross-Poll. Crops
Rice	FCRI	Rice
Sesame	FCRI	Oil Crops
Sorghum	FCRI	Sorghum
Soybean	FCRI	Food Legumes
Spinach	HCRI	Cross-Poll. Crops
Squash	HCRI	Cross-Poll. Crops

(Cont'd)

TABLE 13: (Continued)

CROP	VARIETY-DEVELOPING UNIT	
	INSTITUTE	SECTION
Sugarbeet	SCRI	
Tomato	HCRI	Self-Poll. Crops
Turnip	HCRI	Cross-Poll. Crops
Watermelon	HCRI	Cross-Poll. Crops
Wheat	FCRI	Wheat

TABLE 14: ARC BREEDER SEED MAINTENANCE

CROP	NO. OF VARIETIES MAINTAINED	UNIT WHICH MAINTAINS BREEDER SEED
Artichoke	1	HCRI Veg. Prop. Crops
Barley	5	FCRI Barley
Bean, broad (faba)	3	FCRI Food Legume
Bean, green (string)	3	HCRI Self-Poll. Crops
Bean, dried	3	HCRI Self-Poll. Crops
Beet, garden	3	HCRI Cross-Poll. Crops
Cabbage	2	HCRI Cross-Poll. Crops
Carrot	3	HCRI Cross-Poll. Crops
Cauliflower	3	HCRI Cross-Poll. Crops
Chickpea	3	FCRI Food Legumes
Clover, berseem	4	FCRI Forage Crops
Cotton	9	CRI
Cowpea	2	HCRI Self-Poll. Crops
Cucumber	9	HCRI Cross-Poll. Crops
Eggplant	3	HCRI Self-Poll. Crops
Fenugreek	1	FCRI Food Legumes
Garlic	2	HCRI Veg. Prop. Crops
Jute		
Lentil	2	FCRI Food Legumes
Lettuce	3	HCRI Cross-Poll. Crops
Lupines	2	FCRI Food Legumes
Maize	8	FCRI Maize
Mallow	1	HCRI Cross-Poll. Crops
Melon & cantaloupe	8	HCRI Cross-Poll. Crops
Okra	4	HCRI Cross-Poll. Crops
Onion	3	FCRI Onion
Pea	5	HCRI Self-Poll. Crops
Groundnut	2	FCRI Oil Crops
Pepper	3	HCRI Self-Poll. Crops
Potato	18	HCRI Veg. Prop. Crops
Radish	2	HCRI Cross-Poll. Crops
Rice	5	FCRI Rice
Sesame	2	FCRI Oil Crops
Sorghum	3	FCRI Sorghum
Soybean	2	FCRI Food Legumes

(Cont'd)

TABLE 14: (Continued)

CROP	NO. OF VARIETIES MAINTAINED	UNIT WHICH MAINTAINS BREEDER SEED
Spinach	4	HCRI Cross-Poll. Crops
Squash	1	HCRI Cross-Poll. Crops
Sugarbeet	7	SCRI
Tomato	8	HCRI Self-Poll. Crops
Turnip	2	HCRI Cross-Poll. Crops
Watermelon	8	HCRI Cross-Poll. Crops
Wheat	7	FCRI Wheat

TABLE 15: FOUNDATION SEED PRODUCED BY ARC STATE FARMS

GOVERNORATE & REGION	NO. OF FEDDANS IN SEED CROPS*	TONS SEED PRODUCED
LOWER EGYPT:		
Alexandria	---	---
Beheira	20	16.95
Gharbia	332	286.41
Kafr El Sheikh	662	905.41
Dakahlia	---	---
Damietta	---	---
Sharkia	---	---
Ismailia	---	---
Suez	---	---
Menoufia	---	---
Kaliubia	---	---
Cairo	---	---
MIDDLE EGYPT:		
Giza	---	---
Beni Suef	183	233.73
Fayoum	---	---
Minia	26	18.15
UPPER EGYPT:		
Assiut	---	---
Sohag	50	28.76
Qena	15	3.55
Aswan	24	2.33
TOTALS	1,312	1,495.29

* Crops include: cotton, wheat, rice, broad bean, lentil, groundnut, & soybean.

TABLE 16: REGISTERED SEED PRODUCED BY ARC STATE FARMS

GOVERNORATE & REGION	FEDDANS IN REGISTERED SEED CROPS*	TONS SEED PRODUCED
LOWER EGYPT:		
Alexandria	---	---
Beheira	1,058.75	575.63
Gharbia	428.1	1,042.1
Kafr El Sheikh	6,222	6,825.46
Dakahlia	---	---
Damietta	107	60
Sharkia	---	---
Ismailia	---	---
Suez	---	---
Menoufia	---	---
Kaliubia	130	74.1
Cairo	---	---
MIDDLE EGYPT:		
Giza	---	---
Beni Suef	283	332.58
Fayoum	110	79.5
Minia	79	36.15
UPPER EGYPT:		
Assiut	---	---
Sohag	210	125.68
Qena	92	37.87
Aswan	60	17.71
TOTALS	<u>8,779.85</u>	<u>9,206.78</u>

* Crops include: cotton, wheat, rice, broad bean, lentil, groundnut & soybean

TABLE 17: CERTIFIED SEED PRODUCTION ARRANGED AND SUPERVISED BY CAS

GOVERNORATE	NO. OF CONTRACT FARMER/GROWERS	NO. OF FEDDANS IN SEED CROPS
LOWER EGYPT:		
Alexandria	44	8,591
Behera	880	74,965
Gharbia	1,069	63,394
Kafr El Sheikh	1,057	51,863
Dakahlia	1,715	73,243
Damietta	532	14,096
Sharkia	1,223	50,701
Ismailia	98	720
Suez	--	--
Menoufia	882	42,718
Kaliubia	124	3,086
Cairo	1	5
LOWER EGYPT TOTALS	7,625	383,382
MIDDLE EGYPT:		
Giza	143	885
Beni Suef	673	21,742
Fayoum	482	23,601
Minia	750	72,438
MIDDLE EGYPT TOTALS	2,048	118,666
UPPER EGYPT:		
Assiut	323	46,672
Sohag	224	8,863
Qena	34	839
Aswan	4	231
UPPER EGYPT TOTALS	585	56,605
NATIONAL TOTALS	10,258	558,653

TABLE 18: TOTAL SEED PRODUCED, JANUARY - DECEMBER, 1987

CROP	AMOUNT (ARDABS) OF SEED PRODUCED:			
	FOUNDATION	FOUND/ REGIS.	REGISTERED	CERTIFIED
Cotton		8.9		818,400
Rice	3,100		26,000	390,700
Wheat		31,801		453,242
Barley		5,775		6,658
Sorghum, sweet				1,547
Broad bean	29 100,514			1,133
Lentil	3 19,647			20
Onion	15 417			140
Groundnut	6,422			
Sesame	4.5 73			30.5
TOTALS	<u>3,151.5</u>	<u>37,584.9</u>	<u>27,323.5</u>	<u>1,797,620</u>
Soybean		2 mt		5,022 mt

