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QUARTERLY REPORT

July 1 to September 30, 1979

EGYPT WATER USE AND MANAGEMENT PROJECT

Submitted By

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Contract No.
AID/NE-C-1351 (Egypt)
Project No. 263-017

Consortium for International Development
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Appendix

QUARTERLY REPORT

July 1 to September 30, 1979

EGYPT WATER USE AND MANAGEMENT PROJECT

Contract No. AID/NE-C-1351

(Egypt)

PROJECT STATUS

Introduction

Work progress tends to be slower during the third quarter primarily for two reasons. One a considerable number of the Egyptian staff were on training in the United States at Colorado State University and two the month of Ramadan reduces the number of working hours per day. In addition to this shortage of time and man hours, the Technical Project Director received permission from USAID mission to proceed on early home leave during mid June and mid July. During his absence the Project Coordinator at Colorado State University came to the project to assume the duties of the Technical Project Director. During this period of time the Project Coordinator became acquainted with the day to day routines of the project management in Egypt.

During the latter part of July a project review team consisting of representatives from the Consortium for International Development (CID) and the U.S. Agency for International Development (USAID), conducted an indepth mid project review of the project. They had indepth conferences with most of the American staff members as well as Egyptian staff members and observed many of the activities taking place in the field in Mansouria and in Kafr El Sheikh. Because of time limitations they were unable to visit the Minya site but did spend several hours in conference with the American team leader at Minya discussing project activities there. Written reports were prepared by both the CID review team and the USAID review team and submitted to USAID and trustees of CID. The CID review team report was submitted to USAID and is attached. The USAID report is drafted and will be available next quarter.

In general the project remained on track with problem identification work continuing in El Minya. Field trials are being developed in Mansouria as the search for solution continues. Work plans are being developed for field trials in Kafr El Sheikh following completion of the problem identification work there. The following sections deal with some of the specific details of the work that was carried out during the past quarter in the three project areas.

Mansouria

The field trials that were established on the five sites mentioned in the previous quarterly report dealing with land leveling, plant stand density and micronutrient foliar applications of micronutrients using both hybrid and native varieties of corn were harvested but a complete analysis of the data remains to be completed. In this particular field trial farmers planted corn using their native variety and a hybrid variety according to their standard normal planting practice. In addition, the project planted corn at optimum spacings for both the hybrid and native varieties. The plant populations planted under the direction of the project ranged from 19,200 to 22,200 plants per feddan. While the spacing used by the farmer for the hybrid variety range from 15,600 to 25,800 plants per feddan. For the native corn variety the farmers planted 12,400 plants per feddan verifying again the low plant stand density that is often used for corn in Egypt. It is expected that as the farmer compares his plant stand density with those planted by the project and sees the differences in yield and bigger plants he will be moved to adopt the optimum spacing needed for optimal production.

Four farm fields were leveled during the past quarter using the project tractor and land scraper. Insofar as possible agreements were made or are being worked out with the farmer to permit improved practices including longer irrigation runs, smaller irrigations that are scheduled only when needed and more uniform water distribution over the field. The equipment to be tried in these fields include tensiometers, siphon tubes and gated pipes. On duty during this past quarter on a TDY basis was Dr. A. W. Marsh who presented many seminars and training sessions on the use of tensiometers for scheduling irrigation. On the land leveling field trials the agricultural economists were collecting

cost data and making preparations for evaluation of this type of water management practice.

A considerable amount of time was spent by two task groups that were assigned to the development of two detailed work plans for field trials along the El Hammami and Beni Magdoul Branch Canals. One of the more serious problems noted on the El Hammami water course is the light textured sandy soils and the associated complaints of farmers of inadequate water supply especially near the end of the Mansouria Canal and the Branch Canal. Plans were developed on the El Hammami branch for delivering water by a buried pipeline system under moderate pressure to the area so that reduced canal seepage would occur which are tending to build up water tables and to provide a more positive supply of water for farmers near the ends of the branch canal. Tenders were developed by the research institute for obtaining competitive bids on this buried pipe system. The economists and agronomists worked closely with the development of these plans to provide the necessary input and to assure that proper background data was obtained for its further evaluation. In addition plans were developed for using an elevated meska on both the Beni Magdoul and El Hammami branch canal systems for purposes of delivering water by gravity to a large number of farmers. The water to be pumped into the meskas using a single pump station. As indicated in previous quarterly reports the agricultural economists estimate that considerable savings to farmers can be experienced if they will join together in a cooperative way in lifting the water by using a single pump station. A considerable amount of engineering time was devoted to these improved type irrigation delivery systems to be installed as a field trial for purposes of improving on-farm water management. It is expected that other engineers here in Egypt and expatriot TDY assistance will be used to review these engineering designs to insure that such a field trial will produce the results anticipated.

The sociologists in Mansouria assisted in completing an ownership operatorship survey of the land in the Beni Magdoul hydrologic unit and begin the same type of survey for the El Hammami unit. An additional sociologist has been assigned to the Mansouria field team and some effort and time was spent in training the new sociologist.

As the field trials progress the role of the sociologist becomes one in which he supports the other disciplines work by giving information and obtaining cooperation from farmers and individuals with respect to field trials that are to be implemented with the farmers. Work also continued with the record keeping system for fourteen farmers at Mansouria. These records will be completed and summarized at the end of the cropping season on September 30, 1979.

Kafr El Sheikh

The soil survey data was finally completed for the Kafr El Sheikh area and a considerable amount of time was spent in assembling the data of the El Bahriyah area. This data will constitute another project paper dealing with the soil survey of El Bahriyah as was the case for the Mansouria area. The field trials that were reported last quarter on the establishment of rice and cotton are at the stage of harvest and data is not available at this time regarding the success of these cotton and rice field trials. However preliminary observations of cotton harvests indicate where zinc foliar sprays are applied to the plant or the soil that increases in yields were experienced.

