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1979

QUARTERLY REPORT

October 1 to December 31, 1979

EGYPT WATER USE AND MANAGEMENT PROJECT

SUBMITTED BY

R. H. BROOKS, PROJECT TECHNICAL DIRECTOR
CAIRO, EGYPT

E. V. RICHARDSON, PROJECT COORDINATOR
COLORADO STATE UNIVERSITY
FORT COLLINS, COLORADO

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

Consortium for International Development
Executive Offices
P. O. Box A
Logan, Utah 84321

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(Egypt)

PROJECT STATUS

INTRODUCTION

Very significant changes in personnel occured during this quarter. On October 4, 1979, Dr. Mahmoud Abu-Zeid was released from his position as director of the project and director of the Research Institute. He was promoted to Director of the Water Research Center. The center is responsible for coordinating the research of the ten research institutes in the Ministry of Irrigation. To replace Dr. Abu-Zeid, Dr. Hassan Wahby was chosen to assume the leadership of the project as well as the Research Institute. Dr. Wahby comes to the project as a well qualified engineer and manager having most recently served in the technical division of the Ministry of Irrigation. The project is fortunate to have his experience and leadership ability.

In addition, several Egyptian Main Office personnel were transfered to the Water Research Center; Mr. Farouk Shahin, Mr. Zaki Abo El Fotouh and Mr. Saif Issa. Mr. Shahin and Mr. Issa were the main office engineers working with John Wolfe. They have been replaced by Mostafa Saleh from the Ministry of Irrigation.

The assignment for training within the project was the responsibility of Engineer Zaki Abo El Fotouh. He has not been replaced in the project, but the responsibility has been given to the Egyptian sociologist, Dr. Mohamed Sallam.

This quarter brought to a conclusion the services of three American staff who had completed a two year tour of duty; Dr. Alexander Dotzenko, Mr. Harold Golus and Dr. Edward Knop. No replacements were made during the quarter. However, it is expected that all will be replaced during the first quarter of 1980.

Because of these rather significant changes of personnel within the project, both American and Egyptian, a large number of TDY personnel worked on the project during this quarter (see backstopping) and maintained the momentum of project progress. However, considerable time was spent by the resident staff in briefing and orientation of TDY personnel and new Egyptian staff members.

The advisory committee met December 16. The minutes are in the appendix.

MANSOURIA

The proposed El Hammami buried pipeline water delivery system has been delayed until the first or second quarter of 1980. Bids from tenders submitted to contractors during the past quarter were cancelled. Bids received from contractors exceeded one-half million Egyptian Pounds and a more economical water delivery system has been considered. Lower heads and smaller pipe sizes will be used by splitting the area into two farming units each to be served by a separate independent system. Mr. A. R. Robinson on temporary duty contributed significantly to the review of design and plans mentioned in the last quarterly report. A copy

of his review comments and recommendations are appended to this report. The excessive costs together with Mr. Robinson's recommendations led to cancellation of all bids and in the development of a new set of plans and specifications. Baseline data for the area was collected by all disciplines in anticipation of the installation of a new distribution system.

With the assistance of Mr. Kern Stutler on temporary duty, considerable progress was made in establishing procedures for rapid land leveling using the project tractor, scraper and land plane. A need exists for a small size field plane. The Miskin field plane was too large to get into the fields in Mansouria. Yet, the field plane is essential for final smoothing and planning after using the scraper. Three fields were leveled just prior to planting winter crops.

Apparently, even though farmers have agreed on several occasions to improve his farm topography by land leveling he lacks confidence in our recommendations concerning his irrigation practice of water distribution, amount and frequency of irrigation. The Mansouria field team has done a very creditable job in developing farmer confidence in project recommendations and project personnel.

These recommendations have come from agronomists regarding agronomic practices (plant stand density, weed and insect control). As a result of their recommendations, farmers working with the project have greatly increased their yields of vegetable crops. The reputation of the project among farmers in Mansouria, especially along the El Hammami water course, is particularly good and this appears to be an excellent mode of operation in other project areas. By increasing farmer confidence in the project

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regarding agronomy, the project will find farmer acceptance with regard to irrigation practices also.

Squash yield obtained from site 1 in El Hammami indicated a high increase in yield as compared with last year. Similar increases were noted for tomatoe and eggplant. Their increases were a result of improving plant stand density, seedbed preparation, insect control and fertilizer practices. An economic analysis was completed for this farm where EWUP practices were followed.

Changes in the overall work plans for Mansouria necessitated changing some farmer cooperators for farm planning and record keeping. At the present time there are fourteen cooperators, seven at Beni Magdoul and seven at El Hammami. Records were completed for the 1979 agricultural year and farm plans were developed for 1980.

KAFR EL SHEIKH

During this quarter, additional data analysis of on-farm water use was completed to obtain a quantitative view of water management on selected farms. The most significant findings are with resepct to: (1) Pre irrigation before and/or at planting time, (2) losses of water between supply point and the field and (3) highly variable amount and frequency of irrigation among farmers for the same crop.

Irrigations before and/or at planting time far exceed the water deficit in the top one meter of the soil profile. For example, a farmer at the head of Hamad Canal applied a pre irrigation amount of 24 cm on a field to be planted to cotton (March 15, 1978). On March 25, he planted the cotton and applied 15 cm of additonal water for a total 39 cm. The deficit was estimated

.../...

at 14 cm, obviously, 25 cm of water was for over irrigation and contributed to the water table. A total of 100 cm of water was applied to the field during the growing season. Based upon estimates of water actually needed for maximum production, only 83 cm was needed. Therefore, over irrigation occured at pre irrigation not during the growing period. This is somewhat typical of the data collected on selected farms.

With respect to water losses in the supply ditch, where there is considerable distance from the lifting point to the point of application, their losses are usually excessive, eg. 40% of the flow is lost in a 100 meter reach.

Some field trials were initiated this quarter to address the above problems. For example, some fields were leveled and borders were constructed for Border type irrigation. Agreements were reached with the farmer to irrigate with a frequency and amount recommended by EWUP. Agronomic practices were also recommended.

Since considerable land surface is occupied with shallow surface drains, a field trial was initiated wherein these ditches were eliminated to encourage improved water management and increase the land area for production. An observation made by Mr. Kern Stutler on temporary duty is worthy of note here with respect to the discussions given above.

"Current practice of the farmers seems to maintain the water ponded over an area for several days and then cut the dikes and allow the excess water to run into the field drains. This may be related to the germination of the berseem which is broadcast into the water, or it may be for leaching. There seems to be no consensus of opinion as to why its done, but it does result in excess

applied water and a raising of the water table. Since the field drains have been eliminated there is now no way to eliminate the excess applied water from the surface and the amounts applied must be controlled. The level border design had an approximate efficiency of 95%. This will be reduced somewhat by the uneveness of the field surface as a result of the construction tolerances. For a 5 cm net application and a tolerance of ± 1 cm the distribution efficiency may be expected to be about 83%. This combined with the application efficiency of 95% would give about 80% overall efficiency. As mentioned the berseem germination may require some ponding so various application depths should be tried on different border strips to check the effect."

The new area mentioned in the last quarterly report, El Mansheya Canal, was inventoried for its physical characteristics including some discharge measurements. Some preliminary planning has been done on possible alternative schemes for improvement of the delivery system with a first-cut economic analysis being completed by the project economists. In addition, farm planning and record keeping work was shifted to the Mansheya Canal from the Om'Sen Canal in accordance with the team work plan.

Five sites were selected along the El Mansheya Canal where wheat variety and irrigation scheduling based upon plant growth stage will be tried. Other agronomic practices for wheat culture will also be recommended.

An economic analysis was prepared of rice planting methods. This work looks very promising for developing labor saving methods for rice culture. Transplanting labor is becoming a serious constraint to rice production in the Northern Delta as mentioned in the Problem Identification report for Kafr El Sheikh.

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The first draft of the soil fertility survey on phosphorus was completed. This will be used as a model for writing additional reports on the status of other micro-nutrients in Kafr El Sheikh as obtained from the soil fertility survey.

EL MINYA

Early in the quarter several seminars were held in Cairo with the objective of developing working hypothesis for detailed problem identification work. The preliminary problem identification report was used as the basis for making the hypothesis which are appended to this report. Later in the quarter in connection with a four day training seminar on team building and interdisciplinary work, put on by Drs. Benton and Hautaluoma (Temporary Duty), a detailed work plan was developed. This work plan deals with the hypothesis that the farmer in Abeuha "applies water at an improper frequency and with improper amounts". Many of the other related hypothesis are included in the work plan also. A copy of the plan is appended to this report also.