TABLE 19: SEED PROCESSED, JANUARY - DECEMBER, 1987

PLANT	CROP	AMOUNT OF SEED PROCESSED
Sakha CAS	Soybean	167 mt
	Maize	119.5 mt
	Rice	46,900 ardab
	Broad bean	7,000 ardab
	Lentil	9,020 ardab
	Wheat	33,232 ardab
Gemmeiza CAS	Maize	77 mt
	Rice	21,246 ardab
	Wheat	8,568 ardab
Sids CAS	Maize	256.7 mt
	Wheat	27,246 ardab
Mansoura EAO	Soybean	683.5 mt
	Rice	47,554 ardab
	Wheat	33,080 ardab
Tanta EAO	Soybean	1,688 mt
	Rice	68,900 ardab
	Broad bean	31,835 ardab
	Wheat	16,950 ardab
Damanhour EAO	Rice	72,295 ardab
	Wheat	60,690 ardab
Bahteem EAO	Rice	138,480 ardab
	Broad bean	54,000 ardab
	Wheat	114,700 ardab
Shobra El Kheima EAO	Rice	3,000 ardab
	Wheat	24,700 ardab
Wadi El Nil EAO	Rice	18,076 ardab
	Wheat	25,000 ardab
Minia EAO	Soybean	5,175 mt
	Lentil	10,770 ardab
	Wheat	24,050 ardab
Deirout EAO	Broad bean	21,100 ardab
	Wheat	21,036 ardab
Sakha ARC	Wheat	39,514 ardab

(Cont'd)

TABLE 19: (Continued)

PLANT	CROP	AMOUNT OF SEED PROCESSED
Gemmeiza ARC	Wheat	1,548 ardab
Shandaweel ARC	Wheat	4,445 ardab
Sids ARC	Wheat Berseem clover	1,257 ardab 2,000 mt
SEED PLANT CAPACITY WAS INADEQUATE-- RICE MILLS CONTRACTED TO CLEAN SEED:		
El Zarka	Wheat	114,200 ardab
Abu El Hassan	Wheat	11,133 ardab
El Ibrahimia	-	-
Abu El Fetooh	Wheat	13,486 ardab
SEED COMPANY CONTRACTED TO PROCESS SEED:		
Nuba Seed Co.	Wheat	10,133 ardab

TABLE 20: TRAINING FOR SEED STAFF, JANUARY - DECEMBER, 1987
 (Some training, as indicated, began or ended before/after this period)

COURSE TITLE	DATE HELD		NO. OF TRAINEES
	FROM	TO	
Organization & Management of Seed Production & Supply	25 April	8 June	1
Workshop on Seed Production	27 Oct	8 Nov	40
Occupational Health & Safety	1 Sept	21 Sept	8
Management Development	5 Sept	16 March 88	15
Statistics	18 Oct	12 May 88	2
English Language	8 Feb	2 April	7
	10 June	30 July	12
	1 Nov	31 Dec	10
	2 Dec	4 Feb 88	1
	5 Nov 86	17 Jan 87	10
	2 Feb	31 March	8
	1 Feb	5 April	22
		TOTAL	

APPENDIX II

OBJECTIVE: TO ESTABLISH RESEARCH LINKAGES WITH ORGANIZATIONS EXTERNAL TO THE AGRICULTURAL RESEARCH CENTER.

- PROGRAMS:**
- A. International Linkages with International Agricultural Research Centers**
 - 1. International Rice Research Institute (IRRI)**
 - 2. International Center for Agricultural Research in Dry Areas (ICARDA)**
 - 3. Consortium for International Crop Protection (CICP)**
 - 4. Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT)**
 - B. Research Grants**

II. ESTABLISHMENT OF RESEARCH LINKAGES

One of the objectives of NARP is to establish research linkages with organizations external to ARC. In this component there is cooperation developed between international agricultural research centers, international and national universities, private and semiprivate sectors and other governmental agencies.

A. INTERNATIONAL LINKAGES

Programs of the International Agriculture Research Centers (IARCs) with Egypt vary but in general their research and related activities contribute to help increase food and feed production by strengthening national agricultural research. It is important for the NARP to be linked to these centers to cooperate in such programs as biological research to improve yields, managing resistance to pests and diseases and technology transfer. In 1987, contacts have been established with most of the IARCs. The amount of cooperation with each Center varies.

1. International Rice Research Center

A Memorandum of Understanding (MOU) was signed between the MOA and IRRI in February 1987 to conduct research and training. The research component also encompasses operational support for the new facilities at Sakha, off-station research trials at Giza, Gemmeiza, Zarzora and Serw as well as on-farm research trials and demonstrations.

The research programs which are supported by the contract are varietal improvement, seed production, crop and resource management, weed control, disease management, insect pest management, mechanization and extension. Research assistance from IRRI will help support the winter nursery program, international rice testing, scientific literature and IRRI scientists visits to Egypt.

Training will provide fellowships for PhD candidates, post-doctoral and short term training at IRRI. Travel will be provided for staff to travel to conferences out of Egypt and conferences will also be held at Sakha related to rice research.

2. International Center for Agricultural Research in Dry Areas (ICARDA)

A MOU was signed with ICARDA to:

- Prepare a Diagnostic Survey of the different agroecological zones in order to identify the problems and constraints to increased production in food legumes, pasture/fodder, barley, wheat (in collaboration with CIMMYT) and livestock;

- Collect crop germplasm from the dry areas of Egypt in order to preserve, evaluate and determine its best utilization;
- Develop an efficient Farming Resources Management Program for various agroecological zones through a collaborative research program;
- Develop Sids Research Center as a center for research and training; and,
- Develop and deliver appropriate training programs for Ministry researchers.

3. Consortium for International Crop Protection (CICP)

A MOU was signed with CICP to assist Egypt to address problems associated with integrated crop protection, including biological control, integrated pest management, crop loss assessment, safe pesticide use, and pesticide management as related to the production of agricultural crops.

4. Centro International de Mejoramiento de Maiz y Trigo (CIMMYT)

Discussions have been held with CIMMYT to provide short term training, post-doctoral work, visiting scientist programs and in-service training of short courses in Egypt.

Contacts have been established with most of the International Agricultural Research Centers in the past year. Letters were sent to 14 Centers asking them to send recent publications from their research activities and brochures describing the research programs at their centers. A request has also been made to the centers to send updated information on the types, duration and costs of training. Responses have been received from most centers.

Germplasm of wheat and barley was requested from CIMMYT/Mexico; wheat, barley and food legumes from ICARDA/Syria; rice from /Philippines; groundnuts and lentils from ICRISAT/India; and potatoes from CIP/Peru. Germplasm of various crops was also requested from Texas A & M University, Oregon State University, New Mexico State University, North Dakota State University, Oklahoma State University, USDA from Beltsville, Maryland, and Hybrid Company in Fort Collins, Colorado. International contacts are also being made with various agencies specializing in the seed industry and agricultural mechanization.

