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EGYPTIAN AGRICULTURAL MECHANIZATION PROJECT

CONTRACT NUMBER 263-0031-HCC-01

ACTIVITY REPORT NUMBER 1

15 SEPTEMBER 1980 - 30 JUNE 1981

Submitted by

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LOUIS BERGER INTERNATIONAL, INC.

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EAST ORANGE, NEW JERSEY

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Egyptian Agricultural Mechanization Project
Contract No. 263-0031-HCC-01
ACTIVITY REPORT NO. 1
15 Sept. 1980-30 June 1981

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1.0 PROJECT SUMMARY

This Report covers the progress of the Egyptian Agricultural Mechanizatior Project from the initiation of the technical assistance contract September 15, 1980, through June 30, 1981. This time has been primarily devoted towards establishing an administrative support base and a technical framework upon which the technical assistance work will be based.

Considerable effort was devoted to the development of the Inception Report, as this document conceptualized the Project Paper, established a theoretical technical framework for project development, initiated a milestone implementation schedule, and developed a scope of work for the technical assistance contractors. In addition, the Inception Report specifically targeted the initial areas of Project impact in the following governorates: Beheira, Gharbia, part of Sharqia (from Qalubia to Zagazig), Qalubia, and Minya.

An implementation strategy has been developed: the random selection of five villages in each governorate where project intervention will occur, except in Sharqia where only three villages will be involved; the pairing of random villages with control villages in which the Project will not intervene. Prior to intervention in the randomly selected villages, intervention strategies will be tested at selected pretest sites, and during this period of pretesting, data collection activities will have been carried out in both the random and control villages.

Project emphasis will be placed upon relieving labor constraints, increasing both yields and cropping intensity, the latter through reduced turn around time between crops.

Four subprojects were initiated: 1) Planning/Evaluation; 2) Research and Development; 3) Machinery Management Extension, and 4) Service Center Development. The Soil Improvement, and Training subprojects have yet to be activated. Eight technical assistance positions were activated: 1) Team Leader and Project Technical Director; 2) Planning and Evaluation Advisor and Senior Economist; 3) Evaluation Advisor; 4) Research Administration Director; 5) Agricultural Engineering Extension Director; 6) Farm Management Advisor; 7) Service Center Development Director, and 8) Service Center Repair Advisor. Positions yet to be filled are: machinery development advisor; soil improvement director; irrigation engineering advisor; training director, and local manufacturing advisor. Egyptian counterparts have been appointed except for the Evaluation Advisor and Service Center Repair Advisor.

Briefly, the major efforts of the activated subprojects were:

1. Planning and Evaluation: Formulated planning and evaluation system; established an analytical LP model and identified data requirements; initiated farm management study and village survey.

2. Research and Development: Installed a cooperative tillage experiment at West Nubaria farms; identified phase-one prototype research equipment; established workshop equipment and soils laboratory needs while modernization of the research and testing station near Alexandria continued.

3. Machinery Management Extension: Selected Itay Al Barud village as a pretest site; conducted tillage, planting, and land leveling trials; identified a basic set of demonstration equipment; completed a subproject milestone work plan.

4. Service Center Development: This subproject was not phased in until April-May 1981; its activities were concentrated upon developing an understanding of the agricultural and business environment.

In addition to the technical subprojects, Egyptian advisory committees have been appointed, or are in the process of appointment, to the overall project and each subproject. The intention is to increase the scope of Egyptian involvement in this mechanization program.

The level of effort in the Project can be measured in two ways: man-months and financial expenditures. During the reporting period, the technical assistance input totaled 45.7 man-months as compared to an anticipated 44.5 man-months. Examination of financial expenditures shows three stages of funding: funds in process of commitment; funds committed, and funds expended. The last two categories represent the current financial input. These totaled $7,838,863. Excluding the contingency-inflation factor, this represented 30% of the U.S. Dollar component. Including the contingency-inflation factor, this represented 20% of the U.S. Dollar contribution. The expenditures to date represent the technical assistance contract and vehicle procurement.

These inputs should relate to goal achievement in the form of the workplan schedule. As of this reporting period, the Project is on the schedule established in the Inception Report.

Consideration needs to be given to potential issues affecting project implementation. The intention in this discussion is not to be critical, but merely to draw attention to potential issues that might inhibit project development.

These may be summarized briefly:

1. Initial contacts with farmers and entrepreneurs suggest a hesitancy to assume a debt burden; this may inhibit the development of credit funds.

2. Banks require real estate mortgages to secure equipment loans; this makes it difficult, if not impossible, to reach landless farmers and entrepreneurs, who would do custom work.

The major objectives for the next reporting period fall into two categories: 1) satisfying the administrative requirements so that financial expenditures can proceed as scheduled and 2) initiation of the Soil Improvement and the Training subprojects. This will require meeting the necessary conditions precedence, assignment of the remaining technical assistance positions, and establishment and activation of the remaining advisory committees, as well as the continuation of existing subproject activities.

2.0 PROJECT ACCOMPLISHMENTS

The major efforts centered around the establishment of an administrative base for support of the Project, preparation of the Project Inception Report, and activation of four subprojects: Planning-Evaluation; Research-Development; Machinery Extension; and Service Center Development.

2.1 Overall Project Achievements

1. Completed the initial draft of the Inception Report, reviewed the draft with the Ministry of Agriculture and USAID, and submitted the final draft for printing. The purpose of this document was to bring the Project Paper into specific focus, establish a theoretical framework on which to base implementation of the Project, develop an initial Project workplan, and define the Consultant's scope of work.

2. Established an administrative support base including: organization of project accounts; Cairo office and staff; Alexandria office.

3. Completed procurement of 13 vehicles for counterpart and expatriate field use.

4. Started preliminary work with the Principal Bank for Development and Agricultural Credit (PBDAC) and Development Industrial Bank (DIB) for establishment of the service center development and water-lifting funds.

5. Initiated general procurement plan. This is a condition precendence required before additional commodity funding can be made available to the project.

6. Selected initial governorates for project intervention: Beheira, Gharbia, Qalubia, Sharqia (Qalubia-Zagazig), Minya.

7. Randomly selected study villages within Beheira, Gharbia, Qalubia, and Minya governorates:

a) Beheira: Deseya, Ezab Besentow, El Gurn, El Darawah, and Desnus;

b) Gharbia: Shabshin El Hessa, Kinisit Damsheet, Kurn El Naggar, Kafr Dima, and Qelyb Abiar;

c) Qalubia: El Shamut, Magul, Kafr El Hossafa, Beltan, and El Hessah;

d) Minya: Beni Ibeid, Beni Moussa, El Atiat, Selia El Gharbia, and El Birba El Kubra.

8. Activated the following positions:

a) Team leader/project technical director (Oct. 1980);

b) Planning/financial advisor and senior economist (Sep. 1980);

c) Evaluation advisor (Dec. 1980);

d) Research administration advisor (Nov. 1980);

e) Agricultural engineering extension advisor (Jan. 1981);

f) Farm management advisor (April 1981);

g) Service center development advisor (May 1981);

h) Service center repair advisor (May 1981);

i) Senior mechanization consultant (Jan. 1981).

9. Appointed an Egyptian counterpart staff for each of the technical positions, except for the service center repair advisor.

10. Egyptian advisory committees will be established for the overall project and each subproject. During this reporting period, the overall Project Advisory Committee and the Research and Development Advisory Committee were established by decree.

2.2 Planning and Evaluation Subproject

1. Formulated the planning and evaluation system, procedural methodology, and data requirements to implement the Project methodology.

2. Approved (by USAID) the farm management study work order for implementation in Beheira, Gharbia, and Qalubia governorates.

3. Randomly selected fourteen farmers in each of the five project villages within each of the three above Project governorates, a total of 180 farmers.

4. Organized the survey field staff, i.e., the field supervisors and enumerators.

5. Phased in the village study program in Minya: budget approved by the Ministry of Agriculture; field staff selected and staff training completed for the first phase; questionnaire for first assignment is operational.

6. Selection of field staff in Beheira for village study program.

7. Completed collection of governmentdata on farm mechanization in Minya, Beheira, and Qalubia.

8. Started the basic collecting and cataloging of available agronomic and research data relative to mechanization.

9. Received USAID approval for conducting an in-house, area-wide mechanization survey.

10. Determined computer system requirements, and got USAID approval for procurement.

11. Provided 50 hours of technical training in modern techniques of planning for the Undersecretary for Engineering Affairs/ Planning Evaluation Unit, including instruction with 2.0 kilobyte minicomputer for evaluative and analytical purposes.

2.3 Research and Development Subproject

1. Installed a tillage research experiment for cotton/berseem rotation at West Nubaria farm; five replications were made with both a moldboard plow and chisel plow at 10, 20, and 30 cm depth; a disk harrow at 10 cm was the control.

2. Identified Phase I prototype research equipment and wrote specifications (initiation of procurement awaiting USAID approval of general procurement plan).

3. Wrote specifications of workshop equipment. Procurement can proceed after USAID approval of procurement plan.

4. Modernization of the Research/Testing Station near Alexandria is nearing completion.

5. Formed Research Advisory Committee by decree; first meeting held in May after research priorities were established.

6. Finalized milestone workplan for Research and Development subproject (see Annex A.2, p. 11).

7. Identified equipment for soils laboratory (mechanical analysis only), and wrote specifications.

2.4 Machinery Managsment Extension Subproject

1. Selected Itay El Barud village as a pretest site for project intervention trials.

2. Conducted chisel plow and land leveling trials at Itay El Barud.

3. Completed in this pretest area a machinery training session and several planting trials for cotton and soybeans.

4. Identified a basic set of demonstration equipment for procurement; specifications written.

5. Completed subproject milestone workplan.

6. Preparing a preliminary draft extension plan in cooperation with extension service.

7. Visited farmers, machinery dealers, and training institutions throughout the area to determine mechanization needs and training capabilities.

2.5 Service Center Development Subproject

As this subproject was not underway until May, the activities were directed to understanding the agricultural and business environments as a basis for development of a workplan.

2.6 Soil Improvement and Training Subprojects

These subprojects have not been activated, although some initial progress has been made with the Soil Improvement subproject, in the establishment of a research priority and preliminary organizational meetings with the Soil Amelioration Authority.

3.0 TECHNICAL AND FINANCIAL LEVEL OF EFFORT

3.1 Level of Effort: Technical Staff

During this reporting period the following positions were activated:

1. Team Leader/Project Technical Director (4 Oct. 1980)
2. Planning/Financial Advisor (15 Sept. 1980)
3. Research Administration Technical Director (3 Nov. 1980)
4. Evaluation Advisor (7 Dec. 1980)
5. Agricultural Engineering Extension Director (12 Jan. 1981)
6. Farm Management Advisor (14 April 1981)
7. Service Center Development Director (9 April 1981)
8. Service Center Repair Advisor (6 May 1981)

The technical staff's level of effort is on schedule compared to the anticipated level of effort in the Inception Report and is summarized in Table 3.1 below.

TABLE 3.1. Level of Effort: Technical Staff, 15 Sept. 1980 to 30 June 1981, in Man-Months

Position	Activation Date	Actual Effort	Anticipated Effort
1. Team Leader	4/10/80	8.9	9.0
2. Planning/Financial Advisor	15/9/80	9.5	9.5
3. Research Director	3/11/80	7.9	8.0
4. Evaluation Advisor	7/12/80	6.8	7.0
5. Extension Director	12/1/81	5.6	5.0
6. Farm Mgmt Advisor	14/4/81	2.5	2.0
7. Service Center Dir.	9/4/81	2.7	2.0
8. Equipment Repair Advisor	6/5/81	1.8	2.0
Total Man-Months		45.7	44.5

3.2 Level of Effort: Financial Expenditure

The financial level of effort is reviewed in Table 3.2 and three stages of funding are considered: 1) funds in process of being committed; 2) funds committed or approved but not actually expended, and 3) funds that have been expended.

TABLE 3.2 Financial Level of Effort: U.S.$ Component and Louis Berger Int. Inc. Local Currency, through 30 June 1981

Funded Items	Funding Stage: In Progress	Committed	Expended
1. Technical Assistance Contract:			
a. U.S.$ Component		5,344,526	394,317
b. Local Currency Component*		1,834,356	74,164**
2. Commodities:			
a. Vehicles		70,000	121,500
b. Computers (misc.)	20,000		
c. Research Prototype Equipment	122,000		
Total:	144,000	7,248,882	589,981

Total Committed and Expended Funds: 7,838,863

*Local currency component converted to U.S.$ at $100=LE 70

**Through 30 April 1981

The committed and expended funds (U.S.$ 7,838,863) represents 30% of the U.S. Dollar component ($26,195,000), excluding the inflation contingency factor of $13,805,000. Including this factor, committed and expended funds represent nearly 20% of the overall U.S. Dollar contribution of 40 Million Dollars. As Table 3.2 shows, the expenditures to date represent technical assistance and vehicle support for the technical staff.

The major expenditure categories remaining are: the soil improvement equipment costs of 3.9 million, training costs of 2 million, and credit funds of nearly 11 million. This assumes approval of a machinery introductory fund of 2 million and the addition of one million to the applied research fund. The required conditions precedent and fund management procedures are in various stages of preparation. Attention is currently being given first, to the service center development fund and second, to the applied research fund.

3.3 Workplan Implementation Schedule

Workplan implementation for the major activities of the activated subprojects is on schedule for this reporting period:

1. Planning and Evaluation subproject: Minya village survey organized; farm management survey staffed and on target.

2. Research and Development: Facility remodeling is on schedule; guidelines for applied research fund developed; cooperative research at West Nubaria farms started; specifications for workshop equipment developed.

3. Machinery Management Extension: Pretest village selected; specifications for initial demonstration equipment written; chisel plow and landplane trials are in progress.

This subproject is falling behind in: 1) identification of extension personnel for training (the problem has been for the Extension Service to identify these people); and 2) initial development of a pilot training program for tractors and implements, which should have begun in June.

4. Service Center Development: Service Center workplan initiated.

4.0 IMPLEMENTATION ISSUES

This section will review the overall project implementation sequence and potential issues that might inhibit project implementation.

4.1 Project Implementation Sequence

During this reporting period the project has moved from the general to the specific: five initial governorates have been identified and 23 villages randomly selected for project intervention. This does not mean that the life of the project need be solely confined to these areas, but only that they will be the initial intervention points for all of the subprojects. This approach is summarized in Figure 4.1. Two major activities are occurring simultaneously: 1) developing a data base in the random and control villages, and 2) initiating project intervention in the pretest area before intervening in the random villages. Omitted from this village level intervention is the soil improvement subproject as this is a specialized activity to be concentrated in Upper Egypt.

4.2 Potential Implementation Issues

The purpose of this section is to draw attention to issues that could inhibit project implementation. The intention is not to be critical but to anticipate problem areas so that remedial action can be considered if these difficulties do indeed arise.

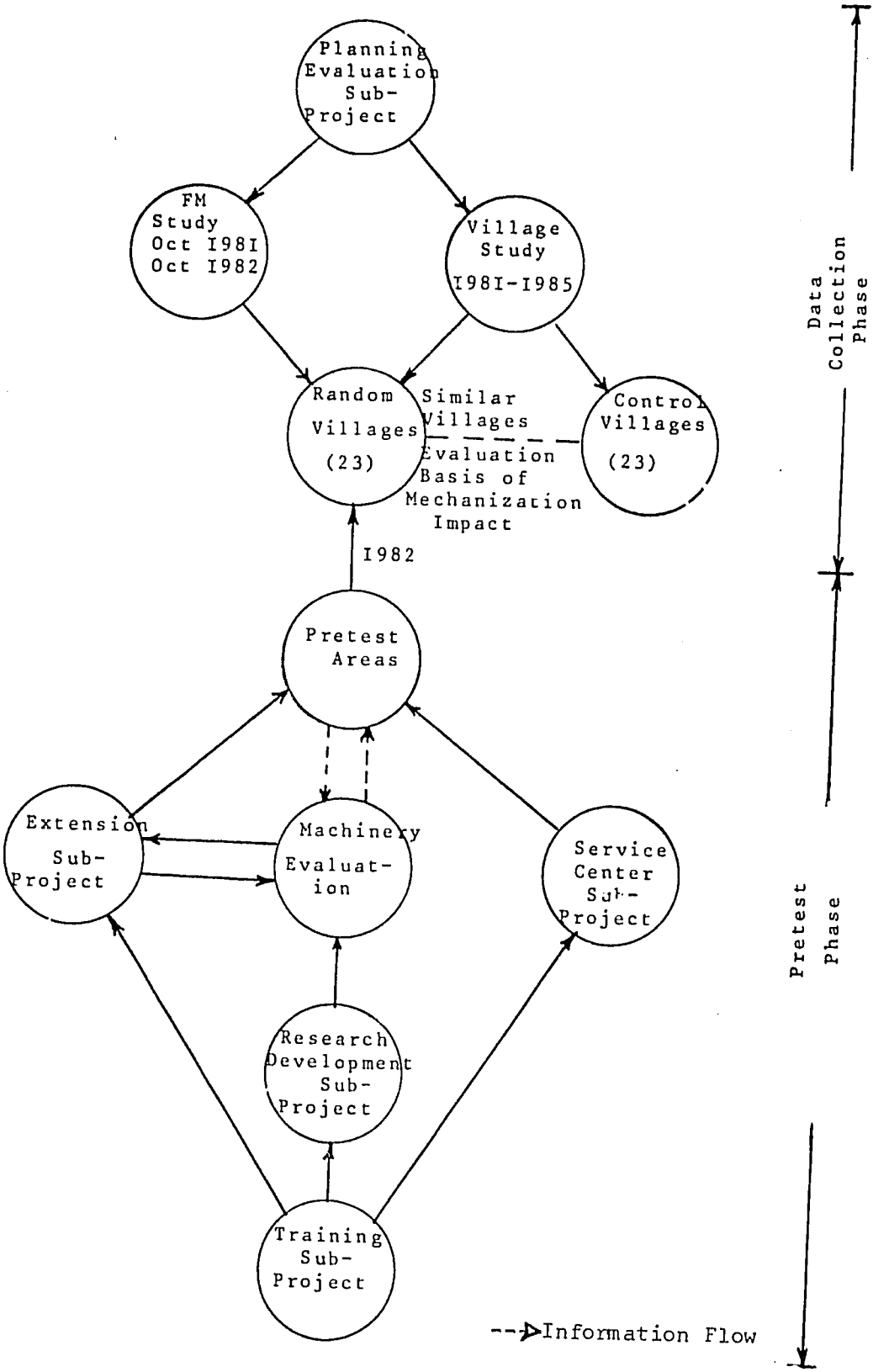

FIGURE 4.I Project implementation sequence at the village (farm) level

1. A sizeable expenditure of project funds, approximately 9 million dollars, is associated with repayable loan funds. This assumes a willingness to assume indebtedness on the part of farmers and entrepreneurs. Initial investigations in the Service Center subproject indicate a lack of willingness to assume a debt burden and this may be a potential problem, rather than the lack of money or credit sources.

2. Conditions precedence for the additional release of monies for training requires a comprehensive training plan, but the Training subproject is not scheduled for activation until August 1981. This will cause a delay in activating the Service Center Development Fund, with its training component, and the in-country training part of the Machinery Extension subproject.

Remedial Action: It is suggested that USAID permit satisfaction of the training conditions precedence on a subproject by subproject basis.

3. Area service center development: There is a definite lack of interest in developing area service centers at commercial rates of interest.

Remedial Action: Implement the area concept in market villages and establish smaller centers than initially anticipated in the Project Paper at favorable rates of interest. To start the program, permit the Project to begin construction and operation of a model service center on this smaller scale.

4. Village mechanics hesitate to take on a debt load and will probably need more training than expected to operate the equipment.

Remedial Action: Select a few trainable and responsible village mechanics, provide selected equipment items and install these in their shops, permit operation of the equipment on a trial basis, and study the economic viability of the equipment. This will serve as a pretest for development of a loan program and will start the project at the village level where improved service is needed. Funding would come from the service center development fund as a separate account.

5. Machinery Extension subproject is handicapped for lack of a basic equipment set for demonstration and training, and U.S. procurement will probably take a year, delaying the program.

Remedial Action: In progress with the Undersecretary for Engineering Affairs advancing monies to purchase an initial equipment set.

6. Research and Development subproject: Workshop equipment is needed before the Research and Testing Center can become operative. Depending on U.S. procurement will delay Center activities for nearly a year.

Remedial Action: In progress with the Undersecretary for Engineering Affairs advancing monies to purchase a basic set of shop equipment.

7. Water Lifting Loan Fund: Current banking practices require a mortgage on land to secure equipment loans. This eliminates loans to landless (tenant) farmers and to entrepreneurs who would otherwise lease pumpsets and equipment

Remedial Action: Request the loaning institution to modify this requirement so that the Project's target group can be reached.

5.0 MAJOR OBJECTIVES FOR JULY-SEPTEMBER 1981 REPORTING PERIOD

5.1 Overall Project Objectives

1. Satisfaction of the following conditions precedence:
   a) General commodity procurement plan;
   b) Extension workplan in cooperation with the Extension Service;
   c) Approval of the Service Center Development fund's management procedures;
   d) Operating procedures for Applied Research Fund including research selection criteria, approval process, and monitoring procedure.
2. Activation of Soil Improvement and Training subprojects.
3. Activation of Project advisory committee: Service Center Development Committee, Machinery Extension and Training Committee, and formation of the Soil Improvement Committee.

5.2 Planning/Evaluation Subproject Objectives

1. Startup of area-wide mechanization survey.
2. Village survey: Minya in operation; start up in Beheira; preliminary work finished in Gharbia.
3. Farm Management study: training of enumerators and supervisors and pretesting of forms.
4. HP 85 computer purchase .

5.3 Research/Development Subproject

1. Procurement of phase-one prototype research equipment.

2. Local workshop equipment tendered for bidding.

3. Soil laboratory equipment in progress of procurement.

4. Monitor progress of tillage experiment at West Nubaria farms.

5. Applied research fund ready for operation in succeeding reporting period (Oct.-Dec. 1981).

5.4 Machinery Management Extension Subproject Objectives

1. Relationship with extension service consolidated through:
   a) Agreement with extension service on a machinery extension workplan;
   b) Assignment of extension service personnel for Training;
   c) Establishment of an Extension Training advisory committee.

2. MOA-sponsored demonstration equipment tendered.

3. Establishment of an Introductory Equipment Fund via a Project amendment.

4. Procurement of locally available training aids.

5. Pilot training program for maintenance, adjustment, and machine management in progress.

5.5 Service Center Subproject Objectives

1. Preliminary investigations completed.

2. Service Center Development Fund completed.

3. Training needs identified and included to supplement Service Center Development Fund.

4. Draft workpoan completed.

5. Equipment repair counterpart assigned.

5.6 Soil Improvement Subproject Objectives

1. Egyptian project manager assigned.

2. Preliminary field investigations completed as pertains to:
   a) establishment of drainage criteria;
   b) ground water hydrology;
   c) identification of suitable soil amelioration methods;
   d) appropriate techniques of mechanical manipulation of the soil.

3. Landleveling and land forming activities with respect to SAO activities.

4. Financial and income analyses relative to the above.

5. From the results of the above, identify equipment and tractor requirements.

ANNEX A

ACTIVITY REPORTS

AND

TECHNICAL NOTES

ANNEX A

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A.1 PLANNING AND EVALUATION SUBPROJECT

A.1.1 Planning/Financial Advisor and Project Economist:

Mr. Steven C. Shepley

15 September 1980 - 30 June 1981

This report covers the period from mobilization on 15 September 1980 to 30 June 1981. It is divided into sub-reports on specific activities within the several areas of assigned areas of functional responsibility.

1. Financial Administration

a. Establishment and management of project accounts: A local currency account was set up for receipt and disbursement of Louis Berger International, Inc. project funds. Monthly cash reports were prepared under my guidance and supervision which detailed all project expenditures and cash receipts. These reports were consolidated into monthly invoices and cash need projections for the Client and AID. I also supervised the preparation of Client invoices for foreign currency payments and arranged for AID approvals and subsequent payments.

b. Commodity procurement planning and management: I supervised and coordinated all procurement activities for project vehicles. This entailed specifications preparation, tender advertising, bid analysis, preparation of award recommendation documentation for AID and arranging with AID for payment disbursement to successful bidders. Following payment disbursements, I arranged for customs clearance and delivery of vehicles, vehicle inspection and assignment to project staff. I also participated in the formulation of vehicle operations policies and issued a number of policy memoranda governing vehicle use and responsibilities. To date, 13 vehicles have been procured and assigned to counterpart and expatriate staff for field operational use.

In addition to procurement management under the Louis Berger Contract, I also supervised and coordinated the planning for commodity procurement and use of AID financial local currency support of project operations. Under the terms of the project paper, AID is providing some $27.1 million for local commodity procurement and to cover local operating costs of project activities. These include funds for prototype research equipment, shop and laboratory equipment, pumps and threshers, in addition to other operating funds such as vehicle operations, extension training facilities, etc. I investigated Government of Egypt and USAID fiscal regulations and developed guidelines for formulation of a set of procedures for receiving, disbursing and comptrolling such funds. In conjunction with this effort, I also developed recommendations for

procurement procedures to facilitate procurements from both in-country and external sources. These recommendations have been incorporated into the proposed procurement plan which has been submitted to USAID to meet CP requirements and shall be incorporated into the Agricultural Mechanization special fund procedures now under development.

c. Service center and water lifting credit fund planning: On December 16, 1980, I and the Planning and Evaluation Unit counterpart staff met with Mr. Ahmed Ragai Hassan, Financial Consultant to the Principal Bank for Development and Agricultural Credit. The purpose of this visit was to first determine the scope and magnitude of the credit facilities currently offered by the Bank and then to evaluate the most appropriate mechanism for channeling project credit funds for water lifting equipment through the Bank. According to information received, the Bank currently provides the following facilities:

1) Production loans: for annual inputs of fertilizers, seeds and pesticides on short term (one season) at 4% simple interest; all cultivators are eligible for this facility as there are no collateral requirements.

2) Livestock feeding loans: during the winter clover season, for short term at 6% simple interest; the minimum requirement for this facility is that the borrower be a land tenant.

3) Fodder loans: for six months at 6% interest; land tenancy is mandatory for this facility.

4) Long term investment credits: Ten years or more, for poultry or livestock production facilities and related buildings, at 13% simple interest. Projects qualifying as "food security"* projects are capitalized at 6% simple interest. Land ownership is prerequisite for loan approval. Alternatively, loans of this type can be secured by a guarantee from a landowner. A one year grace period on repayments and principal is available.

5) Land reclamation loans: offered at 13% with variable term; land ownership or a guarantee from a landowner is required.

6) Medium term loans: five years, at 8% simple interest for equipment purchases, horticulture, beekeeping, etc. Ownership of at least 10 feddans or a guarantee is mandatory.

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*"Food security" is defined as projects related to beef and milk, poultry and eggs, fodder plants, mechanical slaughter houses, fish farming, cold storage for meat and poultry, agricultural products transportation facilities and drip irrigation projects.

Credit facilities provided by the Bank are essentially production oriented at subsidized rates of interest and softer terms than those avialable from the private sector. Credit guarantees are based on land tenure and there appeared at the time of the meeting little flexibility in extending facilities to non-tenured organizations and individuals such as contract farmers and other commercial entrepreneurs such as work shoppers who could support mechanization efforts. One encouraging trend appears to be a steady growth of groups of small farmers (usually relatives) who pool their land holdings to secure loans for commonly owned equipment and other productive facilities.

The Bank officials contacted were informed of the Agricultural Mechanization Project credit fund for water lifting devices. At that time, the broad outline of our proposal was presented, including the concept of using proceeds from credit facilities offered to large land owners at commercial rates and terms to finance subsidized interest rates and soft terms for smaller holders and tenants. The Bank officials were requested to consider this in light of statutory and other constraints imposed upon their operations and to work with the Mechanization project team in the development of a joint proposal which would be presented to the Ministry of Agriculture and USAID for approval.

Some of the major constraints which must be addressed in this regard are:

1) Interest rates for government supported activities tend not to reflect supply and demand for capital but are fixed by the Central Bank and usually cannot be varied.

2) Interest rates according to local traditions are applied simply to outstanding principal and there appears to be strong reluctance on the part of officials to use compounding formulae. Such a practice would not be entirely conducive to the capital multiplication and subsidy pass through concepts of our proposal.

3) Restriction of credit facilities to land holders is considered to be the most significant constraint as it would prevent Mechanization Project personnel from targeting credit resources for water lifting on entrepreneurs who rent out pumping equipment and upon tenant farmers who are willing but least able to make the transition from human and animal powered irrigation devices to mechanical methods.

On December 27, 1980, a subsequent meeting concerning the water lifting credit fund was held with Mr. Kamal Nasser, Director General of the PBDAC. At this meeting, I and my Planning and Evaluation Unit counterparts expressed the desire of the Project to channel water lifting credit funds through the Bank as we recognized the Bank's experience and organizational capacity at the village level to

administer and supervice the program. We expressed the decision of the Ministry and senior project management to concentrate the program in selected villages in Beheira, Gharbia, Qalubia, Sharqia, and Minya Governorates. This focus, we explained, was necessitated by the limitation of available funds ($2,000,000) and the fact that available diesel powered centrifugal pumping units of the low lift high discharge variety required for Egyptian farms cost approximately LE 750. At current prices, this amount would allow for the purchase and distribution of some 1,866 units to convert approximately 18,000 feddans from animal and human powered irrigation to mechanical irrigation. As I explained, our intent through the water lifting credit fund is to develop a replicable model to show the effects of soft credit financing on farmers' decisions to mechanize their irrigation operations and that our initial belief was that a small pilot program concentrated in a limited area was probably the most effective means of deriving maximum benefit from the limited resources available. The Bank officials agreed in principle with this view and also agreed with our contention that the PBDAC with its extensive network of village branches and long experience in making loans of this nature to the farming community was probably the best administrative vehicle for channeling the budgeted water lifting credit funds. We then discussed the broad outlines of our proposal concerning the pass through of revenues from loans to wealthier farmers to enhance credit subsidies to smaller farmers and tenants and our belief that land collateral requirements would make it difficult to reach this target audience. The Bank officials stated that most of their credit facilities were targeted on smaller rather than larger land holders and that they would not, for unspecified political and administrative reasons, be able to administer a special loan program for the water lifting credit activity which was operating under different interest rates and terms than those of their existing program. It was pointed out that the Bank is already extending extensive credit to individuals and groups of farmers for mechanical water pump procurements and that it would neither be desirable nor possible to set up a separate program in selected villages for this purpose with different terms and conditions. Concerning the land based collateral requirements, Mr. Nasser stated that the Board of Directors had recently decided to remove this requirement and evaluate each particular loan application on the basis of the borrower's ability to make scheduled apyments from existing and projected net income levels and that the Bank would use this evaluation as the basis for loan approval rather than land tenure. I asked if this meant that entrepreneurs and tenant farmers could now qualify and the response was affirmative. In spite of this apparent decision, there is no evidence from our field work that it has been officially promulgated. To get the program moving, I recommend that the following action be taken in conjunction with the work of the Water Lifting Specialist who is scheduled to mobilize in July, 1981:

1) We need to survey the villages randomly selected for the Farm Management survey and area of project emphasis to determine which farms are irrigating by animal and human powered means.

2) A list of these farmers should be prepared together with pertinent data required by the PBDAC on their loan application forms. This list needs to be reviewed by the respective village banks and a selection made of those farmers who best meet the ability to pay criteria recently enunciated by the PBDAC Board of Directors.

3) Once evaluated, a final list of proposed loan recipients with completed applications should be forwarded through Bank channels to the Central Office in Cairo with an information copy to the Agricultural Mechanization Project office in the Ministry of Agriculture. The final list should include a wide distribution of small farmers meeting the criteria from among the targeted villages as first priority, but could include farmers outside the targeted areas in the event there are not enough applicants from within the targeted areas.

4) I will work with the PBDAC to meet the AID conditions precedent for disbursement of the water lifting funds, which include fund administration and disbursement procedures, criteria for selection of borrowers, and loan terms and conditions.

5) One essential requirement is the establishment of a special account at the Bank for proceed receipts and disbursements. I will work this up with the Bank and this, together with a description of the procedures, recipient criteria and loan terms and conditions should be forwarded to USAID along with copies of the loan applications for approval and disbursement of funds to the special account.

6) It is proposed that the Bank administer this program in the normal manner used for its management of the medium term loan program. Interest would be at 8% with at least a five year payback period. I will try to get the Bank to waive its normal administrative charge of 1% over and above the 8%, since this is a grant and there should be some kind of incentive, however slight, over the regular equipment loan program. Loan repayments would flow back into the special account to be relent first to farmers within the targeted villages, then to other farmers within the selected governorates and later to farmers in other areas.

7) Several years downstream, the Evaluation Advisor would quantify and evaluate the extent of mechanized irrigation in villages where the credit program provided through the Project has been active and compare this situation with that in the villages where no project credit intervention has been made. It is believed that this analysis and comparison will lead to some valid correlations between easy credit facility availability and degree of mechanized water lifting.

8) Conclusions drawn from this analysis should lead us to substantive recommendations for an expanded credit program for future financing by the GOE or other agencies.

During the reporting period, significant progress has also been made in working out the parameters of the Service Center Loan Fund. On 5 May 1981, I and my Planning and Evaluation Unit counterpart met with Mr. George Issa, General Manager of the Development Industrial Bank, to discuss and lay out the general planning framework for the Service Center development credit fund. It was explained that the fund in question amounts to some $5,000,000 and that the Agricultural Mechanization Project was exploring the possibility of channeling these funds through the Development Industrial Bank (DIB). We explained that the intent was to set up a self-regenerating fund for development of farm equipment service centers throughout Egypt. It was stated that the fund would be initially operative in the targeted Governorates of Beheira, Gharbia, Qalubia, Sharqia and Minya. In response to Mr. Issa's question concerning the requirements and procedures of the program, I told him that USAID requires as conditions precedent for disbursement, the establishment of administrative procedures, loan recipient criteria, interest and payback terms and the opening of a special account for deposit and payout of the grant loan proceeds. We inquired about the general credit policies of the Bank. It was explained that the Bank offers commercial credit facilities, usually oriented toward industrial production, at prevailing rates of interest fixed by the Central Bank of Egypt. These are currently running at 12% simple interest and the payback period varies from 1 to 15 years with a maximum grace period of 3 years. Each loan agreement is established on a case by case basis after a detailed analysis of bankability of the loan application. Loans for equipment are financed up to 70 or 80% of the procurement value with the recipient putting up 20-30% down payment. Title to the equipment remains in the hands of the Bank until the loan is amortized. Loans for land and buildings are arranged on a mortgage basis for up to 80% of the assessed asset value. The land must be legally owned by the recipient. The Bank has already financed some workshop improvement projects in Upper Egypt.

On June 25, 1981, I met with the Service Center Technical Director and the Equipment Repair Advisor to discuss the credit facilities of the Bank and to solicit their views concerning possible areas of emphasis and targets for the loan effort. Both advisors have been contacting some of the major dealers in repair facilities to discuss their initial concept of setting up a main service center in Beheira Governorate which would eventually be expanded to include satellite centers at the village level. These discussions have apparently led the two advisors to conclude that there is little promise, at this stage, in the development of regional centers. Most of the present large scale dealers have ample credit facilities at their

disposal and express little interest in what the loan fund of the Project could offer. There may be some opportunities in regional center development which will surface later on, but for the moment the most promising development potential appears to be in the village workshops.

The Service Center advisors have conducted some limited investigations of this potential. In addition, I and the Farm Management Advisor have traveled extensively in the Project areas. We have observed that there are an average of four to five workshops in each village and that these have a limited capability to repair engines which have stopped running and to provide elementary welding services. In general, the shops are poorly equipped, badly laid out, and confined to small spaces within the village market centers. In spite of these obvious deficiencies, however, the shops appear to do a relatively large volume of business as farmers, local taxi drivers and private truckers tend to bring their equipment to these neighborhood shops rather than hauling their disabled machines to more distant centers which may be better supplied with spare parts and shop tools. This phenomenon can perhaps be explained by the costs and time losses associated with long haul when compared with the ease and lower cost of using local repair facilities. I suggested that we should concentrate our efforts, at least in the initial stage, on upgrading the village workshops through a combined credit and technical assistance effort. Such a program would consist of evaluating and selecting shops within the target villages for general upgrading. Selected shop owners would receive improvement loans for purchase of basic tools, for layout upgrading and for training in general mechanics required for preventive maintenance and overhaul work required at the village level. It was noted that the equipment procurement part of the package would be relatively easy to complete through purchases on the local market but that the training component would be more difficult.

On June 25, 1981, I and the Planning and Evaluation Unit counterpart met again with Mr. George Issa of the DIB to advise him of the evolution of our thinking concerning the Service Center loan program. Mr. Issa was highly receptive to the suggestion that the effort concentrate initially on the village workshops. The Bank has completed a number of such projects in Upper Egypt, most of which were reported to be successful. We stressed the need for relaxation of the interest rate requirements of the Bank as we believed that use of commercial rates would preclude all but the largest shop owners from participating. This view was agreed to and it was decided that the most expeditious means of obtaining approval would be for the Ministry of Agriculture to prepare an official correspondence to the Ministry of Economy requesting permission to use a lower rate on the basis that the

project will be targeted on improving village industries, which is consistant with the Government's village development and decentralization policies. In the course of this discussion, it was agreed that an incentive rate of 8% simple interest would be the appropriate rate. This decision was made on the basis of the Bank's previous experience at the village level with small scale business enterprises. In instances where rates lower than 8% were used, recipients tended to regard the loan as essentially free capital and were lax in repayments and in effectivey managing their investments. Mr. Issa also recommended that a penalty be applied against the outstanding balance for any overdue payments to encourage borrowers to pay on time. The Bank currently applies a penalty of the prevailing commercial rate against all overdue payments until they are paid. This suggestion was accepted. Concerning the payback period, it was decided to fix the periods on a case by case basis according to the gross value of the loan and the financial position of the borrower. The Bank has an extensive followup and training program for loan recipients. This consists of technical assistance in business financial management and technical training in equipment operation and maintenance. Through its two branches in Tanta and Alexandria,* loan applicants are thoroughly scrutinized for financial solvency and fiscal responsibility prior to approval of loan applications. The branch offices also provide followup and technical assistance coordination. Technical training is provided by the Engineering and Industrial Design Development Center's Productivity and Vocational Training Department. According to Mr. Issa, the Center is fully capable of providing the mechanical and maintenance training required to support the credit fund program, as they have received extensive grants from organizations such as the World Bank, ILO, and others and are staffed with expatriate personnel in addition to local training experts. It recommended that the Machinery Repair Advisor visit these facilities to give his appraisal of their capability. Concluding the meeting, it was agreed that the DIB would administer the service center credit fund on behalf of and in conjunction with the Ministry of Agriculture and the Agricultural Mechanization Project. The following additional agreements were also reached:

1) The DIB would be entitled to retain one half of the 8% interest collected on loans. This retention would be used to cover the Bank's loan administrative costs, finance the Bank's technical assistance in financial management and periodic monitoring and followup activities. It is expected that there will be some 700 loans at an average value of LE 5,000 made through the auspices of the credit fund.

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*Development Industrial Bank, 67 Horreya Street, Alexandria, and Development Industrial Bank, 1B Sidki Street, Tanta.

2) The remaining half of the interest charges will be used to finance the costs of mechanics and maintenance training.

3) Selected personnel of the Bank branch offices in Tanta and Alexandria will join the two expatriate and counterpart service center advisors as part of a loan screening committee. This committee will survey service centers in the targeted governorates and villages, generate applications from prospective recipients, develop loan recipient selection criteria and forward applications directly to the Bank with copies to the Ministry of Agriculture.

4) Upon receipt of the applications, the Bank's central office in Cairo will make necessary procurements on behalf of the recipients and arrange for delivery of commodities, administer plant improvement contracts, arrange for training, provide financial guidance and conduct periodic inspections and followups.

I and the Planning and Evaluation Unit will prepare a draft agreement to be approved and signed between the DIB and the Ministry of Agriculture and forwarded to the Ministry of Economy for approval of the 8% interest rate proposed. Once received, the Bank will open up a special account and we shall forward the completed agreement to USAID for approval and disbursement of funds. We plan to ask AID to release funds on a revolving basis to be replenished as they are drawn down. Mr. Issa would like to have the first allocation in the account prior to final approval of loan applications so that there is little delay between approval and disbursement of funds. To launch the proposed program expeditiously, it is recommended that the Service Center Advisor and the Machinery Repair Advisor establish contact with the two branch offices cited above, set up their committee and begin the screening process. It will take until mid-December to complete all requisite procedures for setting up the fund. By this time, we should have a substantial number of loan applications ready for approval.

2. Farm Management Survey Planning

During the reporting period, considerable progress has been made in planning for the project's scheduled farm management survey. I have recruited two counterparts for the Farm Management Advisor and prepared the data questionnaires and farm record books to be used in the pre-test phase. We have elected to conduct the survey in five villages, one each in Beheira, Gharbia, Qalubia, Sharqia and Minya Governorates. I, the Farm Management Advisor and three counterpart staff have made extensive visits to Beheira, Gharbia and Qalubia to collect baseline information concerning the names and numbers of districts in each, the district crop distribution patterns, farm size distributions of each district, and general agronomic data such as yields, soil classifications, etc. During

these visits we have also visited farmers and cooperative societies at the village level and have had planning sessions with the Undersecretaries of Agriculture and the respective technical staffs. I have sought and obtained approval from USAID for Louis Berger International, Inc. to conduct the farm management surveys in Beheira, Gharbia, and Qalúbia using our own expatriate staff augmented by counterparts from the Planning and Evaluation Unit. A work order detailing the proposed scope of work and budget for the three governorate surveys has been prepared and submitted to AID for final approval. Altogether, 15 villages have been randomly selected in the three governorates using a computerized random number generation procedure. The selected villages are:

Beheira Governorate

El Mahmoudia Markaz

- Deseya Village
- Ezab Besentow Village

Abu Homos Markaz

- El Gurn Village
- El Darawah Village
- Desnus Village

Gharbia Governorate

Tanta Markaz

- Shabshir El Hessa Village
- Kinisit Damsheet Village

Basyun Markaz

- Kom El Naggar Village

Kafr El Zayyat Markaz

- Kafr Dima Village
- Qelyb Abiar Village

Qalubia Governorate

Benha Markaz

- El Shamut Village
- Magul Village

Tukh Markaz

- Kafr El Hossafa Village
- Beltan Village
- El Hessah Village

Within the above randomly selected villages, enumerators have been already selected together with the governorate-wide supervisors who will provide day to day administration of the effort. Training of supervisors and enumerators is scheduled to begin on August 15, 1981, at the governorate and village sites. Training will consist of instruction in field observation survey methods, farm record keeping and other survey techniques such as the use of bicycle wheel counters for land area measurement and the use of scales for weighing agricultural and home consumption input quantities. The actual survey will begin on October 15, 1981 and continue through the 1981-1982 agricultural year. Continuous supervision and on the job training of supervisory and enumerator staff will be provided by the Planning and Evaluation Unit, the Planning and Financial Advisor and the Farm Management Advisor throughout the entire period of the survey. Each enumerator will be assigned to report on the production, consumption and marketing activities of two farm families within each village, giving 14 farms covered in each village, 70 for each governorate and 210 under the work order.

It is expected that FINTECS Consultants will conduct randomized farm management surveys in Sharqia and Minya Governorates. To date, however, they have not responded to our request of early May, 1981, to finalize these two work orders.

In advance of the FINTECS response, we have already randomly selected the villages in Minya and Sharqia:

Minya Governorate

Abu Qurqas Markaz

- Beni Ibeid Village
- Beni Moussa Village

Matai Markaz

- El Atlat Village
- Seila El Gharbia Village

The list of selected villages in Sharqia will be presented in the next activity report.

There has also been a tentative selection of farms to be surveyed in Beheira, Gharbia and Sharqia Governorates using random number procedures. This list will be finalized once the next year's cropping pattern has been established by these Governorates sometime in July.

4. Organization and Training of the Planning and Evaluation Unit

In October 1980, Mr. Zaki Helmy was assigned as principal economist for the Ministry of Agriculture, Undersecretariat for Engineering Affairs Planning and Evaluation Unit called for by the Project Paper. Since his assignment, I have provided some 50 hours of technical training to Mr. Helmy in modern techniques of agricultural development project planning and evaluation. These techniques included:

- Regression analysis for benefit quantification
- Input cost accounting
- Internal rate of return and crossover discount analysis
- Discounted cash and cost flow analysis
- Linear programming
- Random sampling

The counterpart economist has also been receiving training in the programming and operation of a 2-kilobyte handheld mini computer and provided with software programs for use in all the analytical techniques taught. During the course of the training, practical exercises have been prepared from available data for Mr. Zaki to gain experience in applying the learned techniques to everyday planning and evaluation problems. Training in random survey procedures has also been provided to Mr. Mair Faltas and Mr. Mohammed Ismail, who joined our planning group as Farm Management counterparts in late April 1981. These training programs will continue throughout the duration of the project as counterpart staff are working side by side with expatriate staff assigned to the Planning and Evaluation Unit in the execution of the planning and evaluation activities of the Project.

In addition to training, I have organized the Planning and Evaluation Unit's data collection and filing system. Available agronomic and other data relevant to the Mechanization effort have been collected from the various research organizations and consulting reports and organized into a filing system according to subject headings. As additional data is collected from external and internal sources, it will be added to the manual filing system and ultimately will be computerized for easier retrieval and analysis.

To facilitate the data management and analytical work of the Planning and Evaluation Unit, I have evaluated the computer needs of the Project and selected an HP-85 system complete with peripherals. The analysis of these requirements was prepared and submitted to AID for approval of a nationality waiver for in-country procurement of the system. Once this procurement is completed, the Consultant and manufacturer's agent will provide comprehensive

training in system operations and programming for later project planning and evaluation efforts and to meet future planning requirements of the Ministry of Agriculture after the consultancy services have been completed.

5. Methodology Formulation and Planning and Evaluation System Design

During the period October through December 1980, I developed a systematic methodology for evaluating alternative mechanization technologies using regression analysis, internal rate of return analysis and other techniques. These approaches together with simulation modeling to test the impact of long range mechanization strategies on farm and sector income were incorporated into Section IV, titled "Methodology," which I prepared for the project's inception report.

6. Liaison and Coordination with AID

A considerable amount of time has been spent by me in routine liaison with AID. This has been spent most in obtaining AID clearance and approval of procurement requests, invoices, work orders, budget adjustments, getting checks issued and explaining our methodologies and procedures to various elements of the bureaucracy. Altogether, I estimate that I have spent a total of 2 man-months in this activity.

It is expected that this allocation of time will continue into the foreseeable future as we shall be encountering the most difficult of bureaucratic obstacles during the next six months as we push through implementation of the procurement plan and set up the service center and water lifting loan funds.

Steven C. Shepley
Planning and Financial Advisor
June 28, 1981

A.1 PLANNING AND EVALUATION SUBPROJECT

A.1.2 Evaluation Advisor:

Dr. Peter C. Reiss

December 1980 - 30 June 1981

1. December 1980 Reporting Period

December was a period of personal and professional settling in. The initial part of the month was spent finding a suitable apartment in Cairo. There were also discussions with members of the Project about the Project's present status, the established guidelines, and future directions.

It was useful to meet with AID personnel who were involved with the Project since its inception and to discuss how its objectives were initially defined and to what extent and why they have changed. John Blackton and Richard Frankel in Programs and Mark Winters in Agriculture voiced misgivings about the early aim of a massive introduction of tractors into Egypt. The Project's early design seems to have been strongly influenced by the Ministry of Agriculture. Blackton contends that Egypt now has more tractors than it is able to use and that nearly all of them are of Eastern European design. (The Director of the Principal Credit Bank has said that in his study of imported tractors, of the 26,000 in the country 21,000 come from Rumania.) All appear to agree that the present focus of the Project (rehabilitation, maintenance, training, soil improvement) are likely to have the most beneficialeffect and are the most realistic goals.

During the first few weeks of December and following, I have begun to acquaint myself with the research that is being done on agricultural mechanization in Egypt. I have had two extended conversations with Mme. Doryea who is now doing field work in two Giza villages on the impact of mechanization on the Egyptian family. Certain significant points emerge:

a) The extent of mechanization in the villages appears to be quite limited. One has no tractors while the other has no more than ten.

b) The failure of the government agricultural cooperatives to provide adequate services to farmers and to maintain whatever tractors they have suggests that the emphasis of mechanization should be on the development of private sector capabilities.

c) The use of tractors for transportation rather than for production appears. Although farmers would like to use tractors for tilling and harvesting, tractors are primarily employed in the hauling of crops to market. It is not clear whether this is a result of the government's ban on non-motor vehicles in Cairo streets.

d) The unwillingness of farmers to discuss their property holdings, production levels, or incomes leads one to doubt the efficacy of a reliance on survey data in which the questionnaire is impersonally administered.

Certainly, some extended field work will be required, not only to enable one to place these data in a socioeconomic context but also to provide a check on the reliability of the data.

A meeting was also held with Mr. Ahmed Bahgat, Agricultural Mechanization Consultant to Catholic Relief Services, who has designed and is distributing a thresher/pump combination in the Delta and in Assiut. Now in its third year, the project has met with considerable success. More than 100 threshers are in operation, fifty are waiting to be distributed, and 100 more are to be dispersed during 1981. The thresher has been used largely for wheat and sorghum. Each crop requires some adjustment of the machine. Some points of interest from this interview were:

a) CRS has used the Credit Bank only as a collection agency, not as a lending institution. Purchasers are asked to provide one-quarter of the total cost as the down payment. Each of the three following years, the buyer is expected to give one-quarter more. No interest is demanded, but the Bank asks that 5% be given as a fee. Thus far there have not been any defaults. The owner can recover the total cost of the thresher in a single season.

b) Threshers are sold through personal contact. Usually the person has never owned a machine before. He is given three days of lessons which include on-site demonstrations, lectures, and a film. During the first year he is visited twice a week. These visits become less frequent during the ensuing years. In the first year parts and labor are provided without cost. There is a slow weaning from CRS to total responsibility for the machine. Such close supervision is seen as an essential part of the process.

c) The thresher is a simple machine with a basic, efficient Hatz engine. All repairs can be done in a small welding shop. The project has focused on developing repair capabilities in the areas where the machine is in use. These service centers, which are private repair shops, must be located near the machines so that the threshers can be easily transported. The focus is on developing the private sector.

d) The most significant failure has been in dealing with a government cooperative and a pooled farmer effort. In both cases there is no single person responsible for the machine's maintenance and use. Despite the close supervision offered by CRS, the cooperative thresher is permanently in disrepair. Also, the cooperative has undermined the rental operations of other thresher owners by quoting an hourly price of LE 3, which is half of what might be charged. Although their thresher does not work