In summary, the detailed problem identification work plan will be carried out primarily on Meska 22 which takes its water from the Abeuha Canal. This meska serves both large and small farmers and the area cultivates the main winter crops, (wheat, beans, sugar cane and Berseem). Irrigation water applied to the fields are being measured, tensiometers were installed, soil samples are being taken before and after irrigation, and observation wells were installed to monitor the water table.

Several economic analysis were completed during the quarter, eg, (1) late versus early planting of cotton, and (2) new corn variety versus Balady including methods of cultivation. Farm

.../...

planning and record keeping was initiated with ten farmers in the Abeuha Command area, four of which are on meska 22.

All the winter cropped soil areas were sampled prior to cultivation as part of the soil fertility survey. Soil samples were collected to represent one fifth of the area. This sampling will be repeated before growing the summer crops. The collected soil samples are now in a stage of grinding after which they will be sent to the soil and water lab for micro and macro nutrient analysis.

In addition, the soil survey and classification work is nearly finished. The chemical analysis of the soil samples as well as the field descriptions will identify the area with respect to soil classes.

All three rounds of farmer interview data have been collected from 32 case study farms.

WATER BUDGET

Kafr El Sheikh

The boundary of the hydrologic unit was again debated. Mr. Ree recommended expanding it to include all land served by the Dakalt canal below the Helal regulator. Dr. Scott and Dr. Sunada both favor keeping it smaller. The best small unit would be the Om'Sen canal area, if the inflow there could be measured accurately, by some procedure yet to be determined.

Flows were calculated for all complete records from flume measurements on the Dakalt, Om'Sen, and Hammad Canals.

Mansouria

Dr. Bill Sayre worked on the water budget during most of the last quarter. He was assisted by the resident engineers and other TDY's.

Auger hole tests were made in Beni Magdoul to estimate hydraulic conductivity. Measured values ranged from 0.02 to 0.05 m/day for the upper clay, and from 0.2 to 0.6 m/day for the underlying sandy material.

Pumping tests were made on a large diameter well in Beni Magdoul, 30 m deep. Results showed a typical drawdown cone in the deep observation wells, but almost no influence in the level of water in the wells only two meters deep. The deep wells also showed a diurnal fluctuation without pumping, a factor which will complicate the calculation of transmissibility.

Observation wells 5 m deep, with lower 1.5 m perforated, showed water levels 10 to 20 cm lower than observation wells only 2 m deep.

El Minya

Designs were made for five measuring flumes, including one in the canal, three in the main drains, and one at the end of meska 25.

Plans were made to construct at least one of these flumes during the winter closure period, and masonry control sections and/or bridges for current meter measurements at the other sites. A metal flume may be installed at the end of meska 25.

MAIN OFFICE ACTIVITIES

With increased field work, the main office staff are required to spend about 1/4 of their time in the field giving guidance and direction to the junior staff in the field teams. The absence of Mr. Golus in Mansouria and Dr. Dotzenko placed an additional load upon the main office agronomists. The balance of their time is spent in writing and in data analysis.

A draft of the problem identification report for Kafr El Sheikh was completed and the approved and the printed report will be available during the next quarter. Similarily a preliminary problem identification report will be published for El Minya. As with the Kafr El Sheikh report, it needs only review and printing.

In collaboration with temporary duty personnel, the following reports were drafted and are awaiting review and approval:

1. "Economic Costs of Water Shortages Along Branch Canals."
2. "Procedures for Calculating the Cost of Lifting Water for Irrigation in Egypt."
3. "Calculation of Machinery Costs for Egyptian Conditions."
4. "Soil Fertility Survey for Kafr El Sheikh - I Phosphorus."

BACKSTOPPING

PLANNING & COORDINATING COMMITTEE

The major activities of the committee this quarter centered on locating replacements for returning field staff. Several candidates for each of the three positions were interviewed. These positions were Senior Agronomist, Agronomist and Agricultural Engineer. Three people were selected and their names submitted to Cairo for approval. These were:

Dr. Richard Tinsley, Sr. Agronomist, Cairo

Mr. William Braunworth, Agronomist and Technical Team Leader Mansouria

Mr. Thomas Ley, Agricultural Engineer and Technical Team Leader Kafr El Sheikh

A search for Ed Knop's replacement was started and several candidates considered but none were selected this quarter.

Work continued on the water management alternatives study, water budget studies, development of a data management program, selection of equipment, backstopping each of the disciplines in the field, the soil fertility study and the training program.

TDY's

Dr. Douglas Benton, Professor of Management, (November 28 - December 15, 1979); to conduct management workshop for project personnel.

Dr. Richard Cuenca, Professor of Ag Engineering, (December 12, 1979 - January 11, 1980), to help in the development of a new canal system in Kafr El Sheikh.

Dr. Jacob Hautaluoma, Professor of Psychology, (November 28 - December 15, 1979); to conduct management workshop for project personnel.

Mr. Tom Ley, Research Associate Ag & Chem Engineering, (October 20 - November 19, 1979); to assist project personnel in on-farm management studies and a general orientation to the project.

Dr. Leroy Luft, Professor of Ag Economists, (September 18 - October 22, 1979), to evaluate the role of livestock on twenty-six case study farms to determine the socio-economic conditions required to induce farmers to shift from animal power to mechanical power for lifting water and for tillage operations.

Dr. Richard McConnen, Professor of Economics, (October 29 - December 14, 1979); to help develop systematic data system.

Dr. Ronald Miner, Professor of Ag Engineering, (November 18 - 24, 1979); to review the project and in particular duties and work of Dr. Brooks and Wolfe.

Dr. David Redgrave, Professor of Agronomy, (October 13 - November 15, 1979); to assist field work and planning in each study location, initial planning for Spring 1980 training program.

Dr. William Ree, Professor of Civil Engineering, (October 1 - November 14, 1979); to assist field work and planning in each study location.

Dr. E. V. Richardson, Professor of Civil Engineering, (October 24 - November 17, 1979); to check on EWUP project activities and progress.

Mr. A. R. Robinson, Civil Engineering, (October 15 - November 14, 1979); to help design of improved irrigation water delivery system.

Dr. Bill Sayre, Professor of Civil Engineering, (September 6 - December 16, 1979); take part in water budget studies in on-farm water management project.

Dr. Verne Scott, Professor of Civil Engineering, (November 15 December 15, 1979); to work on water budget study.

Dr. Mel Skold; Professor of Economics, (October 13 - November 12, 1979); to work on project reports with American and Egyptian project personnel.

Dr. Parviz Soltanpour, Professor of Agronomy, (November 3 - December 20, 1979); to work in soil water quality laboratories.

Dr. Kern Stutler, Professor of Ag Engineering, (October 2 - November 11, 1979); to work on land leveling.

TRAINING

Revisions of the training manual in light of experience in last summer's short course and in preparation of the move of the training to Egypt we continued this quarter.

The work plan, logistics and personnel to conduct the training, in Egypt were established (See Appendix). Because there were no Egyptian trainers in the course the past two summers a large contingent of American trainers must be used in Egypt this summer. The number of Americans will be decreased significantly on the 2nd training session in Egypt

if qualified Egyptians are identified who take part in the course this summer.

Procedures were established for graduate training in CID universities of project Egyptian personnel.

A general outline of a training program for the Ministry of Irrigation was given to Drs. Abu-Zeid and Wahby.

Dr. A. Wahed was on the campus working with Drs. Heil, Cipra and Soltanpour on the use of landsate data in soil surveys. His program is in the appendix.

VIDEO TAPE TRAINING

Dr. Dave B. McWhorter's T.V. Course AE538 Groundwater Hydrology was started this quarter in Cairo with 12 Egyptian engineers taking it.

ON-THE-JOB TRAINING

A continuing activity of the project.

EQUIPMENT

Request for equipment purchase from Cairo were continuously being processed.

COMMUNICATION

The Embassy installed a telex and the installation of a telex at the Engineering Research Center has greatly improved communications.

WORK PLANS JANUARY 1 TO JUNE 30, 1980

JANUARY 1 to MARCH 31, 1980

A. CAIRO

Mansouria

1. The adaptive research program in search for solutions to problems identified will continue in Mansouria.

2. Completion of the design of the underground pipe delivery system for the El Hammami branch canal and the elevated ditch at El Hammami and Beni Magdoul.