Visitors from IRRI (Philippines), CIMMYT (Mexico) and ICARDA (Syria) spent time with colleagues at ARC during the year. Scientists were also received from the Peanut Collaborative Research Support Program (CRSP) at the University of Georgia and the Integrated Pest Management CRSP at the University of Maryland.

B. RESEARCH GRANTS PROGRAM

A research grants program under NARP was placed into operation. This was patterned after the successful University Grants Program conducted under the Egyptian Major Cereals Improvement Project (EMCIP) during 1982-86, and many of the same people were involved. However, the scope of the NARP program is much broader than under EMCIP in terms of the research institutions involved, research areas covered, geographic extent and the amount of funds. Under EMCIP about 50 research proposals were submitted, and 29 of these at nine Egyptian Faculties of Agriculture were provided a total of 2.5 million USD over a 2 1/2 year period. Under NARP, 353 proposal topics were considered from 31 research institutions and about 200 complete proposals have been requested. Under NARP, funds total 13.8 million USD over a 4 1/2-year period for this phase of the program.

The NARP Research Grants Program will be extended in 1988 to cover collaborative research with USA Title XII Universities (those having CRSPs or other buy-in agreements with USAID) and IARCs and also with private sector firms in Egypt that are interested in agricultural research. Contacts have been made with some of these organizations, and discussions have taken place at meetings of the Grants Program Working Group on how to develop procedures for these additional activities. Detailed work plans will be developed for each of the major types of institutions and will be sent to USAID for approval. NARP funds in these additional areas are tentatively budgeted at 7 million USD.

Table 21 shows the subject matter breakdown for the 353 research proposal topics considered from non-ARC agricultural research institutions in Egypt through December 1987 in response to a letter from the Director General mailed in March 1987, together with the evaluation recommendations. As shown, 105 proposal topics were suggested for nonfunding. Proposals for remaining topics have been requested either individually or as part of a consolidated group. If all topics requested are received, they will total about 200. The eight suggested new topics have been assigned to specified university researchers to develop as proposals.

These recommendations were sent to senior administrators at each of the 31 submitting institutions in early November. A copy of the Manual for Grant Research Under NARP (NARP Publication No. 7) was sent to each researcher who was requested to contribute to a proposal. Six training sessions on how to prepare a proposal were conducted between mid November and early December for groups of researchers from specified institutions. Many questions were also answered on an individual basis.

Egyptian staff will be needed from mid April 1988 forward to assist in the NARP Research Grants Program in developing background documentation for Grant Agreements and in making required twice per year site visits to research institutions. This staff also will be needed in preparing the associated written site visit reports and in assisting in the preparation of annual report summaries for publication. Provided staff should be

TABLE 21. Proposal Topic Recommendations by the Grants Program Working Group

Subject Matter Group	Proposals to be requested			New Topics	Not to be Funded	On- hold	Total Proposal Topics Considered
	Individual Proposals	Consolidated					
		Groups	Proposals*				
Cropping Systems	6	1	6	0	7	0	19
Field Crops	11	10	38	0	20	0	69
Horticulture	4	7	25	0	11	0	40
Protected Agriculture	0	1	9	0	0	0	9
Plant Protection	20	6	14	0	20	0	54
Tissue Culture	8	0	1	0	0	0	9
Soil and Water	11	3	9	0	4	0	24
Microbiology	7	0	0	0	3	2	12
Economics	6	2	7	8	7	0	28
Extension	4	0	1	0	0	0	5
Food Technology	5	3	13	0	1	0	19
Animal Production	10	1	3	0	20	0	33
Agric. Wastes (for animal feed)	1	2	7	0	3	0	11
Mechanization	10	0	0	0	5	0	15
Other	2	0	0	0	4	0	6
Total	105	36	133	8	105	2	353

* May be included in a group within another discipline.

experienced researchers (full professors) with adequate English, preferably with a PhD or at least six months of postdoctoral training in a western developed country or at an IARC. Additional training could be provided by the Research Studies Coordinator and perhaps some of the Working Groups members. The Agricultural Machinery Research Institute at ARC already has provided such assistance, in part by the NARP Agricultural Mechanization Advisor. One or more specialists seconded for such activities by each of the following ARC Research Institutes would be extremely valuable: Field Crops, Horticulture, Plant Protection, Soil and Water, Animal Production and possibly others. Perhaps a second person from Field Crops could cover Food Technology and other areas not specifically mentioned. Part-time training under this phase of NARP could assist in the process of cooperation and coordination between the ARC and University agricultural research programs.

APPENDIX III

OBJECTIVE: TO PROVIDE AND IMPROVE RESEARCH SERVICES
TO THE AGRICULTURAL RESEARCH SYSTEM

PROGRAMS:

- A. Commodities
- B. Communications and Publications
- C. Construction and Renovation of Facilities
- D. Data Services and Analysis
- E. Library and Information Systems
- F. Technical Assistance

III. RESEARCH SERVICES

Research services are necessary in the implementation of research. Services which need to be provided and improved in the NARP are commodities, communications, construction and renovation of facilities, data services and analysis, library and information systems and technical assistance.

A. COMMODITIES

The commodity procurement area is interrelated with almost every facet of NARP. It will provide additional physical resources to the research process to increase researchers' capability to achieve overall research goals and objectives. As a support to research, considerable time and effort has been expended this past year in the development of various procurement plans for research related equipment.

Procurement subplans were prepared in accordance with Section 4.5 of the Grant Agreement "Requirements Precedent to Disbursement for Commodities" and PIL #13. This past year, the following subplans were approved by USAID:

Approximate Total Funding in Dollars

National Research Library-November 1987	- 3 million
Farm Equipment, Spare Parts, and Supplies - November 1987	- 3 million
Laboratory Equipment and Supplies - December 1987	- 9 million

Work is continuing on the preparation of the other five procurement plans as required by USAID. Significant progress has been made in the procurement of vehicles for the Technical Assistance team. Negotiations are underway with qualified bidders and an award will be made in February 1988.

The expectations of the Procurement Working Group and individuals involved in the development of required subplans exceeded actual accomplishments. These expectations were based on prior procurement activities with other USAID related projects, where the certification to USAID and the actual procurement process was done by the Contractor and not the Contracting Agency. NARP is responsible for the certification to USAID and the overall procurement process. This additional responsibility has required that expectations be modified to meet the current capability of the system to comply with USAID's procurement regulations.

Institutional change and additional financial support will be required to increase the capacity of the MOA/ARC Procurement Office if it is to manage all facets of commodity procurement with all donor agencies. Sufficient time

must be given next year study and evaluate the MOA/ARC's procurement system. Clear lines of authority between functional areas must be formulated to assure a systematic procurement process. Additional study is needed of the organizational structure of the MOA/ARC procurement office. Changes formulated as a result of this study must be integrated into the management and administrative systems.

B. COMMUNICATIONS AND PUBLICATIONS

A monthly newsletter is being published as well as documents that contain major project plans, reports and research data and information.