As indicated in the first quarter report for 1979 the engineers in Kafr El Sheikh had installed several permanent measuring flumes, cutthroat type for obtaining not only water budget data but also for measuring and monitoring flows into meskas or canals in connection with on-farm water management work. Two branch canals that have been under problem identification work for the past year have been the Omsin canal and the Hamed canal. At the take out of these two canals two concrete cutthroat flumes were installed. During the early part of the rice growing season that is the second quarter of 1979 large quantities of water are often needed for puddling rice fields and for transplanting rice. Farmers along the Omsin canal complain that insufficient quantities of water were available for this period of time for rice culture. They felt that the cutthroat flume placed at the head of the canal was restricting the flow and was not designed properly. To make sure that the flume was delivering proper quantities of water the bottom of the flume was lowered so that larger heads would be available for flow into the canal. Still the farmers complained of inadequate water supply. Finally on their own initiative they installed a bypass pipe adjacent

to the flume to increase water supply into their canal. Since this was an illegal procedure the irrigation district asked that the pipe be removed and indicated that the farmers would be fined for this activity. The farmers at this point in time decided that they no longer wanted to cooperate with the project, the project was not contributing or beneficial to them. In fact they asked that the project remove the flume and restore their canal. In the subsequent staff meeting it was decided that the flume would be left in the canal but that the project should look for another canal along which to work cooperatively with the farmers. A visit to the site by the Project Directors late in the quarter resulted in another branch canal being selected called the Mansaya canal. It was determined that the farmers along this particular canal were highly receptive and cooperative and that many of their problems were similar to those along the Omsin canal. Therefore future field trial work will take place on the Hamed canal and the Mansaya canal. Work plans were developed for field trials along both of these canals which will include land leveling for improved water distribution and methods of distribution, scheduling of irrigation by tensiometers and the use of various other pieces of irrigation equipment for improved delivery of water to the farm. Another field trial that will be attempted in cooperation with the farmers is to attempt the elimination of lateral field drains that have been used in years past for reclamation of sodic soils. These drains are presently being used to remove excess irrigation water from the field and it is doubtful that they have any appreciable affect in controlling salinity or improving the subsurface drainage. A preliminary analysis of the water table readings adjacent to shallow lateral field drains has shown that these field drains have very little influence on the water table. What influence they do have can cause them at different times to act either as a source or sink.

An analysis of the flow measurements in the Omsin canal showed that the installed concrete masonry flume was not really a restriction to flow as the farmers believed. It is evident now that some changes in the operation of the canal system and or some changes in agronomic practices at the time rice is transferred from the nurseries to the field are badly needed. On-farm irrigation scheduling will be

a field trial that will be attempted. Several training sessions were conducted by Dr. A. W. Marsh on irrigation scheduling where in he demonstrated the use of tensiometers.

Records have continued to be maintained for twelve small farms at the El Bahriyah site. These records will be summarized and analyzed at the end of the agricultural year on September 30. Because of the difficulty along the Omsin canal with farmers it has been decided to stop the work there with respect to record keeping and develop the farm record activity for the Mansaya canal. However we will continue to work with one farmer along the Omsin canal in terms of maintaining farm records.

Due to the fact that considerable number of people from Kafr El Sheikh were on training in the U.S during the summer little work with respect to the sociology discipline was done in Kafr El Sheikh as no sociologists were there during the month of July and August. However during September the sociologist assisted in contacting a new group of farmers identified to cooperate with the project along the Mansaya canal. The sociologists discussed the project with the farmers so as to acquaint them with some of the project's intentions and working procedures for purposes of establishing credibility among the farmers.

El Minya

The preliminary problem identification work in El Minya has been completed. From the preliminary qualitative observations a set of stated hypotheses were formulated for developing work plans to obtain detailed problem identification data. This detailed problem identification data will allow more precise selection of field trials in the future for the search for solution phase. From the experiences gained in Mansouria and Kafr El Sheikh this method of approaching the search for solution phase will be much more efficient and effective than what has been experienced in these other two field locations. A preliminary problem identification report is being prepared which will elaborate on the problems that have been qualitatively determined and what their probable causes are. Two meskas were selected of the some thirty or more meskas located along the El Bua canal for purposes of obtaining the detailed problem identification data. The farmers along these two meskas take water both by gravity from the canal and by

lifting. Representative crops of the area are grown in the area served by both meskas as well as representative farm sizes including both large and small size farmers. During this past quarter the development of work plans were initiated. It is expected that detailed data collection will begin in early October for the problem identification work. Some of the agronomic problems identified in the preliminary problem identification work were low plant stand densities, weed infestation in canals and among the crops, zinc micronutrient deficiency and excessive quantities of water applied at inappropriate times. The El Bua canal operates on a rotation basis from the El Mera canal but because of excessive leakage through the main control gate during the off period water is almost continually in the canal at all times. For many of the farmers, particularly those in the upstream reaches of the canal, the canal serves more or less as a continuous delivery system. During the on periods many farmers can irrigate by gravity along the up meskas while along the lower meskas water is lifted by tambour or sakias. Excessive quantities of water flow from the end of the meskas directly into the drains that are largely plugged with weed growth and silt spilled into the drains from construction of earth dams in some of the meskas.

Water Budget

The water budget work for this past quarter mostly consisted of development plans for expected TDY participants from Colorado State University. Plans were developed there for implementing increased water budget activity here during the Fall or final quarter of 1979. The first TDY participant on the water budget work during this quarter was Dr. William Sayre who arrived on the project September 3. A pumping well was drilled in the Mansouria area with several observation wells radiating out from the pumping well. This well is an attempt to obtain transmissibility data on the aquifer underlying the Mansouria area. Such data will be useful in determining the contribution of the ground water to the water budget for the Mansouria area. During the next quarter it is expected that many other water budget TDY engineers will be arriving in Egypt for continuing the work. Dr. Sayre is expected to remain on the water budget work during the entire next quarter.

Main Office Activities

During this past quarter most of the main office disciplinary personnel were involved in the field work with the exception of the sociologists who worked with several TDY sociologists, Dr. Zurcher and Dr. Santopolo. Dr. Gene Queneomen, the main office agricultural economist left Cairo and went to the USA to assist in the Fort Collins training program as an assistant training officer. At the end of his participation in the training program, Dr. Quenemoen took a one month early home leave and returned to the project near the middle of September.

Mr. M. Zaki, project leader for Mansouria, was made training officer for the project. He went to the States to assist in putting on the summer training course. It is anticipated that the "Evaluation and Improvement of Irrigation Farming Systems" training course will be given in Egypt next year. It was in preparation of that move that Dr. Quenemoen and Mr. Zaki took part as training leaders of the course. Mrs. Mona Mostafa El-Kady took over as project leader in Mansouria.