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

4. Research on different methods of water application such as long furrows and border strips will continue.

5. The water budget data gathering and analysis will continue to receive considerable emphasis. Drs. Sunada, Ruff and Mr. Ree will return to Egypt during the quarter to work on it. It is expected that a draft report will be prepared by the end of September.

6. Economic analysis of farm data will continue. The report "Economic Costs of Water Shortages Along Branch Canals," will be finalized.

7. Mr. Bill Braunworth, Mr. Golus' replacement is expected to arrive in March.

Kafr El Sheikh

1. The problem identification report will be printed during this quarter as a project paper.

2. Nancy Adams' replacement is expected to arrive in March.

3. The adaptive research program in search for solutions to the problems of poor water management and crop production will continue.

4. Economic data collection and analysis will continue.

5. Evaluation of the data on the elimination of surface field drains will be continued.

6. Work on the feasibility studies of going to a demand type water delivery system will be conducted.

El Minya

1. Problem identification work will continue. The working hypothesis and work plans for this phase are in the appendix.

2. A draft of the preliminary problem identification study will be completed.

3. The flumes for measuring water flow into and out of the area (water budget) will be installed.

4. The groundwater observation holes will be installed.

5. Economic, social, irrigation practices and agronomic data will continue to be collected.

Main Office

The discipline leaders will be working at field sites helping them in their activities. Drs. Dotzenko, Wolfe and Knop will be gone at this time and their replacements will not arrive until March. It is planned that Dr. A. R. Robinson will come early February to serve for Dr. Wolfe. He will stay 3 months. Dr. Wolfe is expected to return in April. Dr. Dotzenko will return TDY in February and stay until Dr. Tinsley,his replacement comes. Dr. Knop will return in March TDY to serve as Senior Sociologist until April.

Four Egyptians will be sent to the states for six months participant training. They will take academic courses and work with Fort Collins staff in analysis of data as part of their training. These trainees are:

Farouk Abdel Al - Economics
Tarek Tewfik - Ag Engineering
Abdel Fatah Metawie - Ag Engineering
Mohamed Naguib - Sociology

B. FORT COLLINS

Training

The revisions of the manual will be completed. Dr. Redgrave will go to Cairo to work with Dr. Sallam in organizing the on-farm water management short course that will be put on. The tentative schedule for the short course is in the appendix.

Four students will be on campus from the project taking academic courses and working on a report that analyses project data.

Backstopping

Dr. Richard Tinsley, Mr. William Braunworth and Mr. Thomas Ley and their wives will be provided project orientation, Washington orientation and Arabic language training. Dr. Jim Layton will also take part in campus orientation and Arabic language training in case he is approved as Senior Sociologist for the project.

Recruitment is going on for Drs. Wolfe and Brooks replacement and to obtain a Engineer for water budget studies.

The training equipment and personal effects of the overseas staff will be shipped.

Water Budget

TDY personnel will continue to work with their Egyptian counterparts on this.

Soil Survey and Soil Fertility

Dr. Dotzenko will complete some reports on the soils work.

Data Management

Dr. Loftis will go to Cairo TDY to help the field in this activity.

C. PERSONNEL

Field Team

Dr. Richard Tinsley and family will arrive in Cairo in March to replace Dr. Dotzenko.

Mr. William Braunworth will arrive in Cairo in March to replace Mr. Harold Golus.

Mr. Thomas Ley will arrive in March to replace Ms. Nancy Adams.

Drs. Dotzenko and Knop will return to Cairo to carry on as Senior Agronomist and Sociologist until their replacements arrive.

Mr. A. R. Robinson will go to Cairo in February to act for Dr. Wolfe until he returns.

TDY's (Tentative)

Dr. Max Lowdermilk, Sociology
Dr. Dave Redgrave, Agronomy
Dr. Willard(Bill) Schmehl, Agronomy
Dr. E. V. Richardson, Civil and Irrigation Engineering
Dr. Dan Sunada, Civil and Irrigation Engineering
Mr. A. R. Robinson, Agricultural Engineering
Dr. Verne Scott, Civil and Irrigation Engineering
Dr. Alex Dotzenko, Agronomy
Dr. Jim Loftis, Agricultural Engineering
Dr. Jim Ruff, Civl and Irrigation Engineering
Dr. Jim Layton, Sociology
Dr. Ed Knop, Sociology
Mrs. Dorothy Rein, Staff Assistant
Mr. Norm Illsley, Engineer

APRIL 1 TO JUNE 30, 1980

A. CAIRO

Main Office

The on-farm water management short course will be started.

The senior staff will continue to spend at least 1/4 their time at the three project sites. They will be actively engaged in analysis of data and completion of reports. A most inmportant activity will be starting preliminary design of pilot projects for improved water management.

Screening will start to identify 4 perons to go to the States this fall to take academic training.

Mansouria

Search for solution with emphasis in farm organization, improved irrigation and delivery system operations.

The plans and specifications for the underground pipeline in El Hammami area will be completed.

Kafr El Sheikh

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

El Minya

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

B. FORT COLLINS

Training

The short course will be put on in Egypt. Planning will start on the field trip for the trainees who are taking the short course. The exchange of Engineers with the Salt River Project Arizona will be started.

Backstopping

Major activities will be location of replacement personnel, data management, review of reports, and working on water management alternative studies.

C. PERSONNEL

Field Team

Dr. Wolfe will return to the project. Dr. Knop's replacement will be at post. A water budget engineer will be at post.

TDY's

Dr. Willard (Bill) Schmehl, Agronomy
Dr. Mel Skold, Economics
Dr. Dave Redgrave, Agronomy
Dr. Dan Sunada, Civil and Irrigation Engineering
Mr. A. R. Robinson, Agricultural Engineering
Dr. Jim Layton, Sociology
Mr. Niel Biggs, Civil Engineering
Dr. Yack Moseley, Engineering
Dr. Al Madsen, Economics
Dr. Larry Nelson, Agronomy
Mohamed Haider, Economics
Gale Dunn, Agronomy
Max Lowdermilk, Sociology

APPENDIX

1. Advisory Committee Minutes of December 16, 1979 meeting.
2. A. R. Robinson's report on El Hammami and Beni Magdoul irrigation system design.
3. El Minya - Working Hypothesis
4. El Minya - Work Plan I & II
5. Mr. A. Wahed's Work Schedule
6. Tentative Training Schedule for Short Course presentation in Egypt.

EWUP

Egypt Water Use & Management Project

22 El-Galaa St. Bulak, Cairo ARE
Phone 973474, 972674, Cable EWUP, EGYPT

Colorado State University Ft. Collins, Co. 80523
Phone (303) 491 8655, Cable ENGRCSU

ADVISORY COMMITTEE MEETING

MEETING MINUTES

DATE: December 16, 1979

TIME: Sunday, 10:30 a.m.

ATTENDEES:

Dr. Ibrahim El Assyouty
Dr. Aly Serry
Dr. Wafaii Abdel-Salam
Dr. Mahmoud Abu-Zeid
Dr. Hassan Wahby
Dr. Everett Richardson
Mr. Niel Dimick (USAID)
Dr. Royal Brooks

TOPICS OF THE AGENDA

1. Training
2. Water Budget
3. Soil Survey and Soil Fertility Survey
4. Water Management (Field Trials, Problem Identification)
5. Recommendations

Training

Dr. Richardson started by giving a brief explanation of the training procedures and he sketched the procedures on the board. He stated that the Water Management Short Course will be transferred to Egypt this summer. He explained that Practical Advance Training will be given to people working on the Project who need it. Dr. Richardson suggested that we have people from the Universities in Egypt to work on TDY basis to help out in the Water Management Short Course. He also explained

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that courses have been and will be sent from the States to be given on the video machine. He also infromed that there are two kinds of training for graduate students in the States. These are through sections 13 and 14 on the General Provisions. He also informed that if projects needed crash coursed on certain subjects they can be arranged by 3 or 4 Professors at CSU and they can work out a program for them.

Dr. Wahby suggested that the students who go to the States for training should be going on matters related to the Project in order to receive worldwide imputs to the problems that have direct impact on the national economy.

Dr. Abu-Zeid suggested that we should have more people from the Ministry of Irrigation attending the training courses.

Dr. Abu-Zeid said there is the need in the Ministry of people to receive training on field or farm irrigation design.