1. NARP NEWS

The monthly publication, *NARP News*, was initiated by Dr. Momtaz in May 1987. It is important that information about the multitude of project activities be communicated on a regular basis. The purpose of *NARP News* is to provide a means of communication to a wide audience in both Egypt and the USA, who have interest in the Project activities. Currently, the *NARP News* is distributed to about 300 organizations in Egypt and 300 in the USA.

News items covered in the various issues related to different subjects including timely editorials, crops that were in season, history of agriculture in Egypt, guest articles on a variety of subjects by MOA personnel, descriptions of the NARP activities, descriptions of ARC Institutes and Research Stations, USAID support, technical assistance activities and other relevant news items.

2. Publications.

The publications produced contain reports, plans and in the future will contain baseline and research data. The publication list is contained in Annex IV.

C. CONSTRUCTION AND RENOVATION OF FACILITIES

The NARP budget contains LE 1.7 million from the MOA and 6.5 million USD from USAID to improve the infrastructure within the MOA/ARC through renovation and refurbishing existing facilities at the central station in Cairo and at outlying research stations. A construction committee was formed in 1986 to begin planning for implementation of the construction activity. The Plan was adopted by the Construction Working Group that was formed in February 1987. The Working Group solicited interest from architectural and engineering (A&E) firms in Egypt and selected 12 of these to assist in the development of specific plans to complete the objectives of the NARP construction activity. Dr. Momtaz, Eng. Ali Salem and the Construction

Working Group met with USAID officials to complete the needed procedures to identify needs, design construction, prepare bids, select contractors, and monitor progress on construction.

PIL #12, Amendment #1 approved and defined the terms of reference for all construction for NARP on September 6, 1987. A general form for contracting will be written for all contracts concerned with construction at research stations and any specific items that need to be included will be attached as an addendum to the standard form.

In December, H. E. Dr. Youssef Wally approved an advance of LE 2 million as a working fund to complete the Architectural & Engineering (A&E) plans for all NARP construction activities. The first invitations for bids by A&E firms have been issued for design work associated with the Sakha and Məhallet Mousa Research Stations. This design work will include a sewage drainage system for the housing area at the Sakha station.

In the library construction area, all actions preliminary to contracting with the library's architect-designer have been completed. The site was identified in the spring and functional specifications for architectural design were prepared and submitted subsequently by the LIS Working Group.

D. DATA SERVICES AND ANALYSIS

Planning this year has focussed on the new phase of the data management area activities to move from the previous Data Collection and Analysis Project to a new component of the NARP where the emphasis will be on data management and policy formulation for the MOA. The Undersecretariat for Agricultural Economics, Statistics and Data Processing (U/AES) prepared a full program proposal that outlined the rationale and implementation of the new activities. The amendment will establish an agricultural economics and statistical capability within the MOA and produce analyses which will provide guidance on formulation of policies for the agricultural sector. The U/AES will also develop a capacity to publish the best available data, as heavily qualified as deemed appropriate, on a timely basis. The new project proposal contains 24.2 million USD from USAID and LE 21.3 million from the GOE for operations, training, commodities and technical assistance.

In addition to the many reports that have been prepared for planning the new data management area, a new NCR computer system has been installed in the U/AES unit that provides 17 terminals for nearby and/or remote use. It will also increase the total computer storage capacity of the unit many fold. A long term technical assistance advisor, Mr. Robert Harrower from USDA is in Egypt to assist in the installation of the new computer system.

E. LIBRARY AND INFORMATION SYSTEMS

The Library and Information System supports Egypt's agricultural sector by providing and facilitating information to administrators, researchers, and producers as well as University clientele and the private sector. An effective system must provide convenient and useable facilities, trained staff to provide information, timely research information and training for users to utilize the information.

The following table shows the phases for the development of the Library and Information System.

TABLE 22: Development Phases

No.	Phase	Time Period
1	Planning	October 1986 - October 1987
2	Startup	November 1987 - May 1988
3	Establishment	June 1988 - June 1989
4	Expansion	July 1989 - June 1990
5	Network	July 1990 - June 1992
6	Completion	July 1993 - October 1993

As is shown in the table, 1987 was both a Planning Phase and a Startup Phase. In the Planning Phase the Working Group participated in the NARP Startup Workshop to help develop the Life of Project Plan. A needs assessment was conducted through visits, interviews, and examination of background documents. Numerous planning sessions have been held to prepare planning documents and working papers.

In 1987, the foundation for establishing a centralized library system for Egypt's agricultural sector was achieved by the Library and Information Systems Working Group. They arrived at a consensus about its structure, and policies and then gained administrative approval for the concepts. A decision was made to establish the Egyptian National Agricultural Library System from the present library units of the ARC throughout Egypt. It will incorporate the two largest collections of agricultural books and journals within the Ministry from the present library of the Museum of Agrarian Culture and the central library of ARC. The structure will allow administration and coordination of all library activities within the MOA, and strive for coordination of a network of agricultural and scientific libraries and information centers outside the MOA, such as the university libraries, the library of the National Research Center and others. See Figure 8 and 9 for conceptual drawing of the plans.

ENAL's collections and services will be housed at its central location on the grounds of the Ministry of Agriculture and Land Reclamation, in Dokki and at satellite locations. The satellite locations will be at ARC Research Institutes and Research Stations, the site of the former ARC central library, and two regional resource centers at Sakha Research Station and Sids Research

