

PN- AAG- 536

QUARTERLY REPORT

October 1 to December 31, 1978

EGYPT WATER USE AND MANAGEMENT PROJECT

Submitted by

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

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## QUARTERLY REPORT

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### EGYPT WATER USE AND MANAGEMENT PROJECT

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#### PROJECT STATUS

##### Introduction

This reporting period concluded approximately one year of project field operation. The major aspects of problem identification in the Mansouria Irrigation District have been completed and a report written. In addition the problem identification work in Kafr El Sheikh and data analysis will begin in the early period of next quarter. The following summarizes some of the activities and accomplishments that have taken place during the past quarter.

##### Mansouria

The major agronomic field work during this period dealt with obtaining crop yields on corn and berseem clover. Yield of corn ranged from 10 to 12 ardebs per feddan (56 bu to 67 bu per acre) and this low yield can mostly be attributed to low plant densities. First cutting yields of berseem clover are averaging close to 1 metric ton of dry matter per feddan. Foliar fertilizer applications have been applied to various vegetable crops in the El Hammami area to see what effect they may have on increasing production. Since these foliar fertilizers contain many micronutrients expectations are that yield increases will result and this optimism is based on the results obtained from similar treatments at Kafr El Sheikh area.

The soil classification survey report was finalized and reviewed and then sent to Fort Collins for further review and subsequent publication as an EWUP bulletin. Field work on obtaining soil moisture tension curves and water infiltration rates also occupied field personnel time during this period.

A considerable amount of time has been spent in designing and fabricating boxes for protection of water stage recorders on streams and for ground water wells.

Some water level recorders have been installed. The first one records the flow through the Nyrpic gate at the Beni Magdoul intake. Others are on observation wells in positions where the effect of the canal closure period can be recorded.

All but twenty of the observation wells identified in the original plan for the water budget have been installed.

A combination of concrete and brick masonry measuring flumes have been installed to replace portable ones at two remote farm sites in El Hammami.

The water measurement program initiated during the early stages of problem identification has continued during the past quarter. Measurements include water levels in canals, ditches, drains, and wells, discharge measurements in canals, seepage from canals and ditches, and salt content of water resources. Seepage from the Mansouria Canal has been given special emphasis.

On-farm measurements have been expanded to include detailed topography of selected bunded units (basins). This includes the configuration of the furrows, if any, and any irregularities of leveling. Also, the time period for which a given irrigating stream is directed to each basin is being recorded. From the latter figures an estimate will be made of the uniformity of application among the basins in one strip of land being irrigated as a unit, and from the topography, the uniformity within a basin will be estimated.

A preliminary draft of a report dealing with on-farm irrigation practices in Mansouria was prepared. The report presents data that will be useful in arriving at possible solutions for solving on-farm irrigation problems identified therein. Based upon data collected on the delivery system of the Mansouria Canal, a paper has been prepared and submitted for presentation at the American Society of Agricultural Engineers meeting in Winnipeg, Canada on "Traditional Canal System in Egypt Faces Problems".

The problem identification report for Mansouria indicated that traditional methods of lifting water resulted in excessive farm operating costs. Consequently the EWUP directors appointed a task group with the economics team leader as chairman, to develop some on-farm procedures for working with farmers on this problem. Meska No. 10 on the left side of Beni Magdoul Canal, serving an area of 60 feddans, was selected for this work. A map of the area has been prepared, preliminary engineering surveys have been completed, sociological interviews are in progress, costs of some alternative systems have been investigated and plans are being made for a meeting with the 35 farmers who cultivate land in the area. The task group will assist the farmers to develop plans for improving the agricultural productivity of the area in a way consistent with the farmers desires and capabilities. Changes in water lifting methods are expected to be included but no system will be altered without agreement by the farmers. Seven farms at each Beni Magdoul and El Hammami Branch Canals now have complete farm plans. These fourteen farms being visited each

two weeks to keep the farm records up-to-date. Enterprise reports have been prepared for artichoke, tomatoes, and squash in addition to those for the major crops which were completed previously. During the summer of 1978 farmers reported crop losses and excessive water lifting costs due to poor performance of the El Shimmy Branch Canal. An economic report of this problem was completed.

The Mansouria field team sociologist has: (A) Assisted in the informal organization of some farmers operating lands near Beni Magdoul village in an attempt to improve cooperation and communication among them and with the project; (B) Coordinated and assisted farmers on the last reach of the El Hammami canal to organize for the purpose of building a retaining wall along the canal and improving the road, permitting vehicle movement to the site of their fields (partially accomplished presently); (C) Completed structured interviews with 22 case study farmers; (D) Conducted preliminary interviews with a sample of 12 mesca 10 farmers; (E) Compiled from unstructured interviews and official sources a range of data needed for project activities in the Mansouria area; (F) Assisted personnel from other disciplines in the conduct of their routine field work for both the training and team work benefits this provides.

#### Kafr El Sheikh

In as much as micronutrients appear to be limiting production of certain crops, some field trials were conducted this past quarter using foliar fertilizer sprays containing micronutrients. Significant increases in yields of seed cotton and water melon were measured with 2 applications of spray. Use of Zinc sulfate on rice fields resulted in increases of 50% grain yields where Zinc was applied in the nursery when compared with no Zinc applied. Data were collected on soil salinity, plant population, soil fertility and crop yields of cotton seed from 39 farm fields in the Abu Rayah Area. Corn yields and plant populations were determined from 10 fields. Yield increased markedly as plant population increased.

The soil classification survey in the Abu Rayah area was started and was 95% completed by the end of this quarter. The laboratory work on the samples obtained will have the same analysis determined as that for Mansouria. When the data are available it will be tabulated and evaluated from a crop production stand view point.

Records of water applied to cotton and rice fields during one season has been assembled and prepared for the problem identification report. The irrigation methods and practices of the farmer have also been listed. Routine measurements have continued, including measuring water applied to and removed from designated fields, discharge in canals and

drains, water level in canals, drains and observation wells. Newly installed instruments include a few tensiometers and a rain gage.

Maps of all four farm sites have been completed and duplicated for use by all disciplines on the team.

The sociologist on the Kafr El Sheikh field team has been particularly effective in (A) Encouraging and coordinating the farmer's cooperative cleaning of the two major private drains in the project area which have long been problematic for the farmers. This work is now being completed, and has led to the farmers voluntarily relinquishing operating rights on a government strip bordering the drains as well as their digging a new field drain channel in order to build a new vehicle road to their fields. Post-cleaning improvements are underway as a coordinated activity of the farmers, the project, and the district irrigation office. Pipes for conducting water from the fields at the outlet of farm drains through the banks of the community drain were supplied for improved drainage conditions. (B) The full set of sociological interviews were completed with the sample of 20 case study farmers from the area. (C) Current ownership and operatorship maps were completed for the hydrologic study unit, as were sakia partnerships in the area. (D) A range of miscellaneous secondary and informal interview data were compiled to supplement the extensive information already collected for the area. (E) A good deal of time was spent assisting other disciplines in their field work in support of project team work and training objective.

Twelve case-study farms have been selected for intensive farm management work. Farm plans have been prepared for each farm family. Record books have been established and each farm is being visited at least bi-monthly to get accurate information for updating the farm records. A summary of the farm plans showing farm and family size, crop and livestock plans and expected income has been prepared and distributed to team members.

Enterprise reports have been prepared for cotton, rice, maize, berseem, flax, wheat, horse beans, and seed melon. These crops comprise more than 95 percent of the crop acreage at the Kafr El Sheikh study site.

### El Minya

Mr. Erwin Nielsen arrived in Egypt October 10, 1978 to act as assistant team leader for the El Minya area team. He was moved into temporary housing in Cairo awaiting completion of housing obtained at El Minya.

An interdisciplinary team participated in the site selection of a water course near Abeuha village. It is a hydrologic unit about 1½ by 2 km. It is bounded on two sides

by drains, on one side by a canal, and on the fourth side by a road. Accessibility is relatively good. On-farm water measurement would be relatively easy because all the irrigation is by gravity. The surface water measurements required for the water budget would be relatively few. Because this site is all irrigated by gravity, the possibility exists for comparing its water budget at various stages of development with those of Kafret Nassar, Beni Magdoul, El Hammami, and Abu Rayah, all of which are irrigated by lift in the other project areas.

During the past quarter, one economist and one agronomist has been participating in some preliminary data collection activities to obtain some background data for the area.

The economist assigned to El Minya has prepared an input-output report for sugar cane, an important crop economically in the El Minya area.

A search of literature located several statistical summaries from the El Minya Governorate. These reports have been translated into English. They were used as part of the data base for site selection.

#### Activities in the Main Office at Cairo

Some of the work accomplished during the past quarter are not necessarily area oriented. It is the purpose of this section to review briefly some of the activities of the main office staff who are responsible in a large measure for quality and quantity of the technical work carried out by the field team. In addition, training junior personnel in field duties and techniques also requires a significant amount of time. The information discussed briefly below summarizes their activities.

#### General Economics Activities

1. Prepared records and budgets for work with farmer cooperators. Beginning with the new agricultural year which started October 1 the EWUP economics team prepared farm plans in cooperation with 26 farm families. A farm planning booklet, utilizing the concept of "complete budgeting" was prepared and printed. At the same time English and Arabic farm record books were prepared and printed. These books are provided for each farmer cooperator. EWUP economists visit each cooperator at least once every two weeks to assist with keeping the farm record book up-to-date. At the end of the year the farm record books will be summarized and compared with the farmer's farm plan. This process will provide an improved data base for analyzing farm and water management alternatives.

2. Developed format and procedures for preparing crop enterprise input-output reports. Crop enterprise input-output reports developed during this quarter are listed with each field site. Dr. R. J. McConnen worked with the EWUP economics team on a TDY basis November 11 to December 10 observing methods of collecting and processing data. He developed a format and procedure for including a calendar of water application for each crop. McConnen worked with Mr. Helal, EWUP programmer, and with team economists to develop a method of processing data and printing data tables by computer. He took copies of data and program formats to Montana State University where he will continue his work before returning to EWUP again next summer.
3. Cooperated with computer programmer to build a computerized "break even" analysis program. A problem in Egypt is the excessive cost of lifting water with traditional methods. Data were collected for several alternatives. With the assistance of Dr. McConnen and Mr. Helal the EWUP economists developed a "break even" computer program to analyze water lifting alternatives. The program processes the data and simultaneously prints a cost table and constructs a cost curve so that the cost per feddan can be determined for any point within the effective size range of the specific alternative system. The program can and will be used in the future for analyzing other technological farm management systems involving fixed and variable costs.
4. Paper for UNESCO training seminar. A paper entitled "An Economic Analysis of Water Lifting With a Diesel Pump for a Small Farm at El Hammami", was prepared for delivery in February to a training seminar for UNESCO personnel. This seminar is being provided as a service by EWUP. The paper applies economic analysis of water lifting alternatives to one of the case study farm cooperators.
5. Economics staff training. The senior economists spent more than twenty days in the field to provide on the job training for people working at the field locations. A two day staff seminar was held at the main office in Cairo to provide training in farm budgeting and record keeping, computer analysis of fixed and variable costs, economic theory and preparation of crop input-output reports. Plans were completed for sending two economists for a 2½ weeks training program in FAO headquarters, Rome, during January and February. The preliminary exercises on organizing farm management data for computer analysis has been completed.

#### General Sociological Activities

Several research emphases for the quarter have included:  
 (A) Completing and updating the full set of basic sociological interviews with 42 case study farm operators in areas of present project operation; (B) Developing the coding system

for these data and preparing them for computer analysis; (C) Acquiring and compiling secondary data of disciplinary interest, including 1976, 1966 and 1960 Egyptian census data, for districts of present and anticipated project field work; (D) Collecting and analyzing data from special interviews with farm operators along Mesca 10, Beni Magdoul in preparation for the first project experimental program there.

In conjunction with these data collection and analysis activities, appropriate training was given to field team sociologists to facilitate their job performance and enhance their ability to continue this type of work independently.

Attention was also given during the quarter to reviewing accomplishments and aspirations of the first year as a basis for anticipating appropriate research and extension activities during the second year, upcoming. More specifically: (A) Progress was made on planning for a large sample survey of farm operators in the spring. (B) Considerable attention has been given to planning operational procedures and extension possibilities for the mesca 10 experimental program (see Mansouria report). These have been summarized in several short staff papers. (C) The preparation of several professional papers are underway for midwinter completion. Additional publications, including a monograph summarizing case study findings from the three project field sites, are scheduled into the new year's activities. (D) Preparations have been made for initiating focused investigation of women's roles in the development of irrigated agriculture, to be implemented when appropriate staff support is available. (E) Disciplinary training plans for the next year are tentatively formulated to provide a smooth transition in sociological activities at the end of the period, in anticipation of probable staff changes.

During the quarter, a major investment of group effort was in support of other discipline's applied research activities, team building process and organizational refinement efforts. Noteworthy progress in these areas during the quarter provides the encouragement for continued emphasis on this important activity among all disciplines and project staff levels. The sociologists have assisted these processes in the following specific ways: (A) Participation in the preparation of the Mansouria District Problem Identification Report, which spanned into this quarter; (B) Preparation of discussion documents, including a proposal for project training activities and detailed disciplinary position descriptions; (C) Involvement in the El Minya site selection process; (D) De facto leadership in the development of large computer data processing and storage capabilities; (E) Contribution of interviews data on irrigation and agronomic practices to other disciplines having need for it in their analyses; (F) Active participation in the meetings and informal coordination sessions of the discipline leaders committee and general staff; (G) Routine minor administrative service.

### Other Activities

1. Exchange seminars were held between the Water Master Plan Project and the Egypt Water Use and Management Project. This seminar opened up the communication between the two projects in areas of mutual benefit.
2. A seminar was presented by Dr. Royal Brooks on "Soil Water Relations in Irrigation and Drainage". The seminar was video taped with project equipment and placed in the project library for future reference and training.
3. Several task forces to study and plan for field trial activities that will demonstrate solutions to problems were appointed during the quarter. Their mission and objective is given below:

Meska Water Lifting Task Force - To develop some economical and viable lifting alternatives in order to reduce the farmer cost of lifting water.

Water Table Crop Production Task Force - To determine criteria for assessing crop production in the presence of a fluctuating water table caused by irrigation.

Plant Stand Density Task Force - To investigate the reasons for low plant stand densities and propose some alternative methods for increasing plant stands on a field trial basis.

4. Job descriptions were developed for each American discipline leader in the main office and each Egyptian counterpart. When it is determined in the future that the Egyptian counterpart will assume the role of a discipline leader, new job descriptions will be written for each discipline member in the main office.
5. To increase interdisciplinary planning and coordinating of activities, a committee composed of the Project Directors and Senior Egyptian and American discipline leaders headquartered at Cairo was formed. This committee meets regularly to plan project activities.
6. Advisory Committee met October 3, the minutes are attached.

### Backstopping

#### Planning & Coordinating Committee

The P & C committee continued to meet weekly to plan and coordinate the campus backstopping activities (training, TDY, campus studies, logistic support, etc.) in support of the field program.

Members of the committee are:

Dr. E. V. Richardson	Chairman
Dr. M. D. Skold	Economics
Dr. W. R. Schmehl	Agronomy
Dr. W. Clyma	Agricultural Engineering
Dr. M. Lowdermilk	Sociology
Mr. G. V. Skogerboe	Pakistan Water Mangement Project

The major activities of the committee are for each member to work with and help his discipline counterpart in Egypt, to be a contact between the project and his department, to work on the project TDY, locate other TDY and backstopping personnel in his discipline, develop and put on the irrigation short course, help the field staff analyze data, develop adaptive research programs and to be the principle resource person in his discipline.

#### TDY

The following were in Egypt TDY this quarter.

Dr. E. V. Richardson, Professor of Civil Engineering (11/26/78 - 12/15/78) to work as a consultant with Dr. G. Corey, AID/Washington to investigate new land development.

Dr. P. Soltanpour, Professor of Agronomy (12/10/78 - 1/9/79) to work on soil analyses.

Dr. W. Clyma, Professor of Agricultural Engineering (10/24/78 - 11/22/78) to work on on-farm water management.

Dr. R. McConnen, Professor of Agriculture Economics (11/11/78 - 12/11/78) to work on economic studies.

Dr. D. Sunada, Professor of Civil Engineering (10/6/78 11/19/78) to work on water budget and computer.

#### Training

##### A. On-Farm Water Management Short Course

Rewriting of the training manual was started under the supervision of Max Lowdermilk. Planning on next summers course was started.

##### B. Training Field Trips

None

C. Video Tape Training

Cairo personnel continued taking AE 535 "Surface Irrigation" via video tape through Colorado State University's SURGE program. AE 538 "Ground Water Hydrology" taught by Dr. D. McWhorter was sent to Egypt.

D. On-The-Job Training

This program continues in Egypt.

## WORK PLAN

January 1979 to July 1979

## I. January 1 to March 31, 1979

## A. Cairo

## 1. Mansouria

a. After recent linings of several meskas on the Beni Magdoul canal, it has been observed that at least three water wheels have recently been constructed. Since this appears to be inconsistent with achieving maximum net returns from farming in the area, the economics team is proceeding to study this problem during the next quarter. Interviews will be arranged with the farmers involved.

b. Plans have been made for additional construction to take place during the closure period of the Mansouria canal. These include a measuring flume at the intake of the Beni Magdoul branch, the intake of El Hammam, and at the intake of Kafret Nassar. Recorders will be installed on flumes and perhaps on more observation wells.

c. Development of a complete field trial package for meska #10 which will include water lifting alternatives, improved irrigation practices, land development for improved water distribution, improve agronomic practices for increasing crop production and development of a water user cooperative on the meska for water scheduling. A meeting with the farmers of meska 10 is planned for January to obtain their input and acquaint them more clearly with the project.

d. Development of a field trial package on the El Hammami water course to solve the problem of an insufficient water supply during the summer and prevent over irrigation during each irrigation.

e. Develop and install weather measuring instruments at a field site already selected for purposes of increasing the data needed for computation of water requirements.

f. Print the problem identification report.

g. Finalize the water management report.

h. Print the soil fertility report.

## 2. Kafr El Sheikh

a. Discussions have been conducted with team members about problems of farm and water management at Kafr

El Sheikh. Data will be summarized and reports will be written during the next quarter.

b. A draft copy of the problem identification report will be prepared.

c. Plans are being made for a construction and/or installation of structures, such as measuring flumes in canals and drains, during the closure period in January 1979.

d. Complete the soil classification survey and develop a report for Abu Ragah.

### 3. El Minya

a. Team leader will be selected and assigned to his duties in the project area. The American counterpart will move to El Minya and begin the preliminary problem identification work.

b. A field office will be established and preparations made for making it operational.

c. Additional Egyptian personnel will be trained and assigned to begin the preliminary problem identification work.

d. Specific farms will be selected in order to begin the detailed work of problem identification.

e. The on-farm economics work at El Minya will begin as soon as specific farms are selected by all disciplines. An economist is already located at El Minya and he has received training by economists working at Mansouria on methods of farm planning and farm accounting.

### 4. General

a. Finalize the selection of trainees to go to Fort Collins for the on-farm water management report.

b. Mrs. Mona El Kady will go TDY to Fort Collins to finish analyzing the Mansouria water management report.

c. Provide consulting service to USAID and the Egyptian Government as requested.

### B. Fort Collins

#### 1. Training

a. Prepare the on-farm water management training manual and syllabus.

2. Backstopping

a. P & C committee and project coordinator will:

i. Coordinate the writing of the training manual and syllabus.

ii. Prepare, review and update work plans.

iii. Select, train and provide orientation for TDY personnel.

iv. Select and supervise equipment purchases.

v. Evaluate field team personnel, determine who should and will sign up for additional tour of duties.

b. Campus personnel will work with their field team counterparts in:

i. Development of all work plans.

ii. Analysis of data and writing of reports for all project activities on-farm water management, water budget and soil fertility survey.

iii. Development of data management program.

iv. Development of short course.

v. Development of project personnel evaluation methodology.

C. Personnel

1. Field Team

no change

2. TDY's

Dr. Melvin Skold	12/31/78 - 1/18/79
Dr. Robert D. Heil	12/28/78 - 1/19/79
Dr. Wayne Keim	2/6/79 - 2/15/79
Dr. Thomas Sanders	1/4/79 - 1/21/79
Dr. Willard Schmehl	1/13/79 -

II. April 1 to June 30, 1979

A. Cairo

## 1. Main Office

- a. Supervise the field work in each of the subareas.
- b. Finish Problem Identification report for Kafr El Sheikh.
- c. Do soil and water quality analysis.
- d. Conduct on-the-job training.
- e. Trainees travel to Fort Collins for summer program.

## 2. Mansouria

- a. Continue to collect data on on-farm water management problems.
- b. Continue to adaptive research program.
- c. Continue collection of water budget data.

## 3. Kafr El Sheikh

- a. Complete first project identification report.
- b. Prepare report on zinc trials.
- c. Design adaptive research program.
- d. Collection of water budget data.
- e. Finish soil fertility report.

## 4. El Minya

- a. Collection of social economic, agronomic and engineering data on on-farm water management problem identification problem.

## B. Fort Collins

## 1. Training

- a. Finalize training manual and syllabus for on-farm water management program.
- b. Present training course.
- c. Plan training trip to other countries such as Spain, Turkey, Japan and Taiwan with small irrigated farms.

## 2. Backstopping

- will:
- a. P & C Committee and Project Coordinator
- activities.
- i. Supervise and take part in training
- ii. Continue the work outlined in previous quarter work plan.
- b. Same as item b in previous quarter.

## C. Personnel

## 1. Field team

no change

## 2. TDY's

Dr. L. Zurcher	Sociology	June
Dr. E. V. Richardson	Engineering	May
Dr. J. F. Ruff	Engineering	March/April
Dr. Y. Moseley	Engineering	May/September
Dr. P. Soltanpour	Agronomy	June
Dr. R. McConnen	Economics	March/April
Dr. V. Scott	Engineering	May/June
Dr. J. Loftis	Engineering	May/June
Dr. F. Santopolo	Sociology	May
3 man evaluation team from CID		April/May



Recd  
10/2/78

## Egypt Water Use & Management Project

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October 29, 1978  
Cairo, Egypt

Our Ref: PD/31-78

### MINUTES OF THE ADVISORY COMMITTEE MEETING

DATE: October 3, 1978

TIME: 10:00 am.

#### ATTENDANCE:

Dr. Assuity  
Niel Dimick  
E.V. Richardson  
Ali Serry  
R. Brooks  
M. Abu-Zeid  
Dr. Kamel Hindi

#### The following items were discussed:

1. A Problem Identification Report will be presented in a seminar to following this meeting.
2. Customs - problems of clearing personnel effects and Project equipment.
3. Equipment - Recent project aquisitions -(Richardson)
  - a. HP 9825 - has arrived
  - b. Additional cares being ordered
  - c. Video tape recorder and monitor for surge
4. Farm Machinery status report - N. Dimick  
Most all the equipment has arrived. M-F has been of great help in assembly of farm equipment.  
A farm equipment demonstration at Alex University on will be given on October 12, 1978, where project equipment will be seen.



Some soil scrapers have been distributed to farmers ( 6 or 8 ). There is a need for technical support for purchasers of these scrapers.

5. Training - ( Richardson )  
Formal course on " On Farm Water Management "  
in Egypt and USA  
Field trip in USA.
6. Future project activities ( Brooks )  
The direction the project will be taking over the next six months was discussed. The most beneficial technology will be tried as a means for solving the Problems identified after which a package of these technologies will be developed into a pilot program for possible extension throughout the irrigation district.