The main office sociologist together with the two participating TDY sociologists were successful in completing punch card storage of rounds 2, 3, and part of round 1 for case study interviews for Mansouria and Kafr El Sheikh. Some computer analysis of these data, required for procedural decisions and report writing, were also undertaken. Sociologists contributed to a section of a FAO symposium publication on agricultural development in the Nile valley by writing a paper entitled, "Egyptian Farmers Perceptions of Alternative Extension Strategies and Tactics". In addition substantial progress was made on several project papers including "Cooperation in Egyptian Rural Development". This document is in preliminary draft stage and is being circulated for review. In addition two other papers titled, "Social Dimensions of Egyptian Irrigation Patterns", and "Bureaucracy and Rural Development Processes in the Arab Republic of Egypt" are in preliminary draft stages or awaiting additional data for completing the draft.

BACKSTOPPINGPlanning and Coordinating Committee

The committee in addition to its activities of locating replacement personnel for overseas staff, conducting the on-campus training program, overseeing the water budget studies, developing the data management program, selecting TDYs, selection of equipment and backstopping the on-farm water management program and soil fertility surveys, has started an evaluation of Water Management Alternatives studies. Dr. Wayne Clyma is taking responsibility for the study with Drs. King (Economics), Loftis (Ag Engineering) and Karmeli (Ag Engineering) doing the actual work. Details of this study are in the Appendix. Major activities of the committee is centered on finding replacement personnel for the overseas staff. It appears that Drs. Dotzenko and Knop, Mr. Golus and Miss Adams will return to the campus at the end of their tour. Drs. Brooks and Wolfe will extend one year and Dr. Quenemoen will extend two years. Dr. Nielsen has another year on his contract.

TDYs

The following were in Egypt TDY this quarter:

Dr. John R. Davis, CID Review Team Member (July 21-29, 1979); to review and evaluate the project.

Mr. Bernard G. Henrie, CID Review Team Member (July 21-29, 1979); to review and evaluate the project.

Dr. Donal D. Johnson, CID Review Team Member (July 21-29, 1979); to review and evaluate the project.

Dr. Jim C. Loftis, Research Associate, Agricultural and Chemical Engineering (May 15 - July 3, 1979); to work on data management program for the project.

Dr. Leroy D. Luft, Professor of Agricultural Economics, (September 19 - October 21, 1979); to evaluate role of livestock and determine the socio-economic conditions of animal power vs. mechanical power for lifting water.

Dr. A. W. Marsh, Soil Physicist (August 29 - October 3, 1979); to train project personnel in the use of moisture measuring instruments, discuss soil water-plant relations with respect to irrigation scheduling and the water table and ascertain the effect of water table.

Dr. E. V. Richardson, Project Coordinator (June 22 - July 29, 1979); to act for Dr. R. H. Brooks, Technical Project Director, while he is on home leave and participate in the CID-AID project review July 22-28, 1979.

Dr. Frank A. Santopolo, Professor of Sociology (August 6 - September 6, 1979); to assess on site the project development and the role of field sociologists.

Dr. William W. Sayre, Professor of Irrigation Engineering (September 4 - December 16, 1979); to take part in the water budget studies.

Dr. Louis A. Zurcher, Professor of Sociology (July 18, 1979 - August 18, 1979); to help in defining the role of the sociologist on the project.

Training

The major activity during this period was presenting the "Evaluation and Improvement of Irrigated Farm Systems" training course. Seventeen Egyptians took the course. They were:

El Sayed Fouad Moussa Ramadan
 Fatma Abdel Rahman Attia
 Mohamed Ali Helal Sherif
 Salah El Din Abo El Ela
 Abdel Fattah Metawie
 Amany Hassan El Kayal
 Sayed Ahmed Abdel Hafez
 Abdel Sattar El Rayes
 Tarek Abdel Rahma. Tewfik
 Mohamed Hamed Abdel Salam
 Taha Mostafa Hussein
 El Shinnawy Abdel Aty El Shinnawy
 Mohamed Ragui Darwish
 Elya El Komos Sorial
 Yosef Mohamed Ali Yosef
 Abdel Fattah Basuni El Masry
 Abdel Raour Hassan Mohamed

The schedule for the course is given in the Appendix. At the end of the course the engineers and agronomists attended the National Agronomy meeting August 5-9 which was held at Colorado State University. The sociologists and economists were taken on a field trip to Eastern Colorado. The schedule for this trip is in the Appendix.

On August 10th the trainees, who were joined by Dr. (Mrs.) Samia El Guindy from the Drainage Research Institute, Ministry of Irrigation and six senior staff of the Ministry of Irrigation (MI) took an

extensive field trip to Western Colorado, Arizona and Southern California to observe American Irrigation practices. The schedule for the trip is in the Appendix.

The senior staff from the MI are as follows:

Abdel Rahman Mohamaed Shalaby
Technical Director, Minister's Office

Ahmed Shawky Makrum
Director General for Irrigation

Jean Kamel Abdel Sayed
Director of Aquatic Weeds Institute

Elwy Aly Mahmoud Makky
1st Under Secretary and Technical Director

Aly Aly El Deeb
Under-secretary of State, Ministry of Irrigation

Aly Ezzat Mokhtar
Under-secretary of State, Ministry of Irrigation

Mr. Zaki, Mrs. Omnia El Hakim, Mr. Ishmail El Hakim, Dr. Yack

Moseley and Dr. Jim Layton went with the group.

Video Tape Training

Nothing this quarter

On-the-Job Training

This is a continuing activity of the project.

Equipment

Equipment was continuously being ordered and shipped to Cairo in response to requests from the field.

WORK PLANSOctober 1, 1979 to March 30, 1980

I. October 1 to December 30, 1979

A. Cairo

Mansouria

The adaptive research program or field trials in search for solutions to problems identified will continue in Mansouria with emphasis on the following.

1. Completion of the design of the underground pipe delivery system for the El Hammami branch canal and the elevated ditch at El Hammami and Beni Magdoul. It is expected that considerable TDY involvement will occur with respect to this design after which materials will be ordered and initial stages of construction should begin before the end of this next quarter.

2. Continue to work with farmers in an attempt to help them organize for cooperative irrigation scheduling particularly with respect to the new delivery system to be constructed at El Hammami.

3. Land leveling will occur on four different farm sites in the Mansouria area and attempts will be made to get the farmers to apply different methods of water application to their land, such as long furrows and border strips. The water budget data gathering and analysis will receive considerable emphasis with several TDY water budget engineers to arrive during the quarter. It is expected that a preliminary draft report will be prepared by the end of the quarter.

4. A complete economic analysis of farm number 5 at Beni Magdoul in cooperation with other team members will be undertaken during this quarter. This farm has received assistance on several technical practices and it is anticipated that economic benefits are substantial.