FIGURE 8. EGYPTIAN NATIONAL AGRICULTURAL LIBRARY CENTRAL FACILITY
 SPATIAL LAYOUT PLAN, SEPTEMBER 1987

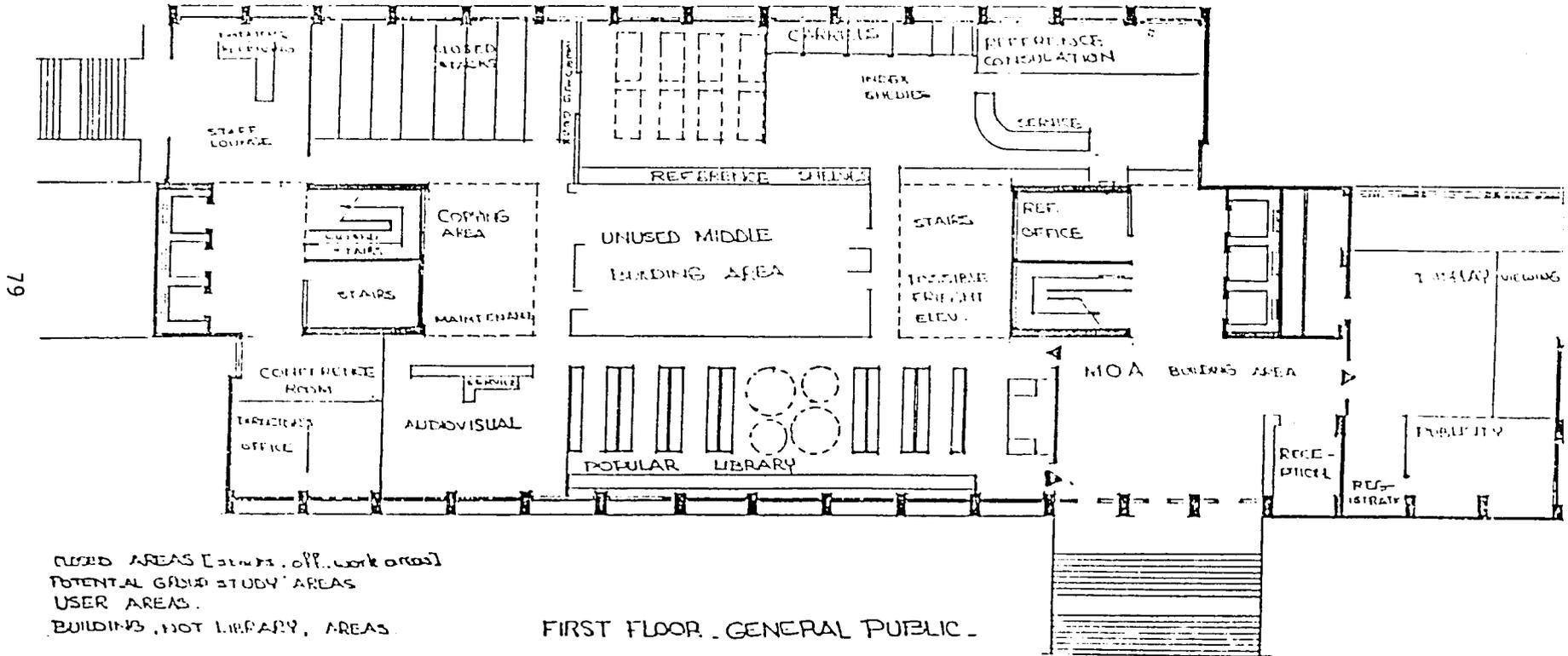
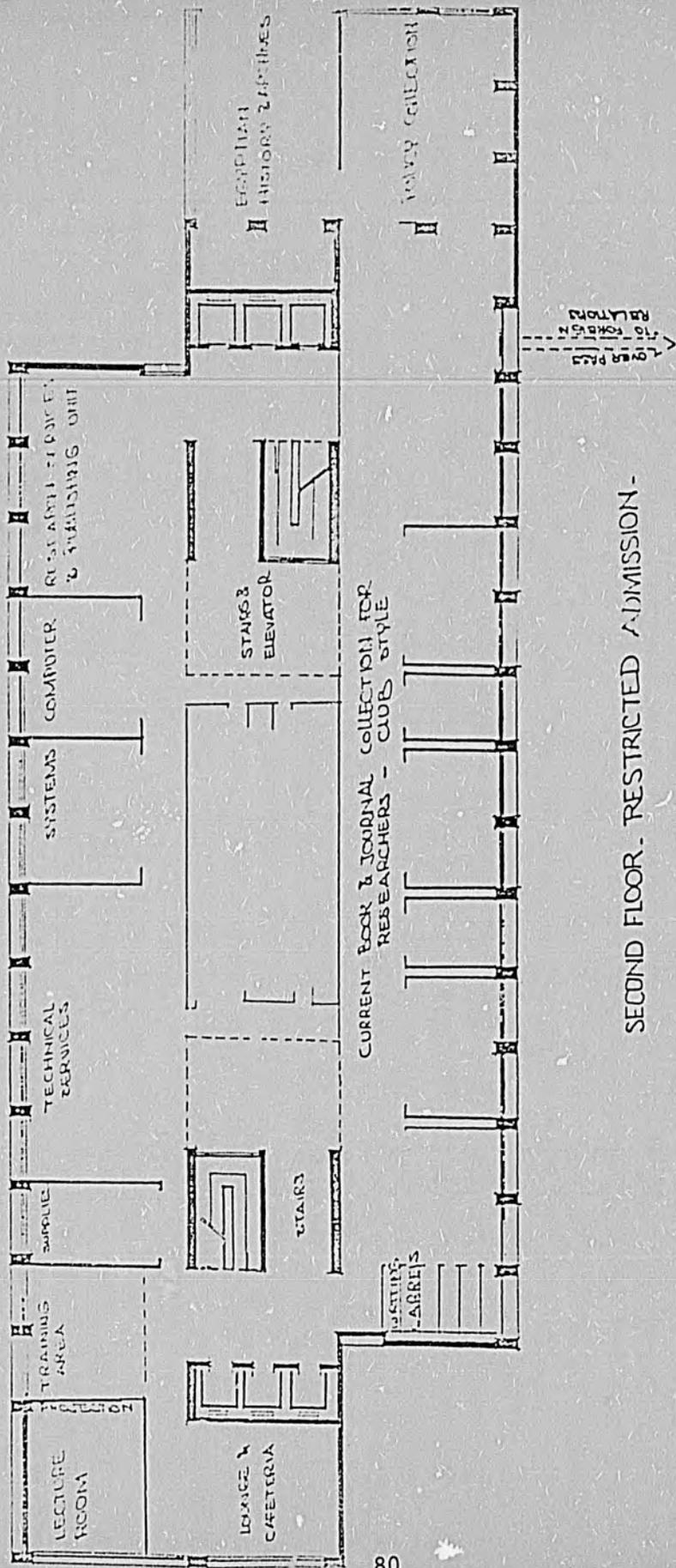


FIGURE 9. EGYPTIAN NATIONAL AGRICULTURAL LIBRARY CENTRAL FACILITY
 SPATIAL LAYOUT PLAN, SEPTEMBER 1987



SECOND FLOOR - RESTRICTED ADMISSION -

Station. Figure 10 on the following page illustrates the concept. Publications will be collected and made available for use throughout Egypt. This will provide active information services by drawing on its collections, the collections of other libraries, databanks and information centers.

The Commodity Procurement Plan for the library was designated into phases with a budget for the life of the project and submitted to USAID and approved. USAID is currently preparing documents for transmittal to AID/Washington to activate the procurement of journals and books. A list of equipment to be purchased was compiled for MOA and USAID for procurement of equipment and furniture.

In the Startup Phase the following implementation activities have begun:

- Collection development plans were made for procurement of 400 journals;
- The site of ENAL's central facility was designated and approved, and functional specifications for the architectural design was approved.
- The Agricultural Museum Library purchased LE 70,000 worth of books and journals from MOA funds;
- The ARC Central Library placed subscriptions for LE 14,000 of journals from MOA funds.
- A microcomputer based integrated library system developed for AID Mission libraries, MICRODIS was received and installed at NARP headquarters; and,
- Two members travelled to the United States for a professional conference and observational tour of major libraries. Their experience enabled them to contribute to planning and startup activities significantly. Their visit to the National Agricultural Library (NAL) resulted in plans for future cooperation between ENAL and NAL.

The Library and Information System component of NARP will begin supporting NARP research and extension activities with information even before the Egyptian National Agricultural Library System is fully organized or equipped. While waiting for construction and commodities, the resources of university libraries can be more fully utilized through training researchers to use information through libraries, and to communicate with researchers worldwide.

