

QUARTERLY REPORT

July 1, 1983 to Sept. 30, 1983

EGYPT WATER USE AND MANAGEMENT PROJECT

Contract No.

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

Consortium for International Development  
Executive Office  
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## I. PROJECT STATUS IN EGYPT

A major focus of EWUP work during the third quarter has been to analyze the results of the staff workshop held in May-June and make further plans for developing conclusions and recommendations after six years of Project activities. Many meetings were held to consider the results of past work and experience and to prepare an outline for a summary report intended for distribution at a National Conference on "Improving Egypt's Irrigation System in the Old Lands". The outline agreed upon is shown in the appendix.

Writers were assigned to various topics under the coordination of Engineer Eldon Hanson. Drafts were collected late in September and distributed to each discipline for review. Work will continue through October on revising and rewriting this document for additional review by field staff and backstop staff from the campus faculty at Fort Collins.

The main office staff has increased its emphasis on providing assistance to field teams during this quarter to replace the American field team personnel who had been assigned to the field sites until their positions were closed out June 30, 1983. The work is progressing smoothly under the direction of well trained Egyptian team leaders. Construction delays continue to impede operating and evaluation progress at pilot program sites. As reviewed elsewhere in this report there has been a complete breakdown in the construction work on the buried pipeline at El-Hammami. The contractor has left the site and the responsible officials from the Ministry of Irrigation are now in the process of negotiating a final settlement with the old contractor and obtaining the services of a new one. Delays with construction at Minya have retarded implementation of the new irrigation system but deficiencies in work quality have been corrected and construction work is progressing. The field team has been working very hard to maintain good relationships between the contractor and the farmers in order to permit the work to continue on the private land. Contractors have traditionally worked on government canals with an adequate right-of-way. They are not experienced in working on private channels where construction work must be coordinated with farming activities, irrigation schedules and farmer's preferences.

The Professional Employees Exchange Program (PEEP) operated jointly by the Ministry of Irrigation and the Salt River Project through EWUP has sponsored two Egyptian engineers to work for eight weeks at SRP headquarters in Phoenix, Arizona. Arrangements have been completed for exchange programs for two additional Egyptian engineers to be in Arizona during the third quarter. Also two SRP engineers will arrive in Egypt early in October.

EWUP continued its assistance to the IMS Project by exchanging reports and providing computer analysis while IMS is awaiting its computer equipment. Dr. James Layton continued to serve as advisor to the IMS Manpower and Training Project in its OFWM training at Kafr El-Sheikh. He also served as liaison person with the AID/Cairo Training Office in arranging travel and training in the U.S. for OFWM trainees. The OFWM tour of irrigation facilities in Colorado and SW United States has been delayed due to problems of completing contract amendments necessary to finance the tour. It is anticipated these arrangements will be completed so that the tour can be conducted in November or early December.

Mr. Mohamed Naguib was appointed to the position of Sociology Discipline Leader in September. He replaces Dr. Layton who has been serving in that position since Dr. Sallam resigned to take a position on a World Bank Project in North Yemen.

Mr. David Martella was granted one month leave without pay beginning October 1. His vacancy is temporarily being filled with CSU professors on a TDY basis.

Several airfreight shipments are still being held by the Egyptian Customs Department. A committee from the Ministry of Irrigation has reviewed the situation and written a letter to the Customs Department which verifies that these shipments are for Project use as described in the Grant Agreement and in accordance with the Bilateral Agreement between the governments of Egypt and the U.S.A. The Customs Department, however, is demanding payment of duties. A bill for the customs fees will be presented to the MOI committee for further discussion.

Project work is now organized among six pilot program groups and nine active task groups.

Pilot Programs

Kafr El Sheikh Site: Manshiya *Mesqa*  
Hammad *Mesqa*

El Mansuriya Site: El Hammami Pipeline  
*Mesqa* #10 Raised Channel

El Minya Site: Abyuha Canal Raised Channel  
*Mesqa* Improvement

Task Group

TG	1	On-Farm Water Management
TG	2	Water Distribution Systems
TG	3	Farmer Organization
TG	4	Farm Management and Planning
TG	5	Water Budget
TG	6	Land Leveling
TG	8	Soil Characterization
TG	10	Conjunctive Use of Water
TG	11	Irrigation Advisory Service

Task groups #7 and #9, Soil Fertility and Pest Control respectively, have completed their objectives and have been terminated.

A detailed report of each pilot program and task group follows.

MANSURIYA

The pilot programs of Mansuriya include the elevation of *Mesqa* #10, forming a lined concrete structure and construction of a buried pipeline replacing the El-Hammami Canal.

The objectives of these structures are basically to:

1. Deliver proper quantities of water to all farmers served by the system.
2. Reduce the conveyance losses which now occur.
3. Deliver water to farmers with sufficient head to allow for faster irrigations by gravity.
4. Eliminate the need for lifting water on an individual basis by providing centralized lifting.

A. Accomplishments and Future Plans for the El-Hammami Pipeline Pilot-Program:

1. The following table lists the amount of pipeline construction that has been accomplished to date. (No work has been completed this quarter).

	Unit	Total amount to be installed	Pipes actually laid No.	%
Pipes with diameter 60cm	meter	3084	2298	75
Pipes with diameter 50cm	meter	1667	1224	73
Horizontal pipes, 10 cm	Unit	768	176	23
Vertical Pipes, 10 cm	Unit	---	---	--
Elbow pipes	Unit	64	8	12.5
T Connection pipes	Unit	64	30	47

2. No work on the pumphouse has proceeded this quarter. Only the two pump stands and the gate stand have been completed. The contractor made several tests which failed each time because of leakage at the joints. On two tests some of the pipe broke.
3. No on-farm water management data were collected due to the complaints of the El-Hammami farmers with respect to the pipeline problems.
4. The farm record data are being maintained and will continue. Several new crop enterprise cost studies have been completed as well. Work is being done on farm management surveys.
5. Collection of selected water budget and water quality data will continue.

B. Accomplishments and Future Plans for Beni Magdul, Mesqa #10  
Pilot Programs are as follows:

1. OFWM data continues to be collected.
2. Data collection has included documentation of the farmers' irrigation schedule. This will be continued and will be used to evaluate the performance of the new *mesqa*. Data regarding *mesqa* #10 are being prepared for an evaluation report.
3. *Mesqa* #10 operation continues to be complex. With three sources of water being used this quarter; the old *mesqa*, the pumping wells, and the new *mesqa*. Beni Magdul Canal was cleaned using the tractor and a drag pulled with a hitch offset from the drawbar. This improved the flow to the *mesqas*. A second pump was installed at the head of *mesqa* # 10. With both pumps working there is sufficient discharge into the *mesqa*. Next quarter, each of the eight outlets on *mesqa* #10 will have fixed irrigation days each week scheduled for the farmers.

C. Special Studies:

1. The water budget work is being continued in the Beni Magdul area. Full details are reported by the water budget task group.
2. The cropping sequence studies are continuing.
3. The farm record data on numerous sites and the farm management surveys in the Beni Magdul Canal area continue.
4. The soil testing program that was started by Dr. Warner has been continued by the team. It consists of obtaining soil samples in the field and making consolidation and permeability tests in the laboratory. It will continue through the next quarter.

D. Training:

Agronomist Sabah Mahmoud, Engineer Tarif Zeitoun, and Sociologist Farouk Abdel-Al went to the U.S. for nine months of training.

Economist Hosam El-Naggar attended the seven-week training session in Kafr El-Sheikh.

Acknowledgment:

The team expresses appreciation of the great assistance and excellent work accomplished by Bill Braunworth who returned to the States last June.

Mansuriya Field Staff

I. Professional

Wadie Fahim	Team Leader		
Eldon Hanson	Eng.(Half time)	Moheb Semaika	Agr.(1/3 time)
Shinawy A. Atty	Economist	Mohamed Naguib	Sociologist
Ahmed Tahoun	Agronomist	Sabah Mahmoud	Agronomist
Farouk Abedl Al	Sociologist	Lotfy Nasr	Economist
Gamal Favzy	Economist	Mahmoud Khadr	Agronomist
Tarik Abdel Rahman	Agronomist	Tarif Zeitoun	Engineer

II. Non Professionals

Ibrahim Hussein	S. Tech.	Gamal Ahmed	S. Tech.
Badry Mahmoud	S. Tech.	Rokaya Abdel Mawla	Secretary
Ibrahim Abdou	S. Tech.	El Said Kamal	S. Tech.
Ibrahim Zakaria	S. Tech.	Mohamed Abdel Hamid	S. Tech.
Adel Abdel Moneim	S. Tech.	El Said Hamed	S. Tech.
Mohamed El-Dash	S. Tech.	Mohamed Farrag	S. Tech.
Ismail El Shimi	J. Tech.	Abdel Rahman Eid	J. Tech.
Abdel Rahim Mohamed	J. Tech.	Shawky El Awady	J. Tech. Lab.
Abdel Maaboud Ibrahim	J. Tech.	Mohamed Shaaban	J. Tech.
Farahat El Ashkar	J. Tech. Lab.	Ahmed Ragab	J. Tech. Lab.
Hamed Aly Tahoun	J. Tech. Lab.	El Shimi Ismail	J. Tech. Lab.