Dr. Assyouty suggested that Water Management Short Course instructors from the Universities in Egypt should be sent to the States for additional on-farm training and to learn the way in which teaching is taking place in the States.

Dr. Richardson said this is a good suggestion.

The Advisory Committee is looking forward to the course coming to Egypt to enable the students to work on problems which are faced in Egypt rather than the problems faced in the States.

Mr. Dimick explained that training under section 13 and 14 is for Project staff.

Dr. Abu-Zeid suggested that we should not take into consideration the students' grades or age as long as they have proper experience and proved high capabilities.

Dr. Wahby pointed out that we should not encourage to send people over age to Post Graduate Studies because opportunities in future won't be too prosperous for them.

Dr. Assyouty suggested to announce about the Project and its training abroad in order to encourge people to come to work for the Project.

Dr. Wahby answered by explaining that the Project is not in favor in doing so as people might come only for the training opportunities and then they leave the Project.

Dr. Richardson and the group discussed the need for the participants in the Short Course taking a field trip to the U.S. to observe American irrigation practice.

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The proposal of Salt River Project to exchange Engineers with the MI was discussed. To get the proposal implemented requires an invitation to four Senior Salt River Project people coming to Cairo to establish the program. These people would be President Abel, his irrigation Director, his Power Director and Training Director. Salt River Project is willing to pay the salaries of their people involved in the exchange but cannot pay travel and per diem. The MI needs to invite President Abel and his staff to visit Cairo. And somebody needs to pay their travel and per diem.

Arrangement would have to be made on the payment of per diem and travel of the American Party with AID and MI.

Water Budget

Dr. Richardson then moved to the topic of the Water Budget and stated that the Water Budget is behind in its Project activities. He then gave a brief explanation of Dr. Bill Sayre's TDY visit and what he achieved while he was in Egypt. He also said that they would like to have an additional American working for the Project in this matter. He also said that there should be an American added to the Project to replace the Chief of Party when he is taken from the field team. That is, there needs to be a Chief of Party in addition of the five Americans presently in Cairo. This would add two Americans to the team. A Water Budget specialist and an Agr. Engineer. The subject was discussed at length.

Mr. Dimick suggested that we could possibly have an American Administrative Officer to take some of the load of Directors. He stated that the Directors should spend a lot more time working on technical problems of the Project rather than in Administration. He also said that we could take on a Junior Engineer for the Water Budget instead of a Senior Engineer and take on an Administrative Assistant.

Dr. Wahby stated that the Project is in need of a Senior Officer for the Water Budget. He also stated that we need to define a work plan to be set out that covers the surface and groundwater potentials. He said that the Senior Officer should work with the Senior Staff in the Main Office and 3 engineers or more in the 3 field projects.

Dr. Richardson stated that more responsibility should be given to the Egyptian Administrative Assistant.

Dr. Brooks explained that Project staff will not go to the Egyptian Administrative Assistant for orders.

.../...

Mr. Dimick stated that we have to be sure that the TDY who comes to Egypt full-time should be the correct person for the position. He also said that we should have chosen one of the TDYs who have come to Egypt to fill in Dotzenko's place.

Dr. Richardson said that he knows of some people for the position of the Water Budget Engineer but he also said that it is very hard to find Agricultural Engineers.

Mr. Dimick felt that we should have the TDYs come for a period of 2 or 3 months.

Dr. Richardson stated that it was difficult to get University staff for longer than one month.

Dr. Brooks suggested that we should now think about the replacement of the person who is going to be Chief of Party. He added that we need an Engineer for the Water Budget as soon as possible.

Dr. Abu-Zeid suggested that it would be a great advantage for the Project to take one of the present Project members to be appointed to the Technical Project Director (TPD) position. He then referred to the CID review team report on page 4 which was distributed at the beginning of the meeting. He said that there is a great need for improvement of the measuring process.

It was recommended that Dr. Quenemoen be appointed Associate Technical Project Director and be asked if he would replace Dr. Brooks as TPD when he leaves.

Dr. Wahby suggested that the Water Budget should be worked out by a team consisting of an American working with 2 Senior Engineers at Cairo and they can work with the Junior Engineers in the field offices.

Dr. Abu-Zeid suggested that we should have one person from the Project and one from the Irrigation District as Junior Engineer working on Water Budget in the field.

Mr. Dimick said that he would prefer a Senior Engineer out in the field or a very good Junior Engineer. Water isn't measured in Cairo and the Senior Team Members (Egyptian and American) should spend more time in the field.

The conclusion for the Water Budget topic was:

1. An American Senior Engineer for the Water Budget is needed.
2. An Agricultural Engineer is also needed as TDY for long term.

.../...

3. Need a Ministry of Irrigation Engineer and Project Engineer for the Water Budget Team in each field location.
4. Ask Quenemoen to take over Associate Technical Project Director position.
5. Give the Chief Accountant, Saad Mansour additional responsibilities.
6. An Administrative Officer should be appointed to each Field Office.

Soil Survey and Soil Fertility Survey

Dr. Brooks informed that a report of Soil Fertility for Mansouria has been written and one for Kafr El Sheikh is being written in the States by Dotzenko. Analysis has been done for Mansouria and Kafr El Sheikh and a draft report is being prepared for Mansouria. He said that it is coming along quite well.

Dr. Serry explained that the soil testing is done before planting in order to find out how much fertilizer the soil needs.

Dr. Richardson said that in the States they pay for these tests in order to know what kind of fertilizer to use and this saves money for the farmer.

Dr. Serry informed that the Government of Egypt has allowed for private sector to import fertilizers. He also informed that they give the economical rate of fertilizer but then the farmer over irrigates and the fertilizer is washed away and he then returns for more fertilizer.

It was stated that USAID would probably finance the establishment of a Soil Fertility testing service if it was requested by the Government of Egypt.

Water Management (Field Trials, Problem Identification)

Dr. Brooks informed that we are pleased with what is being done in El Minya so far with Problem Identification work. He informed that we are progressing well with the Search for Solution phase in Kafr El Sheikh and Mansouria. He suggested that we need more of these trials to convince the farmers of our work.

Dr. Serry asked that if the drains were eliminated, would this casue a problem?

Dr. Brooks informed that it is very doubtful if these drains are effective in salinity control. He informed that they occupy 15 to 20% of the land.

.../...

Dr. Abu-Zeid suggested that we carry on 2 other trials for comparison in areas far from the effect of main drains. He said that with water management we should know which field drainage system we need.

Dr. Wahby pointed out that we should redesign the underground irrigation distribution system in El Hammami and then the design will be sent to Dr. Richardson for review and he will order the pumping equipment and valves needed. He also pointed out that the Project should serve as a model for Egypt.

Dr. Brooks said that this redesigning came up from the problem of water shortage. He said that we are considering a closed conduit system for this problem.

Recommendations

1. That the training program as presently organized continue.

2. It was agreed that the Salt River Project should exchange Technical Personnel and Mr. Abel and party be requested to finalize the plans.

3. That graduate training be closely tied to Project needs.

4. That a field trip to the U.S. may be arranged for those who successfully complete the Water Management Short Course.

5. That an American Engineer be added to the field team to provide technical assistance in Water Budget for the next two years and maybe another Ag. Engineer.

6. That additional Egyptian Staff be added to the Water Budget Studies. Two in each sub office and one at the Main Office. If possible the field office staff should come from both Project and district engineers.

7. That Dr. Quenemoen be appointed Associate Project Technical Director and be asked to serve as replacement when Dr. Brooks leaves.

8. That a replacement for Dr. Brooks and Dr. Wolfe as Ag/Irrigation Engineer be found as soon as possible and work TDY on the Project this next year.

Mr. Dimick suggested we have the next meeting when Dr. Richardson returns in January, 1980 and it should be at one of the field sites.

MEETING ADJOURNED: 1:10 p.m.

/sa

A.R. Robinson

November 10, 1979

Report on Irrigation System Design
Mansouria Irrigation System
El Hammami and Beni Magdoul Areas

Introduction

The two proposed irrigation systems were examined in detail during the period of October 17 - November 10 while on duty with the EWUP in Cairo. These systems are particularly important since the underground pipe-risers-alfalfa valves systems and the associated elevated ditch systems will be among the first of these types constructed in Egypt. The delivery of water to the farms without individual farmer water lifting is of particular importance. System water use and conservation, as well as the maintenance and improvement of crop yield will be observed. Since the study areas are near Cairo, the systems will be used, not only for irrigation studies, but also for demonstrations, training and trials of new concepts and equipment. Future use could include development of water measuring devices and introduction of automatic irrigation systems. The primary purpose is to improve the irrigation on existing farms but the systems could also be considered as "field laboratories".