Kafr El Sheikh

Because of the absence of the technical project director during a considerable time last quarter the problem identification report was not finalized during the past quarter as anticipated in the last quarterly report. It is expected that this problem identification report will be completed during this next quarter and will be available as a project paper.

Basic data will be collected on the newly selected El Mansaya canal in Kafr El Sheikh in the Al Bahriyah area in anticipation of various field trials in the search for solution phase for the Kafr El Sheikh field area. These field trials will consist of land leveling experiments which will be conducted in a manner similar to that conducted in Mansouria where farmers will be asked to apply water to their farms on the basis of need rather than on basis of rotation. Attempts will be made to eliminate some field drains for the purposes of bringing more land into production and controlling the water on dead level fields to eliminate large quantities of water flowing through the drains. The economists will continue to keep records on six farms on the Hammad canal and one farm on the Omsin canal and select six new corporators from the Mansaya canal. They will work with the other discipline leaders in analyzing various agronomic and cultural practices pertaining to rice seeding, reclamation of soil for rice production and on the mechanization and use of machines for lifting water and other cultural practices. It is anticipated that a feasibility study will be made during the quarter with respect to a demand type water delivery system that may possibly serve the rice growers during the early transplanting stage of rice production and at the same time reduce the quantity of water that may be delivered to farmers during the maturation stage of rice to prevent excess quantities of water flowing to the drain.

El Minya

It is expected that the detailed problem identification work will be about 40% complete by the end of this quarter. Much of the water management type data will have been collected by the end of the quarter and only data pertaining to spring or summer crop will remain to be selected during the first and second quarter of 1980.

Farms plans will be prepared for ten farmers selected at the El Bua canal. The farm plans will be for the coming agricultural year which begins October 1, 1979. After the farm plans have been prepared, farmers will be supplied with record books and the economists will visit the farm every two weeks for the purpose of keeping the record book up to date in the coming year.

Work by the sociologists include working with officials, the large sample farmer survey in the area and continuing case study

farmer interviews through completion of the three rounds used in the other project areas.

Main Office

The discipline leaders in agronomy and engineering will primarily be involved in adaptive research programs in the field and search for solutions to problems. A considerable amount of their time will be spent in El Minya and in Kafr El Sheikh. The main office sociologist will become largely involved in a large sample survey of farmers in the three project field sites to compliment the case study data already collected. They in turn will give considerable attention to finalizing many reports and papers mentioned earlier in the project status section of this report. Dr. Ed Knop will be terminating his project assignment near the end of this quarter and much of the work that he has been involved in during the past two years will be summarized in various reports that are anticipated to be published.

The economists in the main office will be involved with training seminars held on a monthly basis. These will generally consist of a two day meeting in which each participant will have an opportunity to present some information about his work. The economists will also be working on the economics of mechanization for small farms. This paper consists of five parts 1) involving cost and farm size relationships illustrated by alternative pumping cost, 2) problems of adopting mechanization for a farm at El Hammami, 3) alternative methods of achieving appropriate size for mechanization adaptation, 4) impact of mechanization on communities and 5) impact on mechanization on national economy. Target date for finishing this report which is intended as a project paper is December 31. Drs. Skold and McConnen will be in Egypt during this period on a TDY basis and will assist in the preparation of this paper. The economists will also be participating and functioning in livestock data collection for use in farm planning. Dr. Luft is spending one month in Egypt during this quarter for the purpose of gathering data relative to livestock production in Egypt. He will gather data of special use in farm planning for small irrigated farms. It is planned that he will stop at Winrock Livestock Center in Arkansas on his return trip to the

United States in order to coordinate his work with a project recently completed through the Catholic Relief Service in Cairo which collected data from four hundred farms in areas similar to the EWUP sites.

Farm record data from Mansouria and Kafr El Sheikh will be summarized in the main office and a report will be published of this summary. These data will cover one agricultural year from October 1, 1978 to September 30, 1979.

The economists will work closely with the engineers and agronomists to collect data on land leveling experiments which will be underway in Mansouria and Kafr El Sheikh. The purpose will be to obtain data useful in evaluating the impact of land leveling on small irrigated farms.

Four agricultural economists will take a TOEFL examination in November in anticipation of participating in research and training activities in the United States. Several training needs have been identified which will require attendance at American Universities.

Finally an economic evaluation of water shortage at the tails of canals will be continued with TDY assistance from Dr. Skold in October and November. Dr. Skold will present a seminar on this topic before he returns to the United States. Also it is expected that Dr. Radosevich a water attorney from Colorado State University will present seminars on his recent work in water pricing and water policies in foreign countries.

B. Fort Collins

Training

The report on the on-farm water training course that was put on this summer will be drafted. Certificates will be prepared for the participants in this summer's course (1979) and last summer's (1978) course. Manual rewrite will be started under Dr. Max Lowdermilk. Planning for moving the course to Egypt will be started.

Drs. Benton and Hautaluoma will plan a management short course. They will travel to Egypt in early December to finalize and present the course.

Backstopping

Replacements for Alex Dotzenko, Senior Agronomist; Harold Golus, Jr Agronomist; Nancy Adams Jr. Ag Engineer and Ed Knop Senior Sociologist will be interviewed, tentatively selected and their names submitted to USAID and the GOE for approval.

Arrangements will be finalized or a decision reached on John Wolfe Senior Ag Engineer to stay another year.

Contingency plans are being made to fill in for the project field team members who complete their tour of duty and return to their campuses before their replacements arrive. They are listed under TDYs.

Replacement and TDY personnel will be provided orientation and training on project goals, objectives and methods. Supervise the selection and shipping of equipment requested by the field.

Water Budget

TDY personnel will continue to work with Egyptians in Egypt on this.

Soil Survey

TDY personnel will continue to work on this. Dr. Wahed will be on campus 6 to 8 weeks to receive training on computer analysis and modern soils taxonomy. Drs. Heil, Sipra and Soltanpour will provide this training.

Water Management Alternatives

Drs. King and Loftis will continue the work that Dr. Karmeli and Peri started this summer. A Graduate Assistant funded by Colorado Experiment Station will assist in this study.

Data Management

Dr. Loftis will continue his activities in designing a data storage and retrieval system.

C. Personnel

Field Team

Dr. Dotzenko and Mr. Golus will end their tour and return home. Replacements names will be submitted. TDY personnel will fill in for their duties until replacements arrive.