III. Drivers

Abdel Latif El Tawil	Mohamed Rezk
Abu El Ella	Aly Habashy
Salah Sadek	Nagy Hassan

KAFR EL SHEIKH

1. Summary of Progress

During the third quarter of 1983, work at the Kafr El-Sheikh EWUP site focused on activities as described below:

1. Routine data collection activities were carried-out on summer pilot program sites of cotton and rice. Lifted and applied irrigation water was measured. Observation well and irrometer readings in the cotton sites were taken. Soil moisture samples were taken before and after irrigation and weekly.
2. Filling of the Manshiya lake was completed. The channel through the old lake is returned to near the design cross section.
3. Two new sites for winter 1983-1984 at Hema *mesqa* close to the Abu Raya Villages were selected for pilot program implementation. Most of Hammad *mesqa* area is rice which made it necessary to select sites at the Hema *mesqa*.
4. Routine sociological contact records and economic farm records work continued. Additional work was done on the crop calendar study. Climatological measurements were taken at Karada station.
5. Work in evapotranspiration methods and calculator programing continued. Work was begun on the summer season report.
6. Data for sociological evaluation of summer season 1983 was collected.
7. Work in infiltration rate experiments report continued.
8. Work in water quality experiments in El-Karada continued.

9. Routine data collection was carried out for the Om Sen *mesqa* water budget including water levels and quality for surface and subsurface water. Meteorological data and crop surveys were taken. Monitoring of irrigation practices along Om Sen *mesqa* (users practices) continued.
10. Delivery system data were collected according to instructions from the main office. Twenty four *mesqas* were surveyed with cross sections taken every 100 meters and profiles and cross sections were graphed. Soil profiles, water samples and crop surveys were taken on 24 *mesqas*.

Economic data were collected for all the area. Sociological data for two *mesqas* were collected and a sample of all the area started.

Measurements of actual discharge in Dakalt canal were completed in order to calibrate the gates. Collection of data concerning water level measurements and time gates are open were started at the head of Dakalt canal.

11. Training for the K.E.S. technicians was held in K.E.S. office by the K.E.S. team members.
12. Some members from K.E.S. team attended the short training which was held in the training center in K.E.S. as trainers and some as trainees.

### III. Training Status and Changes

1. Eng. Abdel Fatrah Metawie was a trainer in the training center (July 23 Aug. to 15 Aug., 1983). He is now on one semester academic training at Colorado State University. (Aug. 20 - Dec. 31, 1983).
2. Eng. Amany El Kayal finished her training leave (Master's degree program at Utah State University) in Sept. 1983.

3. Soc. Sohair Kamal returned back from short training in CSU (June 6 to Aug. 8, 1983).
4. Eng. Safaa Fahmy attended short training in U.S.A. (July 4 to Aug. 22, 1983).
5. Eng. Ahmed Abdel Monsef and Soc. Hoda Hussein attended short training in K.E.S. (July 23 to Sept. 8, 1983).
6. Econ. Ragy Darwish at CSU for two semesters academic training (since Aug. 20, 1983).
7. Soc. Ahmed El-Attar transferred to El-Mansuriya team since the first of Sept. 1983.

#### IV. Work Plans for the Next Quarter

1. Continue work on Dakalt Canal renovation, including collection of socio-economic data for all the area (6300 *feddans*).
2. Working with the delivery system data to define suitable solutions.
3. Routine data collection for winter season 1983 - 1984 pilot program. Work will be carried out in the two new sites in Hema *mesqa*.
4. Routine data collection will continue for the water budget.
5. A comprehensive summary report for the summer 1983 on-farm pilot work will be written.

## II. Personnel Activities

### 1. Professional Staff

Kamal Ezz El-Din	Team Leader	Ahmed A. Monsef	Engineer
Abdel Fattah Metawie <u>3/</u>	Ass. T.L.	Amany El-Kayal <u>3/</u>	Engineer
Magdy Awad	Agronomist	Ahmed El-Attar	Sociologist
Ahmed Ismail	Agronomist	Safaa Fahmy	Engineer
Mohamed I. Meleha	Agronomist	Hoda Hussein	Agronomist
Magdi Badawi	Economist	Ragy Larwish <u>3/</u>	Economist
Sohair Kamal Youssef	Sociologist	Saad H. Zaki	Engineer
Mahmoud Moh. Said <u>2/</u>	Agronomist	Sobhi Elewa <u>1/</u>	Economist

### 2. Technicians

#### Hammad Group

Moh. Ahmed Ba'ir  
Moh. Omer Abdel Meguid  
Kamal Moh. Abu-Omar

#### El-Manshiya Group

El-Said Abdel Hamid  
Salah El Sayed Abdel Hafeez  
Moheb Abdel Sama El-Sawy

#### Water Budget

Farag El-Masry  
Ramadan Gazal  
Hassan El-Rafaey

#### Laboratory

Atef Hamed Sayed Ahmed  
Hanaa Ali Said

#### Equipment & Cars

Abdel Hamid Sayed

### 3. Secretary & Administrative

Mohamed Abu Omar	Admin. Assistant
Nadia Mahmoud Arafa	Secretary

### 4. Drivers

Asel Ahmed A. Aziz  
Osama Moh. Sobh  
Fawzy Fathi Abdel Hamid  
Attia Mostafa Abdu

### 5. Laborers

Saber Ahmed Ismail  
Ibrahim Said Ahmed  
Abdel Raouf Mazal  
Mohamed Mostafa Omar  
Osman Abdel Rasoul  
Ibrahim Moh. El-Besawy  
Abdallah Abdel-Hamid  
Mostafa Ibrahim

### 6. Guards

El-Sayed Ahmed El-Falawi  
Moh. Mahmoud Al-Mashaly  
Mostafa Basyouni El-Gamal

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1/ Vehicles    2/ Laboratory and Karda station manager  
3/ On training Leave

MINYA

I. Summary of Accomplishments

During the third quarter of 1983 work at El-Minya continued to emphasize canal, *mesqa* and road improvement, according to the Master Plan for Unit Area Development, June 1982.

A. Abyuha Canal Pilot Program

1. The flow of water in Abyuha canal was improved by controlling, with chemicals, the horsetail weeds. The Irrigation Department cooperated with the Project in this effort. After eliminating these weeds each *mesqa* now receives water on a timely basis and with adequate streamflow and head.
2. The contractor completed installation of pitching on the right bank of Abyuha canal between kilo 1.45 and 1.75.
3. All the *mesqa* headgates have been installed except for #7 and #20. In addition eight vents need to be installed for irrigation directly from Abyuha canal.
4. The left bank of Abyuha canal is being maintained as a road.
5. The Project staff continued to work with the *mesqa* leaders on water delivery scheduling and control of *mesqa* gates. The farmer leaders have the keys which permits them to open and close the *mesqa* headgates.

B. Mesqa Improvement

1. The work on *mesqas* #11, 12, 16, 19 and 25 was rejected. The contracting company returned to these *mesqas* and finished the work according to contract specifications. Compaction was accomplished by controlling soil moisture conditions of

the *mesqa* banks and packing them with a sheepfoot roller.

2. The construction of the road in place of *Mesqa* #24 was completed but additional compaction is necessary.
3. The rate of performance on *mesqa* modification is very slow. The date for final completion, according to the contract, is past and the work is only 18% accomplished.
4. The specifications for check structures and *mesqa* tail escapes were delivered to and discussed with the contractor. No work has yet started on the structures.
5. After discussion with all members of the Minya team it was decided to provide outlets on *Mesqas* #11 and #14 and lined sections of *Mesqas* #22 and #23 or #27 and #29.
6. It has been decided to try the Pakistan Gates in *mesqa* #12 on a limited scale rather than on *Mesqas* #11, #14, #22 and #23 as initially planned. These *Mesqas* will have turnouts connected to pipes under the banks.
7. Trials have started to rotate water delivery among *mesqas*. Gates were closed from *Mesqas* #1 to #15. This provided farmers at the last *mesqas* with water delivery which permitted good gravity flow irrigation.

#### C. Land Leveling

1. Land along *mesqas* which have been improved is given first priority for leveling. This helps the farmers to fill in the borrow areas along the *mesqa* from which soil was taken in construction of the improved banks.
2. Work is continuing with farmers to arrange and schedule new areas for leveling during the period of harvesting summer crops.

D. Other Activities

1. Measurement of water continues for selected farms along *Mesqas* #7 and #26.
2. Water measurements are continuing for drains and canals for water budget summaries.
3. Water samples are collected from canals, drains and wells for analysis in the main office soil and water testing laboratory.
4. Farm records and sociology contact records are being continued.

II. Plans for the next quarter

1. Complete the installation of iron headgates.
2. Build the inlets of the direct irrigation vents and install the gates for each.
3. Complete the construction of the improved *mesqas*.