Evaluation of Designs

1. System design - The overall design has been found to be lacking in detail and in some cases, basic features need to be redesigned. Of particular concern is the relatively high pressure system of 2 kg/cm^2 (2 atmospheres) which was deemed necessary in order to deliver the required flows and to maintain high velocities in the lines. Velocities in the range of 1 - 2 m/sec were provided so as to prevent deposition of sand and soil in the pipe systems. The design of the intake structures from the main canals for sediment exclusion and flush valves at the end of each line for discharge into existing drains could generally alleviate this condition without recourse to such high velocities. The lines can be flushed out periodically. One reference 1/ indicates that a minimum cleaning velocity for fine sand and silt of 0.42 m/sec is recommended for pipe drains and this should be applicable to the pipe irrigation system.

1/ Design and Construction of Sub-surface Drains - - -. Amer. Soc. of Agri. Engrs. Specifications. EP 260.3, 1979, p. 447.

.../...

2. Pressure System - The higher pressure system may be subject to pressure surges and water hammer occurence that would result in instaneous pressures much higher than the 2 kg/cm^2 design line pressure. In the design, three pumps discharge into a common manifold which is connected directly to the irrigation pipelines. No provision has been made for air and pressure release at the end of the pipelines. Relief stands should be provided at these points. Kruse and Humphery[2/] state that instantaneous pressure increases of 4 times the operating pressures may occur with the operation of pressure relief valves. Other pump and valve operations may increase this. The Asbestos-cement pipe which is to be used has a maximum pressure rating of 6 kg/cm^2 so this pressure could be exceeded. This would seriously endanger the pipe and appurtenant structures such as risers and valves.

3. Design flows - Additional attention needs to be given to the system design flows in order to be assured of delivering the maximum crop water requirement. For design the following were used:

Maximum water requirement	=	34 m^3/day/feddan
	=	.39 l/sec/feddan
Minimum water requirement	=	10 m^3/day/feddan
	=	.12 l/sec/feddan

There is some indication that the above maximum design requirement may be low for this special system. Consideration should be given to increased maximum water requirement made necessary by such charges as level border systems and to short period rotations of water to supply the maximum crop demand. Dividing each of the two systems into three or four approximately equal areas for water rotation should be considered. A more detailed analysis of farmer water needs and requirements would seem to be in order.

4. Structure design - Design and detailing of each of the structures of the system by experienced irrigation Engineers are needed before the contractor receives the plans and specifications. Particularly important are the pump intake structures from the main and/or branch canals. There must be pump stands so that the pumps discharge into a pump stand reservoir for delivery to the pipelines. All pressure release stands and devices, including those at the end of each of the pipelines need to be located and design drawings prepared. The location of each alfalfa valve and/or gated ditch outlet must be determined before construction so that water is delivered easily to the individual farm irrigation systems. The alfalfa valves should be placed at or 2-4 cm below

2/ Kruse, E.G. and Humpherys, A.S., Chap. 11 - Farm Water Distribution Systems, Unpublished ASAE Monograph on Irrigation, 1979.

the ground surface in order to minimize erosion by water. The projected use of alfalfa valve hydrants with aluminum and gated pipe should be a part of the design. Provisions for water measurement should be provided in the design since precise determination of amount of flow in the various sections is needed. Provisions for the washing of cloths and the watering and care of animals should also be considered.

5. Standards and Specifications - Standards and specifications for materials and equipment should be prepared in detail using standards such as ASTM (American Soc. of Testing and Materials) and for construction such as ASAE (American Soc. of Agricultural Engineers) Standard: ASAE S 261.5, Dec. 1978 "Design and Installation of Non-reinforced Concrete Irrigation Pipe Systems".

6. Construction and quality control - The same Engineers who design and check the irrigation systems should follow carefully the construction and also exercise quality control. They should check carefully the construction of all the structures and supervise or perform the final tests on the system.

Recommendations

1. The designs need to be revised and improved before construction starts.

2. The farmers should be a part of the design planning and should be consulted for advice on use of the system.

3. A highly qualified irrigation system design firm should be engaged to make additional surveys, complete the designs, check and instruct on quality of materials and pipe, oversee the construction and finally "Check out" the system.

4. In order to use the irrigation methods in other parts of Egypt, costs and equipment needs should be carefully analyzed. The use of concrete pipe should be considered and steps made to assure good quality pipe.

5. Standard, slip-form concrete ditches with gated outlet pipes should be used for at least part of the elevated ditches.

6. More attention needs to be given to peak flow and crop water requirements under each parts of the systems. Schemes of delivery such as continuous flow, rotations, and demand need to be carefully tested with existing and projected cropping patterns. The possibility of water storage in the new systems and the needs for higher flow requirements for dead-level systems should be investigated.

7. Water flow measurement provisions should be made at major divisions and some intermediate points in the systems. Measurement at the inlet is very important.

.../...

8. The systems should be designed for incorporation of automation features at some later date. The use of control gates, valves, and checks that are timer controlled may be feasible.

Since the EWUP is an interdisciplinary project, other staff should be involved with the design, construction and operation of the systems:

- Economists with the cost/benefit appraisal of the improved systems to include follow-up studies,
- Agronomists in cropping patterns and crop water needs studies for more refinement of the peak water requirements,
- Sociologists in evaluation of needed changes in social structure and to observe farmer adjustments to the new system.

AR/lg

Working Hypothesis for El Minya

The Egyptian farmer in the Abeuha Village has relatively low yields of many crops because:

I He applies water at an improper frequency and with improper amounts. He does this because:

(a) The distribution of water for the Abeuha Canal is on a rotation basis and the system does not promote optimum use of water,
(1) This is due to a Ministry of Irrigation Policy.

(b) Water is not as readily available to farms located near the end of a canal or meska, perhaps because:
(1) Farms or meskas located near an intake are not consistently prevented from taking more than their share.
(2) Weeds and silt restrict flow to the end of a canal or meska.
(3) Seepage from a meska reduces the flow remaining at the end.

(c) The fields are not properly level so he must apply execssive quantities to make up for locations on the field that are higher than the average.
(1) He doesn't have the proper equipment to make changes in fields.

(d) He is accustomed to applying large quantities or in undating his fields as was usually the case during flooding of the Nile.
(1) He does this because of tradition.

(e) The Ministry of Irrigation requires him to lift the water.

II. Excessive quantities of water flow to the drains from meskas because of insufficient control by the district and farmers.

This causes high water levels in the drains resulting in high water tables in fields near the drain.

The above occurs because:

(a) There are too many weeds in the drains.

.../...

(b) too much silt in the drains from construction of mud dams in the meskas for irrigation.
(1) these drains are poorly maintained because the irrigation district lacks resources.

III The interaction between plants, water, soil, fertility, salinity and sodicity is not well understood and practiced. It has been observed that:

(a) Micro Nutrients are not added to the soil or plant leaves.

(b) Salinity and sodicity appear not be be dealt with in present water management practices, even though it has affected crop yields.

(c) Farmers are supplied and or only use high analysis fertilizers. Gov't does not recognize need to supplement soils with minor elements.

IV Farmers use poor agronomic practices such as:

(a) No weed or insect control due to lack of knowledge.

(b) Poor seed bed preparation which produces poor germination.

(c) Does not plant a sufficient number of seeds to produce proper density of plants.
(1) lack of knowledge
(2) tradition

(d) Does not plant cotton at the proper time of the year.
(1) price of cotton low so he receives greater income by leaving in previous crop (beans)

(e) Interplanting crops that reduce or lower the maximum possible return.

(f) Sugar cane production is low because of
(1) poor soil aeration and poor soil physical properties
(2) no pest control
(3) lack of capital to apply proper agronomic treatments to his fields (see VI below)

.../...

V Some of his land is adjacent to a meska where:

(a) Seepage may have caused a high water table and poor aeration of the soil.

(b) Seepage may have caused excessive leaching.

(c) Weeds may have spread from the bank of the meska.

VI His low farm incomes are not only effected by water use and management but also by:

(1) Government agricultural policies regarding price controls, etc.

(2) Lack of availability of credit to farmers.

(3) Adverse farmer reaction to risk and uncertainty, including uncertainty of government action.