A budget for commodities larger than the allocated three million dollars and more training would help establish an effective library and information system. Management of the communication and information dissemination activities should be fully integrated into the present research system by providing technical assistance and training to create a momentum in improving present attitudes about and practices in libraries.

F. TECHNICAL ASSISTANCE

Contracts with the Consortium for International Development (CID), IRRI and USDA have provided technical assistance to NARP. All of the contracts provide for short term technical assistance from outside of Egypt.

1. Consortium for International Development

Eleven staff positions were provided in 1987 in the areas of:

- Chief of Party/Management;
- Administrative Services;
- Interdisciplinary Research;
- Integrated Pest Management;
- Library and Information Systems;
- Manpower Development and Training;
- Mechanization;
- On-Farm Trials Research Management;
- Research Grants;
- Research Stations Management; and,
- Seed Technology.

The technical assistance staff assisted in developing programs and activities in their specialty areas with the Working Groups designated by the Ministerial Decree. A NARP Implementation Workshop was held from February 12-15 to help develop close collaboration between the MOA Working Group members, CID Technical Assistance Team and USAID. (See Annex V). Visits have been made to Egypt by staff members from the lead university, New Mexico State University and by members from the CID office in Arizona.

CID policy requires an internal review within the first year of project operation to provide an external perspective on the project direction. An internal project review was completed in December by a CID Review Team. (See Annex VI).

2. IRRI

The IRRI contract provides for three long term technical advisors in the areas of:

- Research Management;
- Plant Breeding; and
- Plant Pathology Research.

3. USDA

A long term technical assistance advisor from USDA has been in Egypt to assist in the installation of the new computer system of the Data Collection and Analysis component.

ANNEXES

- I. Steering Committee**
- II. Ministerial Decrees**
- III. Research Support Program Expenditures**
- IV. Publication List**
- V. NARP Implementation Workshop**
- VI. CID Review**

ANNEX I: STEERING COMMITTEE MEMBERS

The Steering Committee meets as needed but no less than monthly and is composed of the following persons:

H.E. Dr. Yehia Hassan, The Governor of Menufia, Chairman
Dr. Ahmed Momtaz, Director of ARC and NARP Director General
Acct. Kamal Reda, Undersecretary for Finance and Administration
Eng. Mohamed Dessouki, Administrator, Foreign Relations
Department
Dr. Hassan Khedr, Undersecretary for Economics and Statistics

ANNEX II

MINISTERIAL DECREES

**Ministerial Decree
No. 1072 for the year 1986**

**Deputy Prime Minister
and Minister of Agriculture & Land Reclamation**

After reviewing the Law No. 47 for the year 1978 for issuing the system of civil workers in the Government.

And the Presidential Decree No. 2425 for the year 1978 for establishing the Agricultural Research Centre.

And the Presidential Decree No. 19 for the year 1983 concerning ARC.

And the text of the agreement of the grant from the USAID project No. 152-263 between Arab Republic of Egypt and the United States of America.

Declares

Article 1: Assigning of Dr. Ahmed Momtaz Deputy Director of ARC, as a Director of the National Agricultural Research Project (NARP).

Article 2: Concerned authorities are to execute this decree.

Date 17/11/1986

Dr. Youssef Wally

**Ministerial Decree
No. 390 for the year 1987**

Deputy Prime Minister
and Minister of Agriculture and Land Reclamation

After reviewing the Law No. 47 for the year 1978 for issuing the system of civil workers in the Government.

And the Presidential Decree No. 2425 for the year 1978 for establishing the Agricultural Research Centre.

And the Presidential Decree No. 19 for the year 1983 concerning ARC.

And the Presidential Decree No. 146 for the year 1986 concerning the approval of the agreement for the National Agricultural Research project.

And the Ministerial Decree No. 363 the year 1986 concerning the financial and administrative charts for the National Agricultural Research Project.

And the Ministerial Decree No. 158 for the year 1986 concerning assigning Egyptian Counterparts for the Foreign Experts required for the National Agricultural Research Project.

And the Ministerial Decree No. 1072 for the year 1986 concerning assigning of Dr. Ahmed Momtaz as a Director General of the National Agricultural Research Project.

And the Memo of the Foreign Projects Committee Chairman in the MOA concerning the formation of the Task Forces (working groups) in the National Agricultural Research Project.

And Our approval

Declares

Article 1: Formation of Principal Task Forces for the National Agricultural Research Project as follows (names have been deleted or added to reflect current membership):

1. Administration

Dr. Ahmed Momtaz, Chairman
Acct. Kamal El-Din H. Reda
Dr. Ahmed F. El-Sahrigi
Dr. Youssef Hamdi
Eng. Ali Nashaat Ismail
Couns. Sami Abou Hussein
Eng. Yehia El-Rawi
Eng. Ali Rashaad

3. Training

Dr. Ahmed El-Sahrigi, Chairman
Dr. Yeldez M. Ishac
Dr. George Estino
Dr. Adel Aboul Naga
Eng. El Sayed Fahim
Dr. Essam Gheith
Eng. Atef Abdel Halim

5. Construction

Eng. Ali Salem, Chairman
Eng. Abdel Rahman El-Kashef
Couns. Sami Abou Hussein
Eng. Mohamed Ezzat Yassin
Eng. Fatma Hussein
Eng. Ibrahim Souidan
Acct. Abdel Bari Hassan

7. Seeds

Dr. Abdel Salam Gomaa, Chairman
Eng. Mohamed El-Diguiy
Dr. Olfat El-Bagoury
Dr. Kamla Mansour
Eng. Mahmoud Nour
Eng. Kamal Nasser
Dr. Abd Rabbou Ismail
Dr. Maddah Soliman

2. Inter-Disciplinary Research

Dr. Ahmed Hassan Nour,
Chairman
Dr. Mostafa Hathout
Dr. Hosny Sawwah
Dr. Taha El-Sharkawy
Dr. Mahmoud El-Meleggy
Dr. Abd Rabou Ismail
Dr. Abdel Wahab Allam

4. Procurement

Acct. Kamal El-Din Reda,
Chairman
Eng. Mohamed Mahmoud
Dessouki
Eng. Ali Nashaat
Dr. Yehia El-Hayatmi
Eng. Ahmed El-Behery
Eng. Ali Rashad

6. Research Grants

Dr. Bakir A. Oteifa, Chairman
Dr. A. Gamal Abdel Samie
Dr. Farouk Rakha
Dr. Abdel Moneim Youssef
Dr. Saad Zaki
Dr. Othman El-Khouly
Dr. El-Sayed Hassanein
Dr. Mahmoud El-Barkouky
Dr. Ahmed El-Sahrigi
Dr. Abdallah Nassib
Dr. Mohamed Hanafi Sayed
Dr. Helal El-Sayed El-Hattab
Eng. Ali Abou Gazia
Eng. Mohamed Fahmi El-
Essawi

8. Data Collection and Analysis

Dr. Hassan Khedr, Chairman
Dr. Mohamed F. Sharaf
Dr. Ali Obaida
Dr. Ibrahim Farah
Eng. Nabil Shanan
Dr. Ahmed Abdel Halim
Dr. Mahmoud Mansour
Dr. Hatem Mohamed Ali