III. Personnel Assigned to Minya

Professionals

Abdel Raouf Hassan	Team Leader		
Tim Gates	Eng.(Half T.)	Abdalla Saber	Sociologist
Farcuk Hassanein	Sociologist	Mohamed Awad	Agronomist
Ahmed Abdel Naim	Engineer	Nabil Farag	Economist
Esmat Wafik	Engineer	Elia Sorial	Economist

Technicians

Abdel Kany Hafiz  
Nashat Younis  
Mahmoud Noman  
Bekhit Nazer  
Mohamed Allah

Drivers

Khalaf Moh. Khalaf  
Farouk Hassan  
Mohamed Esawy

Laborers

Khalaf Saad  
Kamel Ahmed  
Hemid Said  
Said Abdel Fattah

TASK GROUP 1 : ON-FARM WATER MANAGEMENT

Objectives

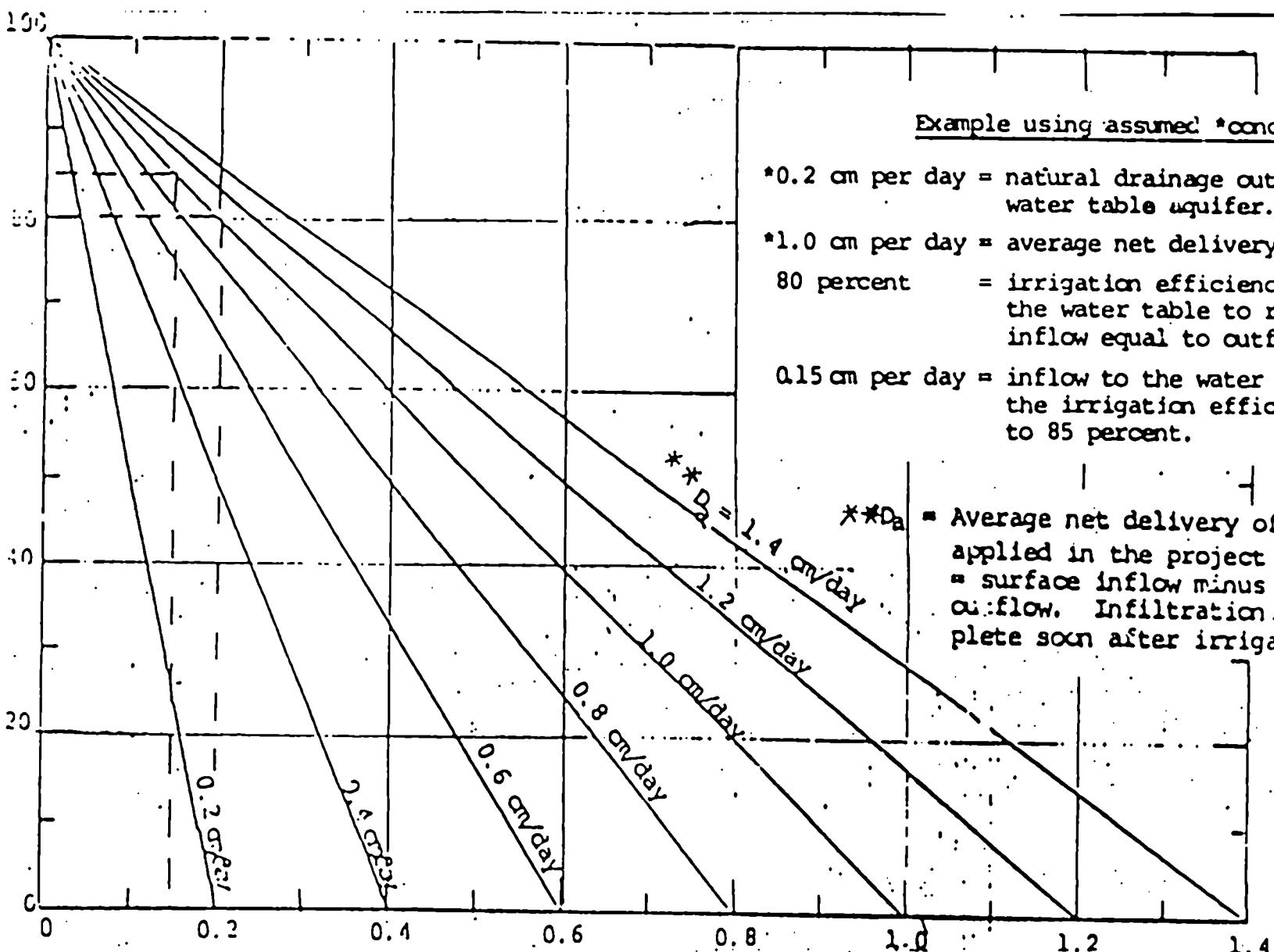
1. Develop criteria for the proper frequency and amount of irrigation and develop an acceptable procedure for implementing the criteria in the pilot areas.
2. Determine the impact of various on-farm water management practices on soil properties, water table, and crop production.
3. Evaluate the cost and benefits associated with the changes in delivery system for selected sites.
4. Evaluate the sociological changes brought about by the various changes in *mawja* delivery systems and on-farm water management practices.
5. Evaluate the on-farm water management practice of long furrows and/or borders as compared to conventional basins.

Work Completed During The Quarter

1. On-farm activities continued in the three areas, but at a reduced level in Kafr El-Sheikh due to the heavy work load associated with obtaining data for renovation of the Dekalt canal. OFWM activities have stopped in the El-Hammami area because of the pipeline problem and farmers complaints.
2. A method shown in figure 1. has been developed to determine the influence of irrigation efficiency on a water table depth in relation to the drainage rate from a water table aquifer.

At this time the method appears to be a significant finding for the Project. It will be useful in determining required irrigation efficiencies to stabilize or lower the water table, and to determine whether or not artificial subsurface drainage will be required.

Net Irrigation Efficiency (E<sub>ni</sub>), percent



Example using assumed \*conditions

- \*0.2 cm per day = natural drainage outflow from the water table aquifer.
- \*1.0 cm per day = average net delivery of water applied.
- 80 percent = irrigation efficiency required for the water table to remain static with inflow equal to outflow.
- 0.15 cm per day = inflow to the water table aquifer if the irrigation efficiency is increased to 85 percent.

\*\*D<sub>n</sub> = Average net delivery of water applied in the project per day = surface inflow minus surface outflow. Infiltration is complete soon after irrigation periods.

Water lost by percolation from root zone and channel seepage, cm/day  
(inflow to water table aquifer)

versus  
Measured deep drainage rate from water table aquifer to deep aquifer or drains, cm/day  
(outflow from water table aquifer) 1/

1/ Static water table occurs when inflow = outflow

Figure 1. Net irrigation efficiency in relation to daily average net depth of irrigation water delivered to the project, inflow to water table of percolation losses from root zone and channel seepage, and outflow drainage from water table aquifer.

Table 1. Required Irrigation Efficiency to Stabilize The Water Table in Pilot Program Areas.

Area	Natural Outflow Drainage From the Water Table Aquifer cm per day	Average Net Delivery cm per day <sup>1/</sup>	Irrigation Efficiency Required to Stabilize The Water Table Percent
Abyuha	0.10 to 0.15	0.4	62
Beni Magdul	---- to 0.05	0.4	85
Kafr El-Sheikh	---- to 0.03	0.35	88

The method has been used to determine data in Table 1 which shows that that irrigation efficiencies required to stabilize the water table in the three team areas range from 62 to 88 percent. They would have to be greater to lower the water table. Inasmuch as the farmers cannot irrigate with overall average efficiencies this high, artificial subsurface drainage would be required.

Figure 1. will be included in Technical Report No. 61 entitled "The Effect of Irrigation Water Management on High Water Tables in Egypt" by Hanson, El-Kady, Gates and Litwiller.

Plans for Next Quarter

- A. To work with Task Group members to summarize the EWUP findings for inclusion in a general final summary report.
- B. To encourage and assist teams to collect field data pertaining to irrigation frequency, amounts and efficiencies and to evaluate results.
- C. John Wolfe will serve on TDY from January 20 to February 28 to prepare a Technical Report on "Criteria for Irrigation Frequency".

Personnel Presently Assigned to the Task Group

Mona El-Kady, Martella, Hanson, Taher, Assia, Semaika, Farouk, and Nadia.

TASK GROUP 2 : WATER DISTRIBUTION SYSTEMS

Objectives

1. Prepare and evaluate procedures for designing gravity distribution systems through canals and *mesqas*. Along with hydraulic principles consider aspects of minimum and maximum stream sizes required at the field inlet, and delivery by continuous flow, rotation, and demand schedules for peak demands and period of reduced demands.
2. Organize and evaluate operation and scheduling procedures for the El-Hammami pipeline.
3. Describe how farmers are organized around their present distribution systems and analyze how different types of farmer organizations may be established in response to changes in those distribution systems.
4. Measure and evaluate seepage losses in the El-Hammami Canal and in improved *mesqas* (lined and/or elevated) and other selected *mesqas*. Evaluate the effect of the improvements on seepage losses.
5. Using data obtained in seepage tests, evaluate the aspects of *mesqa* maintenance with respect to the efficiency of water delivery.

Activities During the Quarter

A. Abyuha Area

The contractor responsible for the renovation of the *mesqas* in Abyuha has been working to improve the cross sections and banks of *mesqas* #11, 12, 16, 19 and 25 to meet contract specifications. After satisfactorily completing this work and following the summer harvest period, work will begin on the remaining *mesqas*. The contractor has been instructed to carefully follow specifica-

tions in compacting and forming the *mesqa* banks. He plans to use a water sprayer and "sheepfoot" roller this purpose.

All of the *mesqa* headgates have been manufactured and delivered to the site. Twenty five headgates have been installed.