Tentative TDYs for Period 10/1/79 - 12/31/79

William Sayre, Civil Engineering
 Leroy Luft, Economics
 William Ree, Civil Engineering
 Mel Skold, Economics
 Dave Redgrave, Agronomy
 Tom Ley, Agricultural Engineering
 E. V. Richardson, Civil Engineering
 Kern Stutler, Agricultural Engineering
 August Robinson, Civil Engineering
 Richard McConnen, Economics
 George Radosevich, Economics
 Ron Miner, Agricultural Engineering
 Verne Scott, Agricultural Engineering
 Parviz Soltanpour, Agronomy
 Doug Benton, Management
 Jack Hautaluoma, Psychology
 Richard Cuenca, Agricultural Engineering
 Willard Schmehl, Agronomy

Tentative TDYs for Period 1/1/80 - 3/31/80

Wayne Clyma, Agricultural Engineering
 Alex Dotzenko, Agronomy
 Jim Loftis, Agricultural Engineering
 Jim Ruff, Civil Engineering
 Dan Sunada, Civil Engineering
 Max Lowdermilk, Sociology
 Jim Layton, Sociology
 E. V. Richardson, Civil Engineering
 Bill Schmehl, Agronomy
 Ed Knop, Sociology
 August Robinson, Civil Engineering

II. January 1, 1980 to March 30, 1980

A. Cairo

Mansouria

It is expected that during this quarter construction will be nearly started on the underground pipe system to serve as a more efficient delivery system for the water short farmers on El Hammami. The construction of the lined system in Beni Magdoul area will be nearly completed. Field trials will continue with respect to the other activities previously mentioned in the search for solutions to problems that may be utilized for pilot studies.

Kafr El Sheikh

Engineers and agronomists will continue to develop field trials to solve the problems identified in Kafr El Sheikh with the economists and sociologists working closely with them in an attempt to obtain farmer cooperation and to analyze various field trials for purposes of selecting those that are best suited for pilot studies.

El Minya

It is expected that the problem identification work will be completed in El Minya at this time with a sufficient quantity of detailed data available for the initiation of certain field trials. It is expected that some field trials will begin during this quarter or at least plans will have been developed for initiation of field trials as soon as winter crops have been terminated.

B. Fort Collins

Training

Completion of modification of short course training manual. Finalize plans for giving short course in Egypt. Start formal training course for academic training of project personnel in the U.S.

Backstopping

Major activities will be providing orientation and training to replacement personnel.

In January campus personnel will be in Egypt working with their discipline counterparts.

Other

The Water Budget and Water Management Alternatives studies will continue.

C. PersonnelField Team

Dr. Ed Knop will return in January. Dr. John Wolfe will return to the States in January on home and sick leave to have his knee operated on. Mr. A. R. Robinson will take Wolfe's place while he is gone. Ms. Nancy Adams will leave in January. Dr. Schmehl will fill in for Dotzenko in January.

It is anticipated that Drs. Dotzenko, Mr. Golus, Dr. Knop and Ms. Adams replacements will arrive on the project in February.

Appendix

EGYPT WATER USE AND MANAGEMENT PROJECT
 TRAINING COURSE SCHEDULE
 Summer 1979

JUNE

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
	17	18 Orientation, Personal Banking, etc.	19 Orientation Project Course ERG	20 Orientation Course	21 General Introduction P.I.	22 Field	23 Denver (Shops)	
	24	25 Field	26 Field	27 Field	28 Discussion Data Reduction	29 Report	30 Rocky Mt.	
	1	2 Field	3 Field	4 Field	5 Data Reduction	6 Report	7 Colorado Springs	
	8	9 Field	10 Field	11 Field	12 Campus	13 Campus	14 Eastern Colorado Vic Koelzer Ranch	
	15	16 Field	17 Field	18 Field	19 Campus	20 Campus	21 Free	
	22	23 Field	24 Field	25 Field	26 Campus	27 Campus	28	
	29	30	31	1 FINAL REPORT	2	3	4	
		← DATA REDUCTION →						
	5	6	7 MEETINGS, CONFERENCES, TRIPS	8	9	10 Field trip	11 Grand Junction	
		← →						
	12	13	14	15	16	17	18	
	19	20	21	22 RETURNS TO EGYPT	23	24	25	

JULY

AUGUST

FIELD TRIP
TENTATIVE SCHEDULE FOR
EGYPTIAN ECONOMISTS AND SOCIOLOGISTS

Monday, August 6

Travel to Sterling, Colorado
10:00 a.m. - 12:00 noon
Meet with Mr. Terry Anders, President
Federal Land Bank

Lunch -- Sterling

Travel to Julesburg, Colorado
3:00 p.m. - 5:00 p.m.
Visit with Mr. Charles McKinstry,
President, First National Bank

Dinner -- Courtesy of First Nat'l Bank
Dale Pfau--County Extension
Agent (Ph.D. in sociology)

Lodging--Julesburg

Tuesday, August 7

After breakfast, travel to Lloyd Skold
Farm and tour farm.

Lunch -- Lloyd Skold farm

After lunch, travel to Yuma, Colorado
3:00 p.m. - 5:00 p.m.
Visit with Mr. Ron Millar, Extension
Farm Management Fieldman

Dinner -- Yuma

Lodging -- Yuma

Wednesday, August 8

a.m. travel to Denver, Colorado
1:00 p.m. - 3:00 p.m.
Meet with Duane Jewel, Statistician
in Charge, ESCS-Statistical Reporting,
USDA

Lodging -- Denver

Thursday, August 9

8:00 a.m. - 10:00 a.m., meet with
Mr. Bob Hamilton and Mr. Sam Kennedy
(economists) and sociologists,
Bureau of Reclamation, Economic
Research, USDI