9. Libraries

Dr. Mohamed F. Sharaf, Chairman
Eng. Mohamed Dessouki
Dr. Hassan Khedr
Dr. Mohsen El-Guindy
Dr. Mohsen El-Didi
Dr. Ahmed Sayed El-Ballal
Eng. Abdel Aziz Hegazy
Eng. Ibrahim Zaki
Eng. Ragaa M. Abdel Hadi
Mr. Ismail Abdel Samie

10. Research Stations

Dr. Ismail Darrag, Chairman
Dr. Mohamed A. Bishr
Dr. Ahmed Rammah
Eng. Badri Mehannah
Dr. Fikri El-Kourany
Dr. Ibrahim Sayed
Eng. Yehia Kadry
Dr. Nabil El-Mouelhy

11. On-Farm Trials Research

Dr. Abdallah Nassib, Chairman
Dr. Ahmed Abdel Rehim Ali
Eng. Fouad Abou Hedb
Eng. Mahmoud Nour
Dr. Laila Bedeir
Dr. Mohamed Shafei Sallam
Eng. Hussein Mostafa

12. Integrated Pest Management

Dr. Taha El-Sharkawy,
Chairman
Eng. Ahmed Khattab
Dr. Yassin Osman
Dr. Zakaria El-Attal
Dr. Fouad Tawfik
Dr. Mohamed Zaher
Dr. Fouad El-Sharawi
Dr. Nabila Bakri

Article 2: The Director General of the project will Undertake the responsibility of issuing decisions for the formation of secondary supporting working groups according to the needs of work in the project.

Article 3: Terminating the effectiveness of the Ministerial decree No. 158 for the year 1986 from date of issue.

Article 4: The concerned authorities are to execute this decree.

Issued: 13/14/1987

Dr. Youssef Wally

**ANNEX III. RESEARCH SUPPORT PROGRAM
EXPENDITURES FROM 11/86 THROUGH 12/31/87**

NUMBER	PROGRAMS	L.E. EXPENDITURES
1	Fiber Crops	240,409
2	Cereal Crops	
3	Oil Crops	531,101
4	Food Legumes	
5	Forage Crops	
6	Sugar Crops	97,500
7	Fruits	
8	Vegetables	323,804
9	Other Botanical Plants	
10	Animal Husbandry	440,834
11	Animal Health	274,149
12	Integrated Pest Manag.	121,867
13	Soil & Water	140,435
14	Seed Technology	225,516
15	Mechanization	100,710
16	Economics & Statistics	212,447
17	Agricultural Extension	39,232
18	Interdisciplinary Research	46,143
19	Research Stations	495,077
20	On-Farm Trials	74,733
21	Food and Feed Technology	51,000
22	Administration	242,264
TOTAL		£ 3,657,221 -----

ANNEX IV: PUBLICATION LIST

<u>PUBLICATION TITLE</u>	<u>PUBLICATION NO.</u>
- <u>Quarterly Report</u> (November - December, 1986)-----	1
- <u>Quarterly Report</u> (January - March, 1987)-----	2
- <u>Implementation Workshop - Proceedings</u> (February 9 - 17, 1987)-----	3
- <u>Quarterly Report</u> (April - June, 1987)-----	4
- <u>Life of Project Plan</u> (September, 1987)-----	5
- <u>Implementation and Financial Plan, Fiscal Year 1987-1988</u> (September, 1987)-----	6
- <u>Manual for Grant Research Under NARP</u> (October, 1987)-----	7
- <u>Manpower Development & Training Plan</u> (November, 1987)-----	8
- <u>Quarterly Report</u> (July - September, 1987)-----	9

ANNEX V: NARP IMPLEMENTATION WORKSHOP

The Implementation Workshop was designed to develop a strategy and an implementation plan that would help define actions that were needed to implement the National Agricultural Research Project.

Staff from the Government of Egypt (GOE), Consortium for International Development (CID) and the United States Agency for International Development were present to share ideas, develop strategy and draft a NARP Implementation Plan. Participants attended the Workshop from February 9-11 to acquire needed background information and status of NARP in the EMCIP Auditorium. From February 12 to 15 the CID Technical assistance staff and their counterparts worked together to agree on the involvement needed in the NARP Project. They drafted a plan of action to define the planned activities and accomplishments needed for each component .

The Workshop was a useful method to bring new staff together to begin to understand the objectives of the Project and to develop a collaborative process needed for program implementation. The documents developed in this workshop were then utilized in developing and writing the Life of Project Plan

The Workshop Activity Teams were divided as follows:

NARP ACTIVITY AREAS

TEAM MEMBERS

Agricultural Research

Dr. Ahmed Momtaz
Dr. Robert Witters

Interdisciplinary Research

Dr. A. Hassan Nour
Dr. A. Ismail
Dr. A. Allam
Dr. Hosney El-Sawah
Dr. A. Rammah
Dr. M. Balal
Dr. Willis McCuiston

Research Station Management

Dr. Ismail Darag
Dr. A. Bishr
Dr. N. Seif El-Yazal
Dr. A. Taher
Dr. Ralph Finkner

On-Farm Research and Demonstration

Dr. A. Mahdy
Dr. M. Shafei
Dr. M. Abo El-Nagaa
Dr. M. Sidky
Dr. Gordon Beckstrand

Administrative Service

Dr. Kamal H. Reda
Dr. A. Abdel Reheem
Mr. Abdel Barry
Eng. Ali Nashaat
Mr. Cory Wengreen

Library and Information Science

Dr. M. Sharaf
Eng. M. Dessouki
Dr. M. Hathout
Mr. Ibrahim Zaki
Dr. M. El Didy
Dr. Susan Emerson

Research Studies

Dr. B. Oteifa
Dr. A. Nassib
Dr. Richard Foote

Seeds

Dr. Abdel Salam Gomaa
Dr. Maddah Soliman
Dr. Bill Gregg

Crop Protection

Dr. T. El-Sharkawy
Dr. Ahmed Awadallah
Dr. Y. Osman
Dr. A. El-Attal
Dr. Robert Harwood

Agricultural Mechanization

Dr. A.F. El-Sehri
Dr. Youssef Hamdy
Dr. Amir Khan

Training

Dr. S. Bahaa El-Deen
Eng. El-Sayed Faheem
Dr. Yeldezh Ishak
Dr. A. Fafei
Eng. Atef Abdel Haleem
Ms. Colcen Brown

Data Analysis

Dr. Hassan Khedr
Dr. Aboul El-Enein
Dr. M. Mar:sour
Dr. Nabil Mowelhy

Construction

Eng. Ali Salem
Eng. Fatma Hussein

Commodities

Mr. Ali Rashad
Dr. Y. El-Hayatmy
Eng. A. El-Behery

ANNEX VI: SUMMARY OF CID INTERNAL REVIEW OF NARP DECEMBER 1987

The Consortium for International Development's (CID) policy is to conduct an internal review financed by CID of projects between the 8th and 18th month of implementation of the project. The purpose of the review is to assess the CID team's overall performance to date, to identify areas of performance which can be enhanced, to provide specific recommendations to improve performance, and to identify lessons learned that will be valuable in the future.