The decision was made to install Pakistani farm turnouts on *Mesqa* # 12 for experimental purposes. These turnouts are to be manufactured by the Project under the supervision of Eng. Ahmed Bayoumi.

2. Kafr El-Sheikh Area

The K.E.S. team concentrated on summarizing and analyzing Dakalt data including *mesqa* surveys, crop surveys, economic, and sociological components. Potential alternatives for implementation were discussed. Data were organized on a *mesqa* basis. In cooperation with Eng. Ree, stations of hydraulic importance on Dakalt Canal were indentified and measured. A schematic of the entire Dakalt Canal system was drawn.

3. Mansuriya Area

Beni Magdul was cleaned with the tractor using an offset hitch by which equipment was pulled through the canal. Weed growth was removed and the carrying capacity of the canal was improved.

4. Analysis of Canal Linings

A draft of a report on canal linings was completed by John Andrew. Three canal sizes were delineated and the costs associated for each were estimated. Included are total annual cost summaries for various canal lengths. The respective canal shapes for each size and for each lining material are also included.

The total annual cost for 2500 meters of size 1 (structural widths of 0.30 to 1.00 meter) varied from L.E. 1.05/m<sup>2</sup> for bricks with plaster lining, to L.E. 4.44/m<sup>2</sup> for 35 ml butyl membrane.

For size 2 (structural widths of 1.00 to 3.00 meters), total annual cost for 10,000 meters of canal varied from L.E. 0.93/m<sup>2</sup>

for cast-in-place concrete to L.E. 3.53/m<sup>2</sup> for 35 ml butyl membrane. For size 3 structural width of 3.00 to 10.00 meters) total annual cost for 5,000 meters of canal varied from L.E. 1.22/m<sup>2</sup> for cast-in-place concrete to L.E. 3.41/m<sup>2</sup> for 35 ml butyl membrane.

Primary benefits considered were land area savings, reduced maintenance costs, reduced system management costs, increased application efficiency, and quantitative water savings.

#### Plans for Next Quarter

1. A study by sociologists will be made to describe farmer's existing irrigation patterns related to needs for channel conveyance and distribution. The data will be collected next quarter and given an initial analysis.
2. Reports and/or data assembled to date will be reviewed to determine if additional write-ups should be made for inclusion in Project final reports.
3. If teams request assistance, help will be given as time permits.
4. W.O. Ree will serve on a TDY assignment to design and evaluate watercourse improvement alternatives for the Dekalt Canal system.

#### Personnel Assigned to Task Group 2

Mona, Hanson, Gates, Layton, Tinsley and Gamal.

### TASK GROUP 3: FARMER ORGANIZATION

#### Objectives

1. To define the purpose and nature of a farmer organization.
2. To examine the existing organizational capabilities of the farmers.
3. To develop and analyze strategies for implementation of specific farmer organizations.
4. To analyze the procedures and administrative structure encompassing the farmer organizations at the specific field sites.

The work of this task group involves three major forms of activities: (1) the actual development and sustaining of various farmer organizations, (2) the documentation of this process, and (3) the documentation of the existing situation of which the organization is part. Activity 1 is designed to accomplish objective 3 while activity 2 is designed to complete objective 4. Activity 3 is matched with objectives 1 and 2.

#### Work Completed During The Quarter

##### A. Developing and Substaining Farmer Organization.

###### 1. Minya

The development of both the *mesqa* organizations and the canal organization proceeded concurrently with canal-area renovation. There have been organization meetings of *mesqa* leaders throughout Abyuha to further explain the work and to receive feedback from the farmers. Also, each *mesqa* has been consistently visited by the Project sociologists to discuss the progress of the work with the leaders and farmers as related

to their particular *mesqas*. The major effort this past quarter has been to work with the leadership of the *mesqa* and the farmers in order to develop a viable organizational pattern of behavior in which the leaders function as leaders and problems are solved in collective manner when necessary.

2. Mansuriya: Mesqa #10

An organizational framework has been established . Periodic meetings with the leadership, and others, have been held. This organization is being used to discuss and implement a stricter scheduling pattern of irrigation, and to solve the problems still plaguing the *mesqa*.

3. Mansuriya: El-Hammami

The work with the farmers has come to a standstill due to failure of the contractor to fulfill its responsibilities in constructing the pipeline.

B. Documentation of farmer Organization Work

The documentation of the organizational work is now starting to be compiled and will be presented in a number of proposed technical reports. The major report to be written will examine the following aspects of developing a water users association.

1. identifying the local leadership,
2. contacting that leadership,
3. contacting the farmer,
4. establishing the organization,
5. sustaining the organization,
6. evaluating the organization.

Personnel Assigned

Jim Layton, Farouk Abdel-Al, and Eldon Hanson.

TDY Support this Quarter

Frank Santopolo.

TDY Support for Next Quarter

Dan Hilleman.

#### TASK GROUP 4: FARM MANAGEMENT AND PLANNING

##### Objectives

Farm Management and planning task group objectives are to evaluate alternative farming systems on Egyptian farms, to evaluate current agronomic practices as contrasted to recommended practices, and to evaluate the farmers' ability to implement improved agronomic practices.

##### Activities Completed During Past Quarter

- Crop management studies, proposed Technical Report #53.
- Status of zinc in the soils of project sites, proposed Technical Report #52.
- Irrigation practices of EWUP study cases - Abyuha and Abu Raya sites, proposed Technical Report #45.
- Farming System of Egypt with special reference to EWUP study cases, initial draft for proposed Technical Report #49.
- Farming system economic analysis of EWUP study cases, proposed Technical Report #50.

##### Plans for Next Quarter

- Complete the farm record manual.
- Complete the internal memorandum on enterprise cost studies for summer 1982.
- Continue to keep farm record-books with the selected farmers to evaluate the alternative farming system.

- Continue work on final report of farming systems in Egypt.
- Revise report on farm land accessibility as draft working paper and as a technical report.
- Continue work on second year crop calendar report at Kafr El-Sheikh and Mansuriya.
- Complete the analysis of farm management surveys for El-Hammami, *Mesqa* #10 in El-Mansuriya, and *Mesqa* #26 at Abyuha.
- Prepare reports and information needed for interdisciplinary major presentations at the National Conference.

Personnel Presently Assigned to Task Group #4

Farouk, Tinsley, Martella and Naim.

### TASK GROUP 5: THE WATER BUDGET

#### Objectives

The objective of the water budget work for the remainder of the project are as follows:

1. To continue to collect complete water budget data (surface inflow and outflow, precipitation, weather station data for evaporation and evapotranspiration, water table elevations, specific yield, hydraulic conductivity, water quality, surface outflow) at each of the project sites.
2. To conduct regular periodic analysis of water budget data for each site with subsequent reports of results.
3. To produce an annual water budget report for each site.
4. To produce a final comprehensive report of the water budget work.

#### Activities and Progress this Quarter

Additions and revisions were made to proposed PTR No. 47, "Water Budgets for Irrigated Regions in Egypt".

Soil core samples were extracted from seventeen locations in Beni Magdul and consolidation/permeameter analyses were conducted to determine values of vertical saturated hydraulic conductivity for use in estimating vertical leakage rates in the region.

#### Plans for Next Quarter

Continue analysis of soil samples from Beni Magdul.

Begin collecting soil samples from Abyuha and Om Sen regions for similar analyses of vertical saturated hydraulic conductivity.

Install several deep observation wells in Abyuha and Beni Magdul to monitor the water levels in the underlying semiconfined aquifer.

Personnel Presently Assigned

M. Helal 1/, Mahmoud Ibrahim, Azza Nasr, Moheb Semaika and Tim Gates

Main Office Support Staff

Iman Saber and Laurette Gouel (P.T.)

Field Professional Staff

A. Abdel Naim (Abyuha), Wadie Fahim (Mansuriya) and Ahmed Ismail (Om Sen).

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1/ Returned from U.S. on Aug. 18.

TASK GROUP 6: LAND LEVELING

Objectives

To collect and analyse all EWUP information on land leveling and:

1. Evaluate farmers acceptance of new standards and practices.
2. Analyse costs of precisions land leveling.
3. Assess the impact of leveling on on-farm water management.
4. Establish training for farmers to improve their own land leveling skills.

Activities and Work Completed this Quarter

1. Land leveling was minimal this quarter because most of the land was occupied with crops. In El-Minya, four sites were leveled totaling almost eight *feddans* as shown in the table.

Farm Site	Area Levelled		Cut m <sup>3</sup> /Fed.	Fill m <sup>3</sup> /Fed.
	<i>Fed.</i>	<i>Qirat</i>		
Mesqa #16	4	--	57	55
" #23	2	--	58	59
" #25	-	16	57	54
" #25	-	16	50	53
Total	7	8	--	--
Average	-	--	55.5	55.25

The similarity of cuts and fills with small volumes on small areas indicates that the work was mainly a land-smoothing operation. The maximum average cut or fill was approximately two centimeters on the smaller areas and less than three-fourths centimeters on the larger areas.

2. OFWM data continues to be collected on land previously leveled in the three team areas.

Plans for Next Quarter

1. To review data collected to date and evaluate findings. Where findings are important, write appropriate reports for inclusion with material to be assembled in final reports.
2. To encourage teams to continue the program and to respond to requests for help as time permits.