(4) The high cost of lifting water by present methods Why sakias are not a common method of water lifting instead of tambours?

(5) The high cost of producing crops and livestock by present means.

(6) Adverse cropping patterns dictated by present methods for lifting water.

(7) Lack poultry and honey production and other diverse operations.

VII His present farm management practices are strongly effected by

(1) Rural life, traditions and labor conditions

(2) Inadequate extension support

(3) Limited voluntary organization among themselves

مشروع تحسين استخدام مياه الري
قسم اقتصاد الري
EWUP - Economic Discipline

December 20, 1979

WORK PLAN FOR HYPOTHESIS I

EL MINYA

STATEMENT OF HYPOTHESIS: The farmer applies water at an improper frequency and with improper amounts.

APPROACH: Find out first if the farmer does apply too much water at any irrigation (or too little), and whether the timing was too soon, just right, or tool late. If his practices are found to be less than ideal, find out why.

PROCEDURE:

1. Site Selection

   a. Choose five fields for intensive measurement including one with berseem, one with wheat, one with sugar cane and beans, one with sugar cane and onions, and one with broad beans. Each site will contain only one field uniformly cropped, and irrigated all at one time. The sites should preferably each be irrigated by gravity from the meska.

2. Water Measurement

   a. With portable flumes, measure the water applied to each of the five sites at each irrigation. Convert each measurement to cm depth of water applied to the field during the irrigation.

   b. Record the length of time required for the irrigation, and the date and time it began.

   c. Measure runoff from the field, if any.

3. Measurement of soil moisture tension

   a. Following the procedure and layout recommended by Dr. Marsh, install tensiometers in four or five fields including:

      1. Wheat
      2. Berseem
      3. Broad beans
      4. Sugar cane with onions
      5. Sugar cane with broad beans (if enough tensiometers are available)

   b. Read the tensiometers daily until they are known to be operating properly, then three times a week, but making sure that one reading occurs just before each irrigation and another right after an irrigation as soon as the soil is firm enough to walk on. The before and after readings can be made at the time of soil moisture sampling, but the others should be made in the early morning, at about the same time each day.

c. Record the readings and plot them on the charts furnished.

d. Compare the tensiometer readings with recommerded values for the chcser crops. Decide if the irrigation intervals is too large or too small.

e. Install one observation well near each bank cf tensiometers, and read it at the same time as the tensiometers. The well should be 1½ inch plastic pipe, 3 m long, perforated in the bottom 2 m, and installed with 20 cm projecting above the soil surface.

4. Measureme t of soil moisture content.

a. Choose the same four or five fields that have tensiometers.

b. Take soil samples with a soil moisture probe, preferably, or with a king tube. Weigh them for soil moisture content.

c. Sample within the upper 1/3, the middle 1/3, and the lower 1/3 of the field. To avoid excessive traffic near the tensiometer, these locations should not be less than 8 m from the tensiometers. Put down 3 holes at each site. Take samples from the following zones: 0-15 cm, 15-30 cm, 30-60 cm, 60-90 cm. If the field contains furrows, one of the three holes should be in the bottom of a furrow, one on the ridge, and one between.

d. Take the samples just before each irrigation and 2 days after.

e. Obtain bulk density and 15 atmosphere soil moisture tension data for these fields.

f. Calculate the volume (depth) of water stored in the 90 cm zone as a result of each irrigation. Compare this with measurements of water applied and runoff to obtain field application efficiency. Also estimate consumptive use from the soil moisture determinations

g. Calculate the required leaching fraction, and compare the results to see if the water applied exceeds the sum of that stored in the root zone and that required for leaching.

5. Consumptive use

a. With the help of the water requirements section, estimate consumptive use for the four crops by empirical methods.

b. Compare the estimated values with the values obtained by soil moisture sampling.

6. Salinity

a. Obtain a sample of water from each observation well listed above once each month and measure electrical conductivity of the sample.

b. Once each three months, take a second sample from each well and send it to Cairo for chemical analysis.

c. Once each month measure the electrical conductivity of the supply water in the Abeuha Canal.

d. Once each three months send a sample of Abeuha Canal water to Cairo for chemical analysis.

e. Canal salinity measurements will serve the water budget as well but the water budget will also need samples from the drains taken at the same time.

7. Water shares

a. From interviews conducted by the sociologists, try to determine if there is a shortage of water any place in the Abeuha area, which causes irrigations to be applied too late or in insufficient amounts, and if so, is it more prevalent in one part than in another.

b. If the answer to both parts of the question in "7.a". is yes, then:

1. Divide the Abeuha Canal into 3 reaches by choosing 3 measuring sites in addition to those proposed for the water budget.

a. The first could be at the bridge between meskas 11 and 13 if the blocks can be isolated.

b. The second could be at the bridge between meskas 22 and 23 if those blocks can be isolated.

c. The third should be at the tail escape.

2. Make frequent, regular measurements at the first two sites with a current meter.

3. Install a staff gage at each measuring site. A water level recorder may prove desirable later at some sites. Calculate a flow calibration for each site.

4. Plan for a flume to be installed at the tail escape.

5. Determined the area served by each reach of the canal, and the water shares per feddan delivered to each.

8. Soil fertility

a. Take soil samples prior to planting time to assess the status of available nutrients, also to have an idea about the physical and chemical properties of soils in the five chosen fields.

9. Additional observations to be recorded at the appropriate time for each of the five chosen fields.

a. Crop variety.

b. Seedbed preparation.

c. Method of planting.

d. Seeding rate and date of planting.

e. Plant population, especially before harvesting.

f. Weed density within different parts of the field.

g. Fertilization practices. Organic manure, phosphatic and nitrogenous fertilizers (amount, time and way of application).

h. Plant behaviour during the crop season (prevailing symptoms).

i. Cropping pattern.

j. Stage of growth at the time of every irrigation.

k. Insect and disease situation.

l. Yield.

/ls

E. Richardson
Engineering

PROPOSED WORK SCHEDULE

and

ACTIVITIES

for

MR. A. WAHED

during

TDY ASSIGNMENT PERIOD

10-4-79 to 11-14-79

as part of

Egyptian Water Use Management Project

TDY Assignment Collaborators:

R. D. Heil

J. Cipra

T. Augenstein

C. Yonker

October 15, 1979

PROPOSED WORK SCHEDULE FOR M. WAHED

Oct. 3 - Nov. 14, 1979

Monday	Tuesday	Wednesday	Thursday	Friday
		3 Arrival Date	4 J. Cipra Familiarization with procedures	5 J. Cipra
8 J. Cipra ____	9 Generating interpretative map data ____	10	11	12
15 J. Cipra ____	16 Interpreting Landsat for Land Classification ____	17	18	19
22 Cipra and Land Class. Principles & Methodology	23 Application of Heil Land Class. to Project Areas	24 Rocky Mountain Forest and Range Experiment Station	25	26 R. D. Heil Caroline Yonker
29 Caroline Yonker R. D. Heil	30 USGS-NCIC Denver J. Cipra	31 Important Farmlands Conference		
			1 Important Farmlands Conference	2 Land classification R. D. Heil
5 Land classification Heil	6 SCS Denver	7 Land & Soil Class. Heil	8 USBR - - - Denver Land Classification Procedures & Methods	9
12 Heil and Cipra Report writing and review	13	14 Departure date	15	16

ACTIVITIES - GENERAL OUTLINE

1. Familiarization with ERTS imagery analyses techniques
2. Familiarization and application to the Egypt Project Study Areas of methodologies in Land Suitability Classification
3. Observation and familiarization of an operational soil and land inventory and classification program (Rocky Mountain Experiment Station)
4. Familiarization with methods and procedures of the U.S. Bureau of Reclamation irrigation land inventory and suitability classification program
5. Application of ERTS imagery analyses for determining soil and/or land conditions on the Mansouria Project Area
6. Resolution of soil taxonomy problems related to soils found in the Project Study Areas
7. Application of ERTS imagery analyses for developing soil map of the irrigated (Nile Delta) and desert regions of Egypt

GENERAL PROPOSED REPORT OUTLINE

I. Remote Sensing Related Activities

   A. Familiarization with hardware and software used for analyzing ERTS Imagery

   B. Familiarization with interpretation of remotely sensed data

   C. Evaluation of the potential applicability of remote sensing toward objectives of the water management project and soil survey program in Egypt

II. Land Classification Techniques and Methodologies

   A. Familiarization with discriminate and factor analyses procedures for classifying soils and/or land

   B. Familiarization with U.S. Bureau of Reclamation methods and procedures for determining irrigation land suitability

   C. Familiarization with an operational resource inventory and classification process (Two-day work with Rocky Mountain Forest and Range Experiment Station personnel on the multiple resource inventory and classification project.)