The review team was composed of: Dr. Merle Niehaus, Team Leader; Dr. James Collom; Dr. Dennis Child; Dr. Donald Lindsey; Dr. Ahmed Abdel Rahim; Eng. Abdel Wahab Moustafa; and Eng. Abdel Latif Fawzi.

The conclusions of the evaluation team indicated that CID as TA contractor is meeting its contractual responsibilities successfully and that good progress is being made towards accomplishing the goals of the project. The evaluation team was favorably impressed by the speed with which the project has been organized and by the fact that there are many documented accomplishments.

The evaluation team felt that since Dr. Momtaz is now Director General of both ARC and NARP that this will allow good continuity for the changes made under NARP will be institutionalized within ARC. The team noted that the project has moved forward very quickly and effectively under his guidance.

The evaluation team was impressed by the fact that nearly 600 winter crop interdisciplinary research and on-farm research trials (IR/OFT) were planted this year. A system was in place which covered training, organization, logistics, equipment, financial management, reporting, and communications. The fact that the system is in place insured rapid expansion of both interdisciplinary research and on-farm research. A number of other similar accomplishments with long term implications for Egyptian agricultural research were documented.

The review team found some areas of concern but none which would cause the project to falter and none which is unsolvable. The team made several recommendations, all of which are meant to be constructive. Several were meant to encourage people to continue what they are already doing; others were meant to help people be more effective; and a few were recommendations in areas which needed attention. They found that the technical areas were for the most part being executed well and the training and grants areas were progressing extremely well. Most of their concerns related to the assistance being provided in the research management area and they, for the most part, are currently being addressed.

The review team stated that the project team is to be commended and certainly the Egyptians associated with NARP have done a tremendous job in order for the Project to have accomplished so much such a short time.

DISTRIBUTION

NO.

6	Dr. Ahmed Momtaz	Director General, NARP, Director ARC
1	Dr. Yehia Hassan	Chairman, Foreign Agricultural Projects Committee
1	Dr. M. Sattour	Deputy Director, ARC
1	Dr. Abdallah Nassib	Director, Field Crops Research Institute
1	Dr. Samir Moustafa	Director, Cotton Research Institute
1	Dr. Ahmed Nour	Director, Sugar Crops Research Institute
1	Dr. Kamla Mansour	Director, Horticulture Research Institute
1	Dr. Moustafa Hathout	Director, Animal Production Research Institute
1	Dr. Hosny El-Sawah	Director, Animal Health Research Institute
1	Dr. Sayed A. Salama	Director, Veterinary Serum & Vaccine Research Institute
1	Dr. M. Sabry Tawfik	Director, Animal Reproduction Research Institute
1	Dr. Ahmed El-Sahrigi	Director, Agricultural Mechanization Research Institute
1	Dr. Youssef A. Hamdi	Director, Soils and Water Research Institute
1	Dr. Mokhtar El-Satour	Director, Plant Pathology Research Institute
1	Dr. Ahmed Khattab	Director, Plant Protection Research Institute
1	Dr. Mohamed Sharaf	Director, Agricultural Economics Research Institute
1	Dr. Shafie Sallam	Director, Agricultural Extension and Rural Development Research Institute
1	Dr. Zakaria El-Attal	Director, Central Agricultural Pesticides Laboratory
1	Dr. Ahmed Abdel Halim	Director, Central Laboratory for Statistics
1	Dr. Akila Salleh	Director, Central Laboratory for Food and Feed
1	Dr. Ismail Darrag	Director, Agricultural Research Stations
1	Eng. Ali Nashaat	Secretary General, ARC
1	Dr. Abdurabbo Ismail	Director, Specialized Extension, ARC
1	Dr. Alaa Eldin Z. Bondok	Head, Central Administration for Minister's Office, MOA
1	Dr. Adel El-Beltagi	Head, Central Administration for Minister's Office, MOLR
1	Acc. Kamal Reda	Head, Financial and Administrative Affairs Sector, MOA
1	Eng. Adel Ezzi	Chairman, Agriculture Development and Credit Bank
1	Dr. Abdel Salam Gomaa	Head, Central Administration for Seeds, MOA
1	Dr. Yassin Osman	Head, Central Administration for Pest Control, MOA

1	Eng. Mohamed Dessouki	Head, Central Administration for Agricultural Foreign Relations, MOA
1	Dr. A. Moneim Barakat	Head, Central Administration for Animal Health, MOA
1	Eng. Mahmoud Nour	Supervisor, Central Administration for Planning, MOA
1	Eng. Abdel-Razik Badawy	Head, Central Administration for Animal Production, MOA
1	Eng. Fouad Abo-Hedeb	Chairman, West Nobarria Company
1	Dr. Ibrahim Antar	NARC Member
1	Dr. Ahmed Abdel-Rahim	Technical Trusteeship for Research Institutes, ARC
1	Dr. Mahmoud El-Barkouki	NARC Member
1	Dr. Bakir Oteifa	Chairman, Grants Program Working Group
1	Eng. Aly Salem	Chairman, Construction Working Group
1	Dr. Hassan Khedr	Chairman, Data Collection Working Group
1	Dr. Yeldez M. Ishaq	NARP News
1	Dr. Mohsen El-Didi	NARP News
1	Eng. Aly Abo-Gazia	Chairman, Horticulture Crops Exporters Union
1	Dr. Nabil M. El-Mowelhy	Deputy Director SWRI and member of TTR, ARC
1	Eng. Mohamed El-Akad	Head, Cotton Physiology Research Section CIR and member of TTR, ARC
1	Dr. Adel Abo-El-Naga	Deputy Director APPRI, and member of TTR, ARC
1	Dr. Mohsein El-Gindy	Senior Researchers, Pesticides Central Lab, ARC, and member of TTR, ARC
1	Dr. Rashad Abo-El-Enein	Deputy Director FCRI and member of TTR, ARC
1	Mr. Cory Wengreen	Administrative Services Advisor
1	Dr. Willis McCuistion	Interdisciplinary Research Advisor
1	Dr. Ralph Finkner	Research Station Management Advisor
1	Dr. Gordon Beckstrand	Deputy Chief of Party/On-Farm Research and Demonstration Advisor
1	Dr. Amir Khan	Agricultural Mechanization Advisor
1	Dr. Robert Harwood	Integrated Crop Protection Advisor
1	Dr. Bill Gregg	Seed Technology Advisor
1	Prof. Richard Foote	Research Studies Coordinator
1	Dr. Gusan Emerson	Library and Information Services Advisor
1	Ms. Coleen Brown	Deputy Chief of Party/Training and Man-power Development Advisor
6	Mr. John Foti	Project Officer USAID/NARP
2	Dr. H. Matteson	Project Director, NMSU/CID/NARP
2	Dr. Earl Kellogg	Executive Director, CID
20	ARC Libraries	Director General Office