Personnel Assigned to Task Group #6

Bayoumi, Hanson, Assia and Gamal.

TASK GROUP 8: SOIL CHARACTERIZATION

Objectives

1. To determine what soil management techniques are needed for best use of soil and improving water management.
2. To develop water management recommendations based on soil characteristics.

Accomplishments

- Continued working on the final technical report summarizing irrigation management as related to soil characterization studies. This will be the final report of Task Group #8 and will conclude the output of its activities.
- Shared the activities of planning for the National Conference.

Plans for Next Quarter

Prepare final Technical Report summarizing all irrigation related soil interpretation studies. This will be the final report of Task Group 8 and conclude its activities.

Personnel Presently Assigned

Taher, Tinsley, Assia and Semaika.

TASK GROUP 10: CONJUNCTIVE USE OF WATER

Objective

1. Evaluate water collected from the main drains, canals and irrigation wells from the three project sites.
2. Classify the water from various sources for its suitability for irrigation.
3. Determine the consequences of using drainage water for alternative soil and crop situations.
4. Indicate special management practices necessary for using water of different qualities.
5. Determine the effect of using different combinations of water on the leaching requirements for alternative soil-crop situations.

Work Completed During The Quarter

1. Water samples were collected monthly from drains, canals and wells and analyzed chemically.
2. A draft for the quality of water at the three Project sites has almost been finished.

Plans for Next Quarter

1. Report on the water quality at Minya and Mansuriya will be completed by December 1983.

Personnel Presently Assigned

Assia, Hanson, Taha and Ikram.

### TASK GROUP 11: IRRIGATION ADVISORY SERVICE

The Irrigation Advisory Service (IAS) task group has focused on two major areas of analysis in order to examine the existing situation in terms of establishing such a service. First, there is the need to document how EWUP presents its different pilot programs to the farmers with the purpose of describing how a possible prototype to an IAS may actually perform. Next, an examination of the organizational environment into which the IAS must implement its objectives needs to be described. From these two areas of analysis, the objectives of the task group have been created and the work activities have been designed.

#### Objectives

1. To examine how technical advice and assistance to farmers and farmer organizations is extended and developed into viable programs.
2. To Develop criteria and procedures for establishing a countrywide IAS. This requires that the purpose and parameters of a IAS be defined and that a discussion on how the organization may be institutionalized be presented.

#### Tasks Completed

- Evaluation studies of the Kafr El-Sheikh work in terms of interacting with the farmers are now being analyzed. Reports are being written concerning this topic.
- The Project's work with the farmers on *Mesqa* #10 in Mansuriya has been documented for the past year through a special study examining how an innovation is presented to a receiver group. Data from that study are now being tabulated and analyzed.
- A study examining objective #2 has been completed with a preliminary analysis already completed.

Future Tasks for Next Quarter

- The report concerning objective #2 will be written .
- Reports of the evaluation studies in Kafr El-Sheikh and of the special study on *mesqa* #10 will be written.
- Analysis of the contact records describing the Project's efforts in implementing the various programs will continue.

Personnel Presented Assigned

Jim Layton, Moheb Semaika and Gamal Awad.

TDY Support this Quarter

Ed Knop.

TRAINING

The following individuals traveled to CSU for 9 months of academic training:

Sabah Mahmoud Ahmed El Sayed  
Mohamed Ragy Salah El-Din Darwish  
Tariief Ali Fahmy Zaitoun  
Farouk Ahmed Abdel Al Omar

Amany El-Kayal returned from two years of study under a Peace Fellowship. She earned a Master's Degree in Irrigation Engineering.

Short term training assignments were implemented as follows:

Abdel Raouf Hassan Mohamed El-Salahi: 13 June - 8 July 83  
"Farming Systems Research" - Colorado State University.

Sohair Kamal Yousef: 13 June - 29 July 83  
"Social, Technical + Economic Aspects of Improved Irrigation Management" - Colorado State University.

Safaa Fahmy Mohamed Risho: 10 Jly - 20 August 83  
"Soil and Water Conservation Management" - Utah State University

Abdel Fattah Metawie: 1 Semester at CSU 30 August - 31 December 83  
Take Engineer courses and complete thesis work.

Mohamed Lotfy Nasr: 26 Sept. - 10 Nov. 83  
"Production Response of Crops to Varied Levels of Timing Irrigation Water Applications" - CSU.

EWUP transferred the management of the summer On-Farm Water Management Course to the Irrigation Management Systems Project. Still, EWUP supported this programs by supplying trainers and some logistical items.

American advisors presented seminars on topics related to irrigation improvement. The training period was from 23 July to 8 Sept. 1983.

EWUP also provided the support to send 26 trainees plus 6 senior officials of the MOI to the U.S. for a field trip of irrigation sites in the southwestern part of the country.

Four engineers were provided training under the Professional Employees Exchange at Salt River Project, Phoenix, Arizona. They are:

Ahmed Abu Bakr Darwish  
Mohamed Fathi Saoudi

Hassan Ali El-Attafi  
Ramsis Pakhoum Lotfy

MAIN OFFICE

The technical work of the main office is done through eleven task groups. The work is performed by 27 professional staff members with TDY assistance as indicated in the "Backstopping" portion of this report. The main office and TDY staff work with field team personnel at each of the three Project sites to conduct demonstrations and field tests, collect data, and carry out plans for interaction with farmers and local government officials.

The following is a complete list of personnel assigned to the Main Office as of June 30, 1983.

Hassan Wahby	Project Director
Gene Quenemoen	Technical Project Director
Farouk Abdel Al	Economics Discipline Leader
David Martella	Economics Disc. Counterpart
Gamal Ayad	Senior Economist
Ahmed Taher	Agronomy Disc. Leader
Richard Tinsley	Agronomy Disc. Counterpart
Mohamed Abdel Naim	Senior Agronomist
Assia El-Falaky	Senior Agronomist
Moheb Semaika (66% time)	Senior Agronomist
Mona El-Kady	Engineering Disc. Leader
Eldon Hanson	Engineering Disc. Counterpart
James Layton	Sociology Disc. Counterpart
Mohamed Naguib	Sociologist
Yousria Allam (50% time)	Sociologist
Mohamed Helal*	Computer Engineer
Azza Nasr	Computer Engineer
Tim Gates	Engineer-Water Budget
Mahmoud Ibrahim	Computer Engineer
Iman Saber	Technician
Ahmed Bayoumi	Farm Mechanization Engineer
Nadia Wahby*	Senior Eng. Water Requirements
Abdel Atti Allam*	Engineer - Water Requirements
Wadie Ragy	Engineer - Water Requirements
Mohamed Nabil Naguib	Engineer - Water Requirements

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\* On leave without pay.

Farida Abdel Meguid *	Engineer - Water Requirements
Mohamed Ahmed Salem	Senior Adminis. Personnel
Abdel Aziz El-Kady	Senior Adminis. Expeditor
Ahmed Zaki	Junior Adminis. Expeditor
Salah El-Din Salem	Junior Adminis. Secretary
Sayed Sakr	Junior Adminis. Storekeeper
Zeinab Abdel Ghany	Junior Adminis. Inventory
Ekhlas Abdel Ghaffar	Junior Adminis. Secretary
Magda Yassin Mahmoud	Junior Adminis. Arabic Typist
Ashgan Abdel Zaher	Junior Adminis. Photocopier
Bamba Shaarawy	Junior Adminis. Photocopier
Ibtesam El-Shatter	Junior Adminis. Photocopier
Nahed El-Husseiny	Junior Adminis. Photocopier
Iman Abdel Gaber	Junior Adminis. Accountact
Maher Attallah	Junior Tech. Mechanical Work
Abdel Naby Youssef	Techn.-Mechanical, Motor Pool
Ahmed Soliman Abdallah	Techn.-Mechanical, Motor Pool
Ahmed Ibrahim	Junior Administrative, M.P.
Said El-Said Elwi	Junior Administrative, M.P.
Ibtesam El-Attar	Junior Administrative, M.P.
Imam Sayed Washba	Technician
Osman Shaker	Junior Admin.
Shaaban Mohamed Abdou	Telephone Operator
Ahlam Abdel Rahman *	Junior Admin. Accountant
Taha Moustafa	Eng.-Water Laboratory
Ikram Mohamed *	Eng.-Water Laboratory
Ahmed Ghanem	Techician-Water Lab.
Abdalla Gad	Techician-Motor Pool
Ahmed	Guard-M.P.
Moustafa Mahmoud Mahran	Electrician-M.P.
Saad Mansour	Management Ass. for Finance
Nawal Abdallah Ahmed	Accountant - Main office
Magda Moh. Mahrous	Ex. Secretary - Main Office
Mervat Hassan	Secretary - Main Office
Hannan Samuel	Secretary - Main Office
Hala Mokhtar Awad	Secretary - Main Office
Mary Halim	Editor - Main Office
Hamdi Ahmed Hamdi	Translator- Main Office

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\* On leave without pay.

PUBLICATIONS REPORT

Arrangements for the National Conference Report have begun since the arrival of Mr. Dan Hilleman. Agreements with the AUC printshop have been made. Also contacts with the artist for designing the cover and choice of the best layout were settled. Work is presently progressing in the review and reorganization of the text itself and selecting the most appropriate type setting. Other details concerning inclusion of photographs, illustrations and tables are being taken care of.