   D. Testing of several land classification methods and techniques using Egypt Water Management Project soil data

   E. Interrelationships between remote sensing and land classification objectives

III. Summary and Recommendations

OVERALL INFORMATION ON 1980 EWUP TRAINING PROGRAM

1. PURPOSE OF TRAINING

A. To explain the purposes of the Project and how the activities of the field teams support the Project goals.

B. To show the trainees the benefits of operating as a interdisciplinary team and give them practice in working as such a team.

C. To enhance the individual disciplinary skills by giving practical exercises in both field and office work.

D. To provide the trainees with knowledge about the skills of other disciplines and how each discipline can contribute to the Project goals within a team context.

E. To explain and demonstrate the methods and uses of a systems approach to analyzing irrigated agricultural activities and determining the problems that exist.

F. To provide information and practice in planning, coordinating, and conducting activities. Management, compilation, and interpretation of data. Preparation of useful reports.

G. To provide practice in preliminary analysis of problems as a guide to selecting data that must be gathered, how the data will be used, and selecting appropriate techniques.

.../...

2. TRAINING ACTIVITIES

There are three major subject areas for the training program.

A. Overall information about methods of analysing irrigated agricultural systems within a multidisciplinary team.

This activity will concentrate on problem identification but also serve as the foundation for the search for solution and implementation stages of system analysis.

B. Individual "Hands-On" skills training to give the trainees experience in the detailed field and office activities required to gather quantified data about current activities in irrigated agricultural systems.

This activity will involve the trainees in performing field and laboratory testing and data gathering. Analytical methods and equipment will be stressed along with the methods of recording data, compiling data, and preparing data summaries and reports both for the trainees own use and for the use of other disciplines.

C. Methods of preliminary analysis to guide the selection of data that will be needed and to prepare work goals for both individuals and field teams will be stressed.

This activity will integrate the overall concepts of systems analysis and the "Hands-On" skills training

.../...

into a practical set of activities to achieve the required work goals. Planning, organization, and coordination of both individual and team activities will be stressed. Preparation of periodic work plans, determination of equipment, supplies, and support needs, self assesment of capabilities and in-service training needs, need for senior staff support, review of accomplishments and problems, and preparation of periodic activity reports will all be part of this section.

3. OVERALL SCHEDULE OF TRAINING

There are four major components to the training program.

A. Introduction and orientation.
B. Specific training activities. (Kafr El Sheikh)
C. Application of knowledge and review. (Work Sites)
D. Tour of U.S. irrigation activities, support facilities, and research stations.

SCHEDULE:

May 10	Redgrave arrive Cairo for final preparation activities.
May 17	Training staff and support staff arrive Kafr El Sheikh. Final preparation activities and staff orientation.
May 21	Trainees arrive at Kafr El Sheikh.
May 22	Trainee orientation.
May 23	(Day off)
May 24	Begin training.

.../...

May 24 — May 29	Week 1
May 31 — June 5	Week 2
June 7 — June 12	Week 3
June 14 — June 19	Week 4
June 21 — June 26	Week 5
June 28 — July 3	Week 6

July 3	End of training at Kafr El Sheikh.
July 5-25	Trainees at own work site to begin application of training received.
July 26 - Aug. 4	Review of trainee's activities at work site by 1-2 trainers and EWUP Training Officer. Evaluation of training by trainees.
Aug. 15 - Sept. 5	Tour of irrigation activities, facilities, and research stations in South Western United States. (Preliminary plans given in Memo to Directors and Senior Staff).

4. EXAMPLE OF TRAINING ACTIVITIES AND TRAINING METHODS

The training sessions will fall into three categories.

A. Preliminary training to prepare the trainee for a particular activity.

B. Field and laboratory exercises to assist the trainee in performing the task required.

C. Individual assistance as required during the course of the activity.

At the beginning of the program, the trainees will be assigned specific tasks to perform. In support, lectures and demonstrations will be provided along with individual assistance. Equipment and supplies will be furnished as needed to conduct the activities.

As the training progresses, the trainees will be required to assume a more dominant and responsible role with the trainers changing from teachers to advisors who will respond to the requests of the trainees for specific assistance.

INITIAL PHASE — EXAMPLE

TASK:

Prepare a dimensional and basic topographical map of a meska and the fields that are irrigated from it.

A. Preliminary Training — Lectures

1. Techniques of field survey.
   i. Distance - Angles - Elevations.
   ii. Use of equipment.
   iii. Organization of field notes.
2. Reduction of field notes.
3. Map preparation.
4. Uses of maps.
5. Types of maps.

B. Practical Training — Field (Hands-On)

1. Use of survey equipment.

.../...

2. Practice in measurements and readings.

3. Conduct sample survey and compare accuracy of data.

4. Keep field data books, record data correctly.

5. Reduction of data and preparation of sample map.

C. Practical Exercise — Individual Assistance

1. Help and guidance during field activities.

2. Checking of accuracy in readings and data recording.

3. Assistance with data reduction and map preparation.

FINAL PHASE — Example

TASK:

Trainees determine that a water budget should be conducted for a meska during an irrigation turn.

A. Preliminary Training.

Trainees ask for a lecture about water budgets, crop water needs, water flow measurement, and installation and reading of small flumes.

(Class activities and material prepared and presented as requested).

.../...

B. Field Exercise.

Trainees request flumes, shovels, data books and transportation. Schedule of activities prepared and responsibilities assigned.

C. Individual Assistance.

Trainees request assistance in installation of flumes and that trainer check installation and fully explain and demonstrate how to take readings.

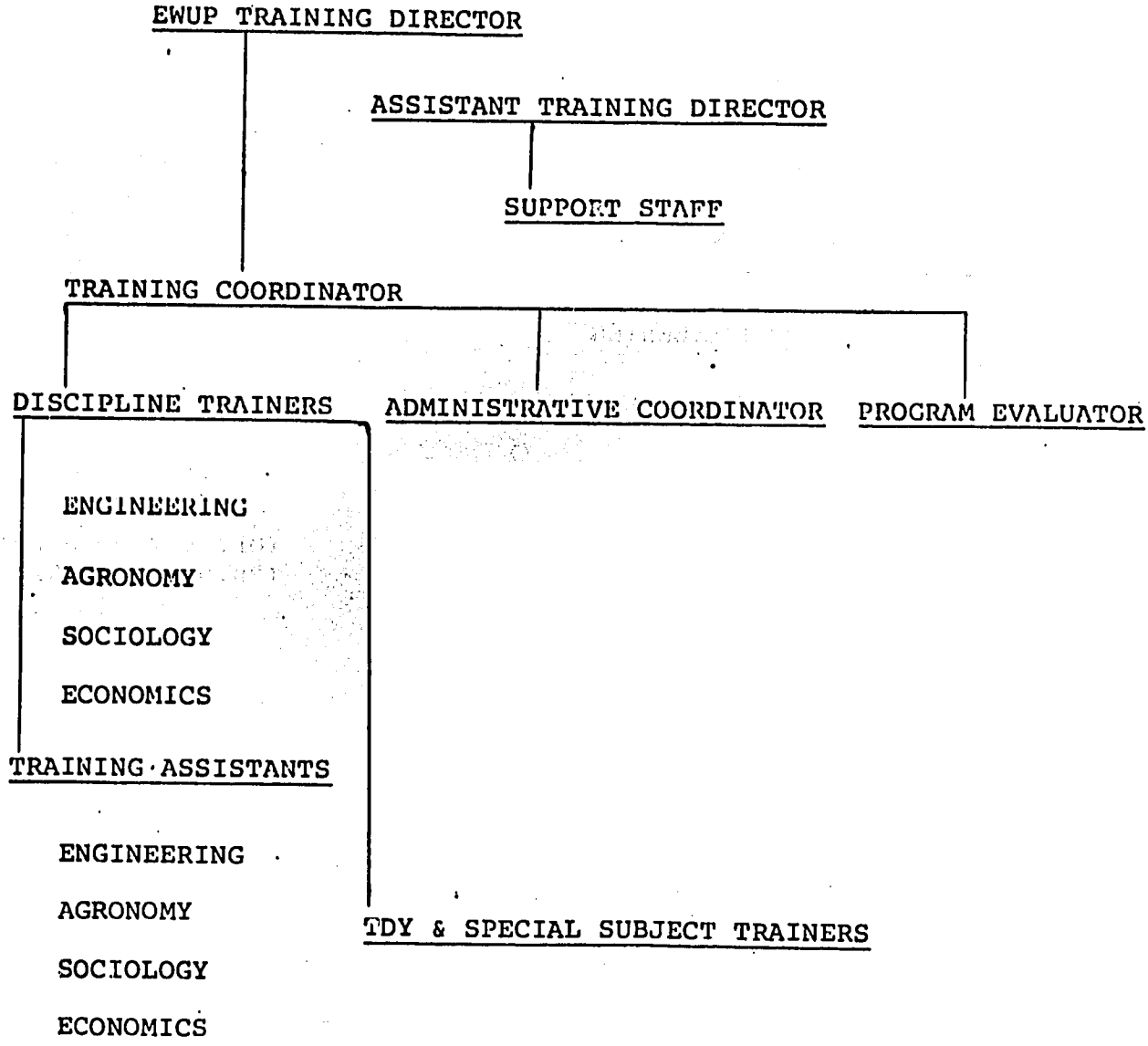
During data compilation, trainees ask for additional assistance in reducing data and interpreting results.