Return to Ft. Collins by early afternoon

Friday, August 10

Extensive field trip begins

FIELD TRIP

Tour Itinerary

- August 10 - Leave Fort Collins at 8 A.M. from Matador Apartments. Meet bus on City Park Avenue. Travel to Grand Junction via I-70. Stop for lunch and ride on Vail Gondola (\$4.50 per person; 18 minutes each way. Restaurant food available at the top, as well as picnic facilities).
(Exit from I-70 at first Vail Exit. Head west to Lion's Head. Turn left into Gondola Parking Area). Continue to Grand Junction via Colorado National Monument. Lodging is at: American Family Lodge
721 Horizon Drive
Grand Junction, CO 81501
Telephone: 243-6050
Reservations are in the name of Jim Layton, and are pre-paid.
- August 11 - Leave motel at 8 A.M. for tour of field sites. Meet Tony Hatch or associate at Orchard Mesa Research Center (3168 B 1/2 Road) at 8:30 A.M. You will be joined by Mr. T. J. Longely of the Colorado Water Conservation Board who will also conduct the afternoon tour. Lodging is the same as for previous night.
- August 12 - Leave motel at 8 A.M. Drive to Cortez via Mesa Verde National Monument. Lodging is in the Sands Motel
1000 E. Main Street.
Cortez, CO (10 blocks east
of city center on Hwy 160)
Telephone: 565-3761
Reservations are in the name of Jim Layton, and are pre-paid.
- August 13 - Leave motel at 8 A.M. Drive to Page, Arizona via Four Corners. Arrive Glen Canyon Dam approximately noon. Contact Harry Gilleland, who will conduct tour of dam, for about two hours. Proceed to Flagstaff, Arizona. Lodging is at La Quinta Motor Inn
2350 E. Lucky Lane
Flagstaff, Arizona
Telephone: (602) 779-3614
lunch at Country Club. Reservations are in the name of Jim Layton and are pre-paid.
- August 14 - Leave motel at 8 A.M. Drive to Grand Canyon. Drive to Phoenix via Flagstaff. Lodging is at Motel 6
2323 East Van Buren
Telephone: (602) 267-8553
First night's lodging + tax is pre-paid.
Second night's lodging + tax to be paid from funds collected prior to departure from Ft. Collins.

- August 15 - All day visit to Salt River Project. Leave motel at 8 A.M. Arrive at Project Bldg on Project Drive at approximately 8:30 A.M.
Lodging is the same as previous night.
- August 16 - Leave motel at 8 A.M. Arrive at USWC lab (4331 E. Broadway) at 8:30 A.M. Contact Dr. Herman Bouwer who has arranged for the tour. Leave Phoenix from lab and drive to Yuma, Arizona. Arrive Yuma. Lodging is at Motel 6
2730 Fourth Avenue
Yuma, Arizona 85364
Telephone: (602) 344-3550
Reservations are in the name of Jim Layton. Lodging for both nights has been pre-paid. Taxes to be paid from funds collected prior to departure from Fort Collins.
- August 17 - Leave motel at 8 A.M. Arrive at University of Arizona Field Station (6425 West 8th Street) at 8:30 A.M. Dr. Bryant Gardner will meet the group and conduct the tour.
Arrive at Welton-Mohawk Project Office (3800 Ave. 3 E) at 1:30 P.M. for tour. Contact Ken Sidebottom. Lodging is the same as previous night.
- August 18 - Leave Yuma at 8 A.M. Drive to Anaheim, California via San Diego and Coastal Highway 1. Lodging is at
Space Age Lodge
1176 West Katella Avenue
Anaheim, California 92802
Telephone: (714) 776-0141
- August 19 - Visit Disneyland, which is across the street from the motel. Group tickets will be available at Group Services Window under EWUP. The cost is \$7.65 per person for one day's admission, plus 15 rides. However, you may purchase a special ticket through your motel for \$11.50 which entitles you to 2 day's admission + 15 rides. Lodging as for 8/18.
- August 20 - Visit Disneyland in the morning. Leave motel at 12 noon in order to arrive at 1 P.M. at Universal Studios in Hollywood (Lankersham Blvd. off Hollywood Freeway). Pick up tickets (\$6.50 per person) at Group Box Office Window under EWUP. Tour will last until 6 P.M.
- August 21 - Leave motel 8 A.M. Arrive Salinity Lab (4500 Glenwood Drive, Riverside) at 9 A.M. for all day tour,
- August 22 - Leave motel at 6 A.M. for L.A. International Airport. Depart 10 A.M. for NY-PARIS-CAIRO,
- August 23 - Arrive Cairo 2:30 P.M.

EVALUATION OF WATER MANAGEMENT ALTERNATIVES

Introduction

Egyptian farms vary a great deal in size, soil types, production technologies, enterprise numbers and combinations, conditions of water availability, labor availability, and managerial capability. The potentials for multiple cropping and intercropping pose additional complexities, and the timing of production activities to meet with resource availabilities becomes another important consideration. Further, institutional constraints of government programs must be recognized. A set of optimization models of representative Egyptian farming situations in the EWUP study areas are needed to simultaneously consider the effect of these many facets on Egyptian farm management decisions.

Water is not used on farms in isolation from other inputs. While the EWUP focuses on improving the efficiency of water use, the full potential of improved water use efficiency cannot be attained if other inputs with which it is combined are used inefficiently. For example, improved water management may lead to a 30-percent increase in agricultural output; but, when combined with improved seeding methods and fertilizer practices, an even greater increase in output could be achieved. Production response analyses combined with production simulation and optimization provide a method to evaluate the relative and combined effects of inputs on agricultural output levels.

Objectives

The objectives of the study are:

1. Develop a model for evaluating alternative technologies at various resources levels. The model will be used to select the optimum combination of resources as well as to evaluate the costs and benefits of a technology in the present or improved farm system.

2. Develop a strategy with the field personnel for collecting data for calibration of the model and for evaluating specific alternative technologies.

Plan of Work

The study would comprise various stages, that may be basically outlined as formulation of a specific model, its use with readily available data and reaching required strategies and analysis of results from the use of the model.

The formulation of the model would be carried out by a team comprising water management specialist, engineer, economist and agronomist. This team will cooperate with other AID-Egypt mission members, mainly in the data acquisition and the application of the model.

The work would involve two major steps: Model development to be followed by its application.

Step I: Model Development

Stage 1: Problem identification. Present practices and problems.

Stage 2: Review of past and present research activities, results and applications.

Stage 3: Study of various available decision models (linear, dynamic, geometric and others).

Stage 4: Development formulation and programming of the model to be used in this work.

Stage 5: Define already available and representative field data for the use of the model to evaluate the model and its parameters.

Stage 6: Analysis of model feasible applications. Presentation of report

Summarizing Stages 1-5.

Step II: Application and Use of Model

Stage 1: Study and selection of problem areas.

Stage 2: Data collection.

Stage 3: Defining strategy on the basis of the use of the model with the relevant data.