Moreover, during the past quarter, the following publications have been completed and released:

PTR #35 Farm Irrigation System Design, Kafr El-Sheikh, Egypt. By Kafr El-Sheikh Team as compiled by Thomas W. Ley.

PTR #43 Planning Irrigation Improvements in Egypt:  
The Impact of Policies and Prices On-Farm Income and Resource Use. By M. Haider & Melvin Skold.

DWP #110 Kafr El-Sheikh On-Farm Pilot Program 1981/82 Winter Season. By Kafr El-Sheikh Team.

DWP #111 El-Hammami Irrigation Delivery System and Actions for Improvement. By Mona El-Kady and Eldon Hanson.

Manual #5 Precision Land Leveling Data Analysis Program for HP-9825 Desktop Calculator. By Thomas W. Ley.

Manual #9 Alphabetical List of Some Crops & Plants with their English, Egyptian, Botanical & Arabic Names and Vocabulary of Agricultural and Other Terms Commonly Used. By Gamal Ayad.

A list of draft working papers and technical papers which are presently in process are reported as follows:

I. Draft Working Papers (DWP's)

No.	Title	Remarks
DWP # 103	To be assigned.	
DWP # 104	Gravity vs. Lift Irrigation By T.H. Podmore	Comments sent to author on 9.10.83 for review.
DWP # 105	To be assigned	
DWP # 113	Problems of Irrigation Ver- tisolis in Egypt. By A.Taher, S. Abdel Wahed, R.L. Tinsley	} Together with Staff Paper # 60, Those 2 DWP's will be combined into one PTR.
DWP # 114	Water Management of Egypt- ian Vertisols. By A.Taher, and R. L. Tinsley	
DWP # 116	Corn Irrigation & Production on <i>Mesqa</i> #6, Beni Magdul Canal, Mansuriya, Egypt, 1982. By Sabah Mahmoud & W.S. Braunworth.	Needs review & reorganiz- ation.
DWP # 117	Berseem Irrig. & Prod. on <i>Mesqa</i> # 6 B.M.C., Mansuriya District, Egypt, 1981/82. By M. Khidr, S. Mahmoud, and W.S. Braunworth	Needs review & reorganiz- ation.
DWP # 118	Crop Calendar for Abu Raya K.E.S. 1980-81. By M. Meleha, S. Elewa.	Needs Review

LIST OF PROPOSED PROJECT TECHNICAL REPORTS

(Titles are preliminary)

Proposed PTR No.	Title	Author
14	The Challenge of Implementing An Irrigation Program In An Egyptian Village	J. B. Mayfield & Mohamed Naguib
16	Irrigation System Improvement by Simulation & Optimization, I. Theory II. Application	J. Mohan Reddy & W. Clyma
17	Optimal Design of Border Irrigation System	J. Mohan Reddy & W. Clyma
18	Population Growth and Development in Egypt: Farmers' and Rural Development Officials' Perspectives	M. Sallam, E. C. Knop & S. A. Knop
21	El-Hammami Pipeline Design	Fort Collins Staff Team
25	Problem Identification Report for El-Minya	Royal Brooks
27	Alternative Approaches in Extension & Rural Development Work: An Analysis of Differing Perspectives	Sallam & E. C. Knop
31	Analysis of Farm Management Data from Abyuha Project Site	E. Sorial, M. Skold, R. Rehnberg & F. Abdel Al
32	Accessibility of EWUP Pilot Sites	
36	Discharge & Mechanical Efficiency of Egyptian Water-Lifting Wheels	Slack, Wahby, Clyma & Sunada
37	Allocative Efficiency And Equity of Alternative Methods of Charging For Irrigation Water: A Case Study in Egypt	R. Bowen & R. A. Young

Proposed PTR No.	Title	Author
38	Precision Land Leveling on Abu Raya Farms, Kafr El-Sheikh Governorate, Egypt	T. W. Ley
39	On-Farm Irrigation Practices For Winter Crops at Abu Raya	A. F. Metawie N. L. Adams & T. A. Tawfic
40	A Procedure For Evaluating Crop Growth Environments For Optimal Drain Design	D. S. Durnford, E. V. Richardson & T. H. Podmore
41	The Influence of Farm Irrigation System Design and Precision Land Leveling on Irrig. Efficiency and Irrig. Water Management	Task Group 1 and others
42	<i>Mesqa</i> Renovation Report	N. Illsley & A. Bayoumi
44	Conjunctive Water Use - The State of The Art and Potential for Egypt	Verne H. Scott
45	Irrigation Practices of EWUP Study Cases - Abyuha and Abu Raya Sites For 1979-1980, 1980-1981 and 1981-1982	F. Abdel Al D. Martella & R. Tinsley
46	Hydraulic Design of A Canal System for Gravity Irrig. at Abyuha	T. K. Gates, W. O. Ree, & M. Helal
47	Water Budgets for Irrigated Regions in Egypt	M. Helal, A. Nasr, M. Ibrahim, T. Gates, W. Ree, M. Semaika

Proposed PTR No.	Title	Author
48	A Method for Evaluating and Revising Irrigation Rotations	R. L. Tinsley A. Ismail, & M. El-Kady
49	Farming System of Egypt: With Special Reference to EWUP Project Sites	G. Fawzy, M. Skold, & F. Abdel Al.
50	Farming System Economic Analysis of EWUP Study Cases	F. Abdel Al, D. Martella & D. W. Lybecker
51	Structural Specifications and Con- struction of A Canal System For Gravity Irrig. at Abyuha	W. R. Gwinn, T. K. Gates A. Raouf, E. Wafik & E. Nielsen
52	Status of Zinc in the Soils of Project Sites	M. Abdel Naim
53	Crop Management Studies by the Egypt Water Use & Management Project	M. Abdel Naim
54	Criteria for Determining Desirable Irrigation Frequencies & Requirements and Comparisons with Conventional Fre- quencies and Amounts Measured in EWUP	M. El-Kady, J. Wolfe, & M. Semaika
55	Computer Assisted Design and Evalua- tion for Watercourse Improvement	D. Martella, T. K. Gates, G. Layton, et.al.
56	(To be assigned)	John Andrew

Proposed PTR No.	Title	Author
57	Infiltration Studies on Egyptian Vertisols	K. Litwiller R. L. Tinsley H. Deweeb & T. Ley
58	Cotton Field Trials, Summer 1980, Abu Raya.	K.E.S. Team M. Awad, A. El-Kayal
59	Management Scheme of A Canal System for Gravity Irrigation at Abyuha	A. Saber, E. Wafik, T. K. Gates, & J. Layton
60	Hydraulic Conductivity and Vertical Leakage in the Clay-Silt Layer of the Nile Alluvium in Egypt	J. W. Warner, T. K. Gates, W. Fahim, M. Awad & T. W. Ley
61	The Effect of Irrigation Water Management on High Water Tables in Egypt	E. Hanson, M. El-Kady, T. K. Gates, & K. Litwiller
62	On the Water Quality of Irrigation Canals, Drains And Groundwater In Mansuriya, Kafr El-Sheikh & El-Minya Project Sites	Assia El-Falaky
63	Watercourse Improvement Evaluation (Mesqa # 26 & Mesqa # 10)	McConnen, E. Sorial & G. Fawzy
64	Influence of Soil Properties on Irrigation Management in Egypt	A.T.A. Moustafa, R.L. Tinsley

Proposed PTR No.	Title	Author
65	Experiences in Developing Water Users' Associations.	J. Layton and Sociology Team
66	The Irrigation Advisory Service: A Proposed Organization for Improving On-Farm Irrigation Management in Egypt.	J. Layton and Sociology Team
67	Sociological Evaluation of the On-Farm Irrigation Practices Introduced in Kafr El-Sheikh.	J. Layton, A. El-Attar, H. Hussein, S. Kamal and A. El-Masry
68	Sociological Work at the Project Field Sites.	Sociology Field Staff
69	The Interaction Between EWUP and the Farmers: A Case Study of <i>Mesqa</i> 10, Beni Magdul.	Y. Allam & J. Layton
70	Factors Affecting the Ability of Farmers to Effectively Irrigate: A Case Study of the Manshiya <i>Mesqa</i> , Kafr El-Sheikh	M. Naguib & J. Layton
71	Impact of Turnout Size and Condition on Water Management on Farms.	E. Hanson, M. El-Kady & K. Litwiller
72	Day/Night Irrigation Timing Preferences of On-Sen Farmers.	A.F. Metawie & K. Litwiller

## II. BACKSTOPPING

### Planning and Coordinating Committee

The Planning and Coordinating Committee met weekly to plan project activities, review and work on reports and discuss work plans with the TDY's. Committee members worked on the training programs and provided orientation for the Egyptian professionals who are taking non-degree graduate training at Colorado State University. The committee members also backstopped the discipline needs for the Egyptian and American staff in Egypt. Additionally, the committee members helped plan the National and International Conferences on farm water management to be held in Cairo.

The National Conference has been postponed until February 1984. The conference was postponed to allow more time for the completion of the Task group reports and to allow increased participation by non-project members. The Universities, the Ministry of Irrigation, the Ministry of Agriculture and other interested professionals have been invited to attend the conference. Dr. McConnen has been helping with the organization of the National Conference along with the International Conference to be held in Spring 1984.