Note how the training program progresses from a formal training activity to a structure that approximates the actual work conditions. Trainers go from a initial teaching role to a role that is similar to the senior staff. Trainees begin as students, but progress toward working as a field team with planning responsibilities both as individuals and as a team. The trainees set goals and request equipment, facilities, and support.

.../...

5. TRAINING PROGRAM STAFF

A.. STRUCTURE



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B. STAFF

POSITION	
EWUP TRAINING DIRECTOR	Dr. M.S. Sallam
ASSISTANT TRAINING DIRECTOR	Eng. Salah El Din
TRAINING COORDINATOR	Dr. David J. Redgrave
DISCIPLINE TRAINERS	
ENGINEERING	Dr. Yack Mosely
ECONOMICS	Dr. Al Madsen
SOCIOLOGY	Dr. Jim Layton
AGRONOMY	(Dr. Larry Nelson) (Ph.D. June 80)
ASSISTANT DISCIPLINE TRAINERS	
ENGINEERING	(Open)
ECONOMICS	Mohamed Haider
SOCIOLOGY	(Open)
AGRONOMY	Gale Dunn
ADMINISTRATIVE COORDINATOR	

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TRAINING PROGRAM EVALUATOR	Dr. Max Lowdermilk (TDY)

TDY TRAINERS (TENTATIVE)

SPECIAL SUBJECT	(Open)
ENGINEERING	Dr. Dan Sunada Tom Ley
ECONOMICS	Dr. Gene Quenemoen
AGRONOMY	Dr. Keleg Dr. Zanati
SOCIOLOGY	Dr. Max Lowdermilk Dr. M.S. Sallam

TRAINING SUPPORT STAFF

SECRETARY	(Open)
DRIVER	(Open)
TECHNICIANS	(Open)

C. STAFF SUMMARY

Full time training staf

EWUP	4
C.S.U.	8

TDY Training Staff

EWUP	5 + special subject lecturers.
C.S.U.	2

Training Support Staff

EWUP	(?)

.../...

D. DUTIES

EWUP TRAINING DIRECTOR

a. Overall supervision of Training Activities.

b. Coordination with Ministry Officials.

c. Coordination of Trainee Section.

d. Trainee Evaluation. Pre & Post Training.

e. Arrange training facilities, equipment, and supplies.

ASSISTANT TRAINING DIRECTO

a. Assistance to Training Director.

b. Supervision of Support Staff.

TRAINING COORDINATOR

a. Organization and operation of Training Program.

b. Staff selection, orientation, and direction.

c. Trainee evaluation.

.../...

d. Design of Training Activities.

e. Supervision of Training Staff.

DISCIPLINE TRAINERS

a. Teaching of speciality in both classroom and field exercise.

   i. Disciplinary

   ii. Interdisciplinary

b. Assistance to trainees during field activities.

c. Preparation of training materials.

d. Review of trainee reports, suggestions for improvement.

e. Supervision of assistant trainers.

f. Review of work plans.

ASSISTANT DISCIPLINE TRAINERS

a. Assistant to Discipline Trainers.
b. Direct assistance to trainee team during planning activities.
c. Field support of trainee teams.
d. Team leader during initial training period.
e. Other duties as assigned by Discipline Trainers.

ADMINISTRATIVE COORDINATOR

a. Administer training office facilities, equipment, and supplies.

b. Compilation of training materials, transfer of materials to Egypt, preparation of subsidiary materials at training site.

c. Task assignment to support staff through Assistant Training Director.

d. Coordinate use of facilities, housing, equipment vehicles, and support staff.

e. Travel arrangements and housing for TDY staff.

f. Personnel records. Time and effort reports.

g. Arrangements for special tours within Egypt.

TRAINING PROGRAM EVALUATOR

a. Pre & Post Training assessment of trainees.

b. Evaluation of training staff and suggestions for improvement.

c. Evaluation of training methods and specific activities.

d. Assistance with adaptation of training course to Egyptian conditions.

e. Overall evaluation of training program and need for changes or improvements.

f. Orientation of TDY Trainers.

TDY TRAINERS AND SPECIAL LECTURERS

a. Provide detailed support to discipline trainers in special areas as requested.

b. Present lectures to training teams and/or discipline groups.

c. Support and assist trainees in field activities.

d. Provide general information to trainees that will improve their overall understanding of Egyptian Agriculture.

.../...

c. Conduct special tours as needed.

6. SUPPORT AND SUPPLIES NEEDED

During Sallam's TDY to CSU, a major activity will be to finalize the detailed activities of the Training Program. This will be done in cooperation with the discipline trainers and a training schedule will be prepared.

From this schedule, and detailed list of activities, a list of training materials and equipment needed will be prepared.

To the maximum possible, supplies will be obtained in Egypt so that the trainees will be more familiar with the material and will be able to obtain similar items during their work. Some equipment may be borrowed from the EWUP main office and others obtained in the United States.

At this time it is not possible to present a detailed listing, but a review of available equipment will be conducted as will a thorough review of the facilities available at Kafr El Sheikh so as to know what is currently available.

7. PRE-TRAINING SCHEDULE

A schedule of pre-training activities will be prepared with the responsibility and the deadline for each indicated. This will provide a detailed listing of the accomplishments that must be completed

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so that the training can take place as scheduled.

This outline will be prepared at CSU while Sallam is on TDY.

Periodic reports from CSU to Cairo and from Cairo to CSU will be instituted so that all can be kept aware of progress and problems. These reports should be on a biweekly basis and may require use of telex communication.

WORK PLAN

On

MESKA SEEPAGE

Minya Project

A. Purpose: This plan is designed to develop data on seepage from meskas which will contribute to the Working Hypothesis I(b) (3) "Reduced Flow," V(a) "High Water Table," and V(b) "Excessive Leaching."

B. Objective: To determine the amount, significance and impact of seepage from meskas. The latter to be determined with the assistance of representatives of the other disciplines (i.e. agronomists, sociologists and economists).

C. Recommended Approach: Select three suitable sites on meska 22 for conducting a seepage loss study using the ponding method, analyze the results, and apply the results to Hypothesis.

D. Procedure:

1. Refer to document "General Procedure for Seepage Loss Measurements by Ponding Method" (Scott, Dec. 79) for additional details.

2. Site Selection Recommendations:

a. Select three (3) sites on meska 22 one near the upper, and middle and lower end of the meska and in close proximity to: (a) observation wells and piezometers to be used in Water Budget study, and (b) the study of farms on the meska.

b. Make a pre-test examination of each site in cooperation with agronomists.

c. Make arrangements with the farmers involved and set a day for the test during an "off" period in cooperation with the sociologists.

3. Preparation:

a. Locate the water table.

b. Construct two (2) observation wells for each test section

.../...

c. Determine the average cross section and normal flow depth of the meska at each site.

d. Install evaporation pan.

e. Develop form for data and results.

f. Make arrangements for test.

4. Test Procedure, Results and Summary Recommendations:

a. Follow details given in "General Procedure ---"

b. Evaluate results and impacts with the assistance of the representatives of the other disciplines of the El Minya Team.

V. H. Scott
Dec. 1979

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