REPORT OF CONSORTIUM FOR INTERNATIONAL DEVELOPMENT
REVIEW OF THE EGYPT WATER USE MANAGEMENT PROJECT

CONSORTIUM FOR INTERNATIONAL DEVELOPMENT

August 22, 1979

REPORT OF CONSORTIUM FOR INTERNATIONAL DEVELOPMENT

REVIEW OF THE EGYPT WATER USE MANAGEMENT PROJECT

The CID Review Team composed of Dr. D. D. Johnson, Dean, Agricultural Sciences, Colorado State University; Dr. John R. Davis, Associate Dean, Agriculture, and Director, Experiment Station, Oregon State University; and Bernie Henrie, Deputy Director, CID, arrived in Egypt on July 21 and began the review on July 22. Prior to that time the project paper, quarterly reports and printed reports, position descriptions, a review of training activities at CSU and a substantial amount of material concerning the project was presented in a briefing held in Fort Collins on July 19 with the campus Planning and Coordination Committee. In Egypt the CID team was joined by the following personnel from AID Egypt:

J. Bremer	M. Parker
G. Steckel	J. Blackton
M. Winters	

Mr. Neil Dimmick joined the group on July 26. The schedule provided for ample opportunity for individual and group discussions and visits to the Kafr-el-Sheikh and Mansouria sites.

The review team expresses its gratitude to Dr. M. Abu-Zeid and Dr. E. V. Richardson for their warm hospitality and assistance.

Introduction and Summary

1. The team was impressed with the lack of a data base regarding irrigation water budgets, plant-soil-water relationship and optimum farm water management for efficient crop production. This indicates to the group that there is an even greater need for continuing the project and helping to develop an institutional capability to develop and sustain an improved

on-farm water management program as well as a set of improved crop production practices and design data for water delivery systems.

2. We find the logical framework matrix, indicators of project activity and assumptions to be valid and consistent with the needs of Egyptian irrigated agriculture as identified in the original project paper. There is sufficient flexibility in the logical framework, particularly in the identification of problems and search for solution phases to allow for the rapid testing of practices which can contribute to increased crop production.

3. Progress toward "end of project status" is excellent. Three pilot areas have been established (Kafr-el-Sheikh, Mansouria and El Minya). Efforts on the Mansouria and Kafr-el-Sheikh, are well into the search for solutions phase. The El-Minya area is well into problem identification. The problem identification and search for solutions phases have been accomplished with dispatch: The adoption of practices by farmers will take a considerably greater length of time, and measures of goal achievement will probably extend beyond the life of the current project.

In our opinion, the project staff, Egyptian and American alike, are enthusiastic, hardworking and are cooperating extremely well across traditional disciplines lines. Even though the adoption of improved water management practices by the farmers will be slow, we encourage the project team to continue their united effort. Shortfalls in reaching project goals are likely to be farmer reluctance and institutional barriers rather than team performance.

4. The synergistic effect of irrigation engineers, agronomists, sociologists and economists working together is particularly noticeable. Traditional discipline boundaries are being broached and identification

of problems and solutions hastened by the interaction. The recognition by Dr. Abu-Zeid of the need for an interdisciplinary and interministry approach is to be particularly commended. AID and CID personnel have responded well to this rather unusual approach. The work with the farmers has been particularly encouraging and has facilitated accomplishment of project goals. We encourage a continued and expanded close working relationship with farmers on the project sites.

The constraints to good water management involve both irrigation water delivery and application, and agronomic considerations. The identification of specific agronomic problems, e.g., zinc deficiency and its correction by foliar application, can often speed adoption of overall improved practices by the farmer as a result of the confidence generated by the finding. Developing this confidence is as important as any other factor in increasing crop production.

5. The immediate need for the Ministry of Irrigation to demonstrate accomplishments in saving water, in horizontal expansion of irrigated lands, and in delivering water properly to farm lands is understood. The initial efforts to line the Beni Magdoul Canal, to line meskas, and to provide a closed pipeline for El Hammami Canal and to help farmers organize to schedule their irrigation periods should provide answers regarding farmer acceptance and adaptation to these alternatives for conserving water and for improving water delivery schedules and increasing crop production.

We suggest that an immediate effort should be made to calculate a water balance for other areas served by canals and to design and evaluate the effects of lining or piping water in additional canals or meskas. To this end, we further suggest that the team add personnel experienced in design of water delivery systems and in the installation of pipeline or

linings. Specifically, personnel from the U.S. Bureau of Reclamation, U.S. Soil Conservation Service, or others, should be considered. Some mistakes may be made, but with demonstrations such as at Beni Magdoul, we are confident that water delivery systems can be improved.

Institution Building with the Government of Egypt

1. We are encouraged by assignment of both Ministry of Irrigation and Ministry of Agriculture personnel to the project team. We are uncertain as to whether other ministries or agencies might be involved. If such involvement would hasten or strengthen the accomplishment of overall project goals, we would encourage such exploration.

As the project personnel continue to work with the farmer, it will generate an increased demand for information and help at the farm level. We perceive that pressures to provide people at the village cooperative or district level will be greatly increased and will tax both the Ministry of Irrigation and Ministry of Agriculture to meet the personnel and information demand.

Maintaining and increasing dialogue between the Ministries of Irrigation and Agriculture and AID, FAO, World Bank and others is encouraged, particularly as they relate to on-farm water management and basic crop production.

2. For a new and unique project such as this, we find the working relationship very good--particularly the interaction of the several disciplines. As the novelty wears off, and as the original team is replaced with newcomers, it will take an increased effort to maintain the favorable atmosphere. Both Dr. Abu-Zied and Dr. Brooks are capable and effective project directors; however, both will find an increased work load with the development and expansion of the project. We encourage them to devote their energies and efforts to policy and management and find ways of delegating

detail to others. This project could well be the model for institutional change in Egypt and we encourage Dr. Abu-Zied to continue to use his expertise as a high level innovator and catalyst in the Ministry of Irrigation. We encourage continued meetings of project personnel and the Directors on a regular basis. We feel this has been a valuable tool.

3. The training program is in phase with the rest of the project activities. Our observations suggest that continued emphasis on hands-on, practical farm practices be emphasized. In addition, irrigation district operation, including water delivery and measurement is a facet of training that should be explored. Taking a clue from the farmer-to-farmer program, an irrigation district-to-irrigation district exchange already under discussion between the Ministry of Irrigation and the Salt River Project in Arizona has merit.

We emphasize again the lack of and need for data concerning water budgets, plant-soil-water relationships, intake rates and consumptive use, and encourage the training program to teach the project personnel the appropriate techniques to design and evaluate farm irrigation systems.

Irrigation guides for farmer use are appropriate to achieve the goals of the project. These can only be written by personnel who know how to design and evaluate farm systems and can adapt the results and techniques into a form acceptable to and usable by the farmer.

When trainees return to Egypt, we encourage them to use or adapt the information and techniques gained to Egyptian conditions. We observe that prior trainees are functioning well in the project team. We believe the transfer of the training program from the U.S. to Egypt is a wise decision.

We encourage identification of future leaders for training. We feel that training at the M.S. and Ph.D. levels in the U.S. or third countries

is valuable. Post-doctoral experience in the U.S. offers another relatively short-term opportunity. While out-of-Egypt training is expensive, we believe the exposure of Egyptians to western U.S. irrigated agriculture has merit whether on short- or long-term programs.

4. Generally, all members of the project team are enthusiastic and hardworking and there is a high level of morale. As in any situation, there are certain conditions or situations which annoy and every effort should be made to eliminate or minimize them before they begin to affect the forward progress of the project. For the American personnel, the most often mentioned restrictions are mail from home, availability of vehicles and drivers, and delivery of goods (especially supplies) through Egyptian customs.

Interim Accomplishments

1. This project is the interface between good agronomic practices leading to increased food production and the water delivery system. Both are exceedingly complex. This project attempts to build a bridge between the farmer and the irrigation district. There is a critical lack of data on both sides and it is unrealistic to assume that this project will provide simple solutions to the many complex problems involved. Nevertheless, the chance of success in identifying social, economic and technical constraints is good and the project should be encouraged to foster change in both farmer practice and water delivery institutions.

Early indications suggest that acceptance of the project and its early results by the several publics has been good. We hasten to caution that untimely or preliminary data which are not based on thorough evaluation may lead to serious difficulties--to the farmer if he perceives change will lead to economic gain and it does not happen, and to the water delivery system if costly changes are made without increases in water use efficiency or

increased crop production. Acceptance of practices by the farmer will be the key. The voice of the farmer related to the delivery system, particularly through irrigation scheduling, will be increasingly important. Efforts to line canals, provide pipelines, etc., must be keyed to farmer acceptance.

2. The research being conducted in this project is of a test and developmental nature. Research elsewhere and the intuition and experience of project personnel have targeted the areas of activity where the greatest progress seems possible. It would be a mistake for those who view the project to assume that the results are other than indicative or that they have widespread replicable value. Ultimately the same work will have to be done at all locations in Egypt. The value of this work is twofold: 1) to identify problems in selected, hopefully representative areas and 2) to evaluate a development process which will effectively serve elsewhere.

We believe that some of the basic assumptions regarding water delivery and control should be challenged and needs to be thoroughly and deliberately evaluated (e.g., underuse or overuse of water, lifting or gravity application, animal vs. diesel pumps, lining of ditches, pipe delivery, etc.). This project has a good chance of providing some of these answers at the three sites, providing for development and demonstration of optimal water and crop production practices.

3. The results obtained by the project are finding farmer acceptance. In fact, relationships between farmer and project personnel appear good and channels of communication are increasing. Project personnel are acutely aware of this communications link and appear to be developing an excellent relationship with the farmer. Newsletters, such as that developed by Dr. Serry, field days, field demonstrations, and similar grass roots

activities should be encouraged. They will serve to further extend the research findings.

The findings, as shown in the published and upcoming reports from the three sites, will emphasize that each site is different and that practices to achieve optimum crop production on those sites are also different. This further emphasizes the basic validity of choice of different sites for the project activities. Some generalizations, some overall applicability to Egypt may be forthcoming but simple, single valued solutions to water delivery and crop production problems should not be expected. The uniqueness of this project is the process of 1) problem identification, and 2) search for solutions by an interdisciplinary team. This process, once refined and tested can be expanded throughout Egypt and the world. The results and project findings must be examined for their social and economic implications before they are widely applied.

Project Administration

1. From what the review team has been able to determine, all parties (GOE, AID, CID) have performed promptly: there is good liaison and communication and the monitoring system is effective. It is important that AID, CID and the Ministries continue to inform each other of related projects and encourage formal and informal exchange with this project team and other project teams and personnel. Periodic program reviews by each of the agencies will be helpful.

2. The recruitment of required project personnel thus far has been successful. The personnel are competent and dedicated. Increasing pressures from state governments and expanding international agricultural activities may make American personnel difficult to recruit. The necessity of providing amenities such as housing equivalent to other Americans

in the area will be increasingly important in recruiting and retaining American scientists on the project. Further, continued attention should be focused on opportunities for professional growth and development. We suggest that future short-term personnel on TDY contain people who may possibly serve as replacement for the present staff. Short exposure to the enthusiasm, effective working relationships and accomplishments of the team and project may serve as an effective recruiting mechanism.

The new graduates joining the project from the Egyptian side will lack practical experience. This makes the in-Egypt training program plans even more valid. In addition, the availability of trained technicians and access to training will be very important in future project activities.

3. Although the review team did not examine the financial structure of the project, we are not aware of any particular financial constraints.

4. The property purchased for use by the project has been accounted for and properly inventoried. There is an existing list of this equipment and the inventory has been reconciled with the expenditures.

5. Fiscal matters including banking in Fort Collins and Cairo have been carried out satisfactorily both for the field personnel, CID, and Colorado State University, though final audits have not yet been accomplished.

Additional Comments

1. We feel that major needs of improved crop production in Egypt are based on two fundamental issues: a) consumptive use and irrigation efficiency data for major crop and soil conditions, and b) optimal water delivery systems at the district and branch canal level. This project will have the effect of tying these two together. It appears to us that the water budget phase is lagging other parts of the project. Additional personnel--agricultural engineers or water management specialists--would therefore, be of substantial value to the project.

2. The needs and attitudes of women must continue to be considered in relation to the impacts of the project, e.g., potable water if water is carried by pipeline, places to wash clothes if ditches are lined or employment opportunities if displaced by mechanical rice transplanters. While the sociological side of the project is impressive and in many ways unique, we feel that the addition of female sociologists to the team would be valuable.

3. The team of Abu-Zeid, Richardson, Brooks and Dimmick is a rare combination of gifted and far sighted individuals who complement each other well. Their continued mutual influence on and direction of the project make its probability of success very high.

4. We are encouraged by the practical involvement of American and Egyptian personnel at the field and farm level and we support the concept that a large majority of the project personnel should be so involved.