### Fort Collins Staff

The training, advising, reviewing and publishing activities of the Fort Collins staff continued this quarter.

The Project bought four IBM Personal Computers and related hardware and software this quarter for use in Egypt. These computers will significantly increase the data storage, analysis and design capabilities of the Cairo and field office staff.

A variety of computers were considered before the IBM computers were ordered. An extensive review of the project's needs and an analysis of various software products available was conducted prior to the selection of the IBM computers. Additionally, the usefulness to the project of third party software and hardware for the IBM PC was investigated. Henry Horsey with the help of Bob Vandenberg investigated the different computer products and arranged for their purchase. Mike Moravan, the principal systems analyst at the Colorado State University Computer Center and Dr. Dan Sunada provided advice and reviewed the information on the computers prior to their purchase. Bob Vandenberg installed and tested the equipment and arranged special packaging for the shipment of the computers to Cairo.

The purchase of computers through Colorado State University resulted in a 30% discount off their retail price. This represents a real savings to the project as indirect costs are not charged on equipment purchases.

Dr. Dan Sunada worked with Wadie Fahim on the development of fortran computer models for the Project. Dr. Dave Redgrave rewrote other computer codes so that they would be compatible with the enhanced software available on the recently purchased IBM microcomputers. Drs. Wayne Clyma and Dan Sunada worked with Dr. El Kady on the summary report for Task Group #1. Henry Horsey taught Dr. El-Kady the operating system for the IBM computers and introduced her to some of the software purchased for the computers.

A three week training tour was arranged for 32 members of the IMS Project by Cheryl Stevens, Pam Hobbs and Henry Horsey.

The IMS tour is expected to begin in mid November if contract amendments are finalized. Additionally, day tours of the Northern

Colorado Water Conservancy District, the Big Thompson Project and irrigated agriculture in the area were arranged for the short term participant trainees.

The Fort Collins staff continued to review the project reports and proposed publications. A list of the publications reviewed this last quarter is in the appendix of this report. All reports assigned to the Fort Collins office staff for publication have been published or are awaiting the completion of the final review procedure in Cairo.

### Long term Training

Four trainees began their long term training tour at Colorado State University. A list of the trainees and the courses they are taking this fall semester follow.

<u>NAME</u>	<u>CREDITS</u>	<u>COURSES</u>
<u>Economics</u>		
Ragy Darwish	EA 405	(3) Ag Production Management
	EC 306	(3) Price and Allocation Theory
	EC 342	(3) Economic Analysis of Water Resource Development
	EC 670	(3) Methodology of Economic Research
	EC 792	Cost-Benefit Analysis (Interterm - January)
<u>Engineering</u>		
Tarif A. Zaitoun	CE 614	(audit) Closed Conduits
	AE 505	(3) Irrigation Scheduling
	GS 581	(3) Farming Systems
	CE 300	(4) Fluid Mechanics

Mr. Tarief is working on the IBM-PC in Fortran and Basic. This will provide Mr. Tarief with the necessary background to utilize the IBM computers in Egypt.

Agronomy

Sabah El-Sayed	AG 415	(3)	Crop Response to Environment
	AE 505	(3)	Irrigation Scheduling
	GS 581	(3)	Farming Systems Research
	AG 795	(3)	Independent Study

Sociology

Farouk Abdel Al Omar	S 100	(3)	General Sociology
	AD 590 bv	(3)	Workshop Community Education
	S695v	(2)	Independent Study
	CO 100	(2)	Composition Fundamentals

Short Term Participant Training

Five Egyptian Project personnel began short term training assignments this quarter.

Abdel F. Metawie is attending a four month training program at CSU this fall semester (September 27 - December 31, 1983) and is taking the following courses:

AE 535	Surface Irrigation Systems
AE 537	Surface Irrigation Laboratory
AE 538	Groundwater Hydrology
CE 613	Hydraulics
CE 712	Hydraulic Structure Design

Lotfi Nasr - (September 25 - November 16, 1983) is researching the theoretical and empirical literature on the economic analysis of water response functions.

Sohair Kamal - (June 10 - July 29, 1983) attended a short course "Social, Technical and Economic Aspects of Improved Irrigation" held June 13, - July 29, 1983 at Colorado State University.

Abdel Raouf - (June 10 - July 9, 1983) attended a short course "Farming System Research" held June 13 - July 8, 1983 at Colorado State University.

Safaa Fahmy - (July 4 - September 4, 1983 ) visited the Project staff at Colorado State University and then attended a short course at Utah State University from July 10 - August 20, 1983, titled "Soil and Water Conservation and Management."

#### TDY's - Egyptian

Four Egyptian project personnel began TDY assignments this quarter.

Mona El Kady - (July 20 - August 16, 1983) toured subirrigation experiments in California and worked at CSU with Dr. Wayne Clyma, Dr. Dan Sunada and other Project members on a summary report for Task Group #1, On-farm Water management. While at CSU, she also worked with Henry Horsey on the new IBM microcomputer.

Mohamed Naquib - (September 25 - November 2, 1983) - worked with Drs. Ed Knop and Frank Santopolo on a report evaluating the procedures used by farmers to determine irrigation strategies.

Wadie Fahim - (July 6 - August 23, 1983) worked with Dr. Dan Sunada on the development of fortran computer models for the project.

Hassan Wahby - (July 5 - July 15, 1983) met with the CID board of Trustees, the Project Planning and Coordinating Committee and the Hanson Irrigation Company in Spokane Washington.

#### Other Academic Training

Engineer Amany El Kayal completed her M.S. degree program at Utah State under a Peace Fellowship.

#### Salt River Project Exchange

No Egyptians worked and trained with the Salt River Project this last quarter. Mohamed F. Saoudi and Ahmed Darwish will begin their tour with the Project at the beginning of the next quarter. Ron Grosch and Sid Wilson from SRP arrived in Cairo on September 2 to begin a 5-week tour with the Ministry of Irrigation.

#### Visitors

A group with the IMS project visited Fort Collins to consult with the Planning and Coordinating committee and other project staff members. The Fort Collins office arranged a field tour for this group of irrigated agriculture and irrigation manufacturing companies in the Southwest. The members of the group were Wagih Abbas, Ahmed Al Mazin, Gamil El-Sayid Mahmoud and Farouk Shahim.

A group with the University Linkage on Water Pricing Project visited the project this quarter. This group was at Fort Collins for meetings with Dr. Bob Young. The members of the group were Dr. Abdalla, Dr. Ellassouiti and Dr. Abou Seida.

#### Equipment

The diesel generator for El-Hammami was tested and accepted in August as scheduled. The unit is stored at CSU awaiting shipping approval.

All of the items for the mobile soil lab have been received. Approval for shipment has been received and the equipment will be crated and shipped soon.

Four IBM personal computer systems were received and tested. The four systems were hand-carried to Egypt by Dr. Dave Redgrave and Mike Moravan.

The Brothers wide-page printer and the Hewlett-Packard plotter for the IBM personal computer have been received. They will be tested and sent with the next group of TDY personnel.

All other equipment, parts and supplies have been purchased as requested.

#### TDY's

A list of the TDY's in Egypt this quarter follows.

Dr. John Andrew, Engineer (May 10, 1983 - August 1, 1983) to prepare a technical report on costs under Egyptian conditions of alternative systems of canal lining.

Dr. Frank Santopolo, Sociologist (June 21, 1983 - July 31, 1983) to work with Task Groups 3 and 11 to document EWUP's work with farmers.

Dr. Terry Podmore, Engineer (July 14, 1983 - August 14, 1983) to prepare a report on gravity flow irrigation systems versus lift systems.

Dr. Ed Knop, Sociologist (July 14, 1983 - August 11, 1983) to analyze data and prepare a report concerning the perceptions of MOI officials about the development and maintenance of an irrigation advisory service.

Dr. Jim Warner, Engineer (July 14, 1983 - August 20, 1983) to assist Task Group 5 with groundwater analyses.

Richard McConnen, Economist (July 16, 1983 - August 16, 1983) to develop the economic criteria for a computer program to be used in the

design and evaluation of watercourse improvements. To assist in the writing of the final report of Task Group 2.

Dr. Mel Skold, Engineer ( July 23, 1983 - August 18, 1983) to work with the resident staff to complete the report on farming systems. To prepare a draft of Section III of the report on farm irrigation practices implemented by EWUP.

Mr. Ron Groşch, SRP (September 28, 1983 - November 9, 1983) to increase the professional competence of the participants by an exchange of literature, information and on the job training relative to irrigation problems and practices in Egypt and the USA. Exchange between MOI and SRP.

Mr. Sid Wilson, SRP (September 28, 1983 - November 8, 1983) to increase the professional competence of the participants by an exchange of literature, information and on the job training relative to irrigation problems and practices in Egypt and the USA. Exchange between MOI and SRP.

Dr. Bill Ree, Engineer (September 6, 1983 - January 6, 1984) to assist in developing programs and procedures for use in the design and evaluation of alternatives for water system improvement in Egypt. Assist with the revision of existing computer programs and the development of new programs for use in hydraulic design of systems.

#### Work Plans

Advisory services, short courses and special study programs will be provided to the Egyptians studying at Colorado State University this next quarter.

An Irrigation field trip of the southwest for the IMS project will be provided.

Specialized computer support and general courses in Basic and the IBM Personal Computer operating system will be provided for the project members. These courses will facilitate the integration of the IBM personal computers into the Project.

Planning will continue on the National and International Farm Water Management Conferences.

The Planning and Coordinating Committee will continue to work on recommendations to the MOI on the National Irrigation Improvement Program.

Project reports will continue to be written, reviewed, finalized, printed and distributed.

Dr. McConnen will continue to work on water pricing.

Editorial and technical support will continue to be provided to the Task groups as they complete their final reports.

The Salt River Project Exchange will continue with two Egyptians arriving in Phoenix on the 7th of November and two Americans completing their tour in Egypt this quarter.

### III. PERSONNEL

#### Field Staff

The Nielsens and Braunworths returned to the United States having completed their long-term assignments.

#### Campus

Mel Skold was on sabbatical leave this quarter. Don Lybecker has replaced Mel Skold on the Planning and Coordinating Committee.

The following people will be in Egypt TDY next quarter:

Daniel Hilleman	October 5, 1983 - December 5, 1983
Mike Moravan	October 8, 1983 - November 15, 1983
Dave Redgrave	October 8, 1983 - November 2, 1983
Verne Scott	November 2, 1983 - December 3, 1983
E. V. Richardson	November 25, 1983 - December 14, 1983
Dan Sunada	November 20, 1983 - December 19, 1983
John Andrew	December 10, 1983 - March 10, 1984
Jim Warner	December 27, 1983 - January 30, 1984

APPENDIX

STATUS REPORT  
PAPERS OUT FOR REVIEW  
AT FORT COLLINS  
Prepared by Diane Maybon

TITLE

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CONJUNCTIVE WATER USE - SCOTT. Fort Collins - Review Completed

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FARM SYSTEM ECONOMIC ANALYSIS - LYBECKER. Fort Collins - Review Completed

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PLANNING IRRIGATION IMPROVEMENT: THE IMPACT OF POLICIES AND PRICES ON FARM INCOME AND RESOURCE USE. - HAIDER'S Ph.D. Fort Collins - Review Incomplete

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DWP # 74 - COTTON FIELD TRIALS, SUMMER 1980 - AWAD/EL KAYAL. Fort Collins - Review Completed

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DWP # 97 - STATUS OF ZINC IN THE SOILS OF PROJECT SITES - NAIM. Fort Collins - Review Completed

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DWP # 101 - ON SUGAR BEET YIELD AND SOIL SALINITY CHANGES UNDER LONG AND SHORT FURROW IRRIGATION SYSTEMS - EL FALAKY. Fort Collins - Review Completed

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DWP # 102 - FARM RECORD SUMMARY AND ANALYSIS FOR STUDY BASES AT ABYUHA, MANSURIYA AND ABU RAYA SITES 1981-1982 - EWUP ECONOMICS TEAM. Fort Collins - Review Completed

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DWP # 107 - ROOT PENETRATION EVALUATION OF 1982 WINTER CROPS IN ABU RAYA, KAHR EL SHEIKH GOVERNORATE - MELEHA. Fort Collins - Review Completed

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DWP # 108 - DAY/NIGHT IRRIGATION TIMING PREFERENCE OF OM SEN FARMERS, KAHR EL SHEIKH - METAWIE/LITWILLER. Fort Collins - Review Completed

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DWP # 110 - KAHR EL SHEIKH ON-FARM PILOT PROGRAM 1981-1982 WINTER SEASON - EWUP KAHR EL SHEIKH TEAM. Fort Collins - Review Incomplete

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DWP # 112 - A COMPARISON OF THE COST OF PICKING  
COTTON TO THE VALUE OF COTTON - SOBHI/ELEWA/DARWISH  
Fort Collins - Review completed

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DWP # 115 - EFFECT OF LAND LEVELING ON THE TIME AND  
DEPTH OF IRRIGATION, APPLICATION EFFICIENCY AND WATER  
USE EFFICIENCY OF WHEAT - EL FALAKY. Fort Collins - Review completed

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PTR # 14 - THE CHALLENGE OF IMPLEMENTING AN  
IRRIGATION PROGRAM IN AN EGYPTIAN VILLAGE -  
MAYFIELD/NAGUIB. Fort Collins - Review completed

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PTR # 17 - OPTIMAL DESIGN OF BORDER IRRIGATION  
SYSTEMS - REDDY/CLYMA. Fort Collins - Review completed

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PTR # 38 - PRECISION LAND LEVELING - BY KAFR  
EL SHEIKH TEAM - LEY. Fort Collins - Review completed

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## Egypt Water Use & Management Project

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SOC/031/83

July 30, 1983

TO: Drs. Hassan Wahby & Gene Quenemoen

FROM: Frank A. Santopolo *FAS*

SUBJECT: TDY Report - June 20- July 31, 1983

I left Ft. Collins on 20 June and arrived in Cairo on 21 June. My main task was to analyze the sociological contact records collected by the field sociologists from all three field sites during a period covering the fall of 1981 through the spring of 1983.

At Dr. James Layton's request, the data analyzed will be incorporated into the task force # 3 & # 11 reports. Since these contact records were xeroxed and available in Cairo, there was no reason for me to visit any site. The field sociologists from Mansuriya and Kafr El-Sheikh were available to me in Cairo and gave me some of the assistance I needed to interpret those contact records.

The preliminary analyses indicated that the Minya records needed more refinement. Dr. Layton returned them and when completed they will be sent to me in Ft. Collins. Even if the Minya data had been completed, the accumulation of about two years of contact records was too much of a task to be completed during this time.

The data for Mansuriya and Kafr El-Sheikh were transferred to McBee punch cards. These cards will remain with Dr. Layton for further cross tabulation as needed. The preliminary and basic analyses for these two sites have been presented to Dr. Layton to be incorporated into his reports as they are written.

When we initiated these contact records we were exploring their potential. Both Dr. Layton and I now believe that these records do reflect the on-going social dynamics of daily activities on the Egyptian mesqa. Moreover, based on the experience we have had with these records, the form and processing can be improved to a degree that monthly monitoring can be realized. Such monitoring would then provide the administrators with a current definition of the mesqa situations in a quantifiable context.



Before ending I must compliment the professional development I have observed in the field sociologists since 1978. These men and women have had to face the farmers on the mesqas daily, serving as a conduit linking the project with the farmer and the farmer with the project. Many of the positive results of EWUP can be directly and indirectly traced to the commitment of these young people.

It has been a pleasure indeed to have worked with them. Of course, the development of these people was the responsibility of Dr. Sallam, Knop and Layton; therefore, they too must share the success.

As I understand it, the project ends in June, 1984; thus, it is appropriate for me to express my deep felt appreciation and thanks for the cooperation and hospitality extended me during my several visits. As I returned for each visit I always felt I was coming back to a part of my family. I can give no higher compliment.

FAS/hs

## APPENDIX

Outline of "Improving Egypt's Irrigation System in the Old Lands".

IMPROVING EGYPT'S IRRIGATION SYSTEM IN THE OLD LANDS:  
Findings and Recommendations of the  
Egypt Water Use and Management Project

- I. Introduction
  - A. Egypt's Irrigation System
    - 1. Distribution
    - 2. On-farm
    - 3. Relationship between distribution and on-farm
  - B. EWUP Goals and Purposes
  - C. National Goals
  - D. EWUP Approach
    - 1. Interdisciplinary
    - 2. Location specification for field sites.
- II. Characteristics of the Existing System (On-farm Water Management, Irrigation Practices and Water Distribution)
  - A. Farming System
    - 1. Crop system
    - 2. Soil characteristics
      - a. Root zone
    - 3. Farm size and topography
    - 4. Farm irrigation practices
      - a. Frequency
      - b. Efficiency
      - c. Basin Size
      - d. Stream size
      - e. Drainage

5. Trends in changes
  - a. Farm size
  - B. Cropping system
  - c. Management of farm practices
  - d. Pumps (diesel, gas, electric)

B. Conveyance System

1. Condition of structures
  - a. Turnouts
2. Condition of channels
  - a. Seepage
3. Operation
  - a. Allocation of water
  - b. Rotations
  - c. Water lifting versus gravity
  - d. Uniformity of distribution
4. Water quality
5. Drainage
6. Maintenance

C. Groundwater System

1. Irrigation losses
2. Water quality
3. Natural drainage and permeability
4. Water table level

III. Interventions Tested for Improving the System

A. On-farm water management

1. Field design
  - a. Stream size
  - b. Levelness
  - c. Basin size
  - d. Farm channels

2. Frequency of irrigation and amounts applied
  - a. Irrigation demand and consumptive use
  - b. Scheduling
3. Crop management

## B. Water Distribution

1. Watercourses
  - a. Lining
  - b. Open channel
  - c. Pipeline
  - d. Elevated
2. Gravity and lift
3. Structures
  - a. Turnouts (*mesqa* and farm)
  - b. Headgates
  - c. Regulators
4. Management
  - a. Delivery scheduling
    - (1) Rotation and continuous
    - (2) Level of operation
    - (3) Rotation evaluation
  - b. Maintenance
  - c. MDI/Farmer relations; water users association
5. CADEP

## C. Irrigation Advisory Service

## IV. Recommendations for Improving the System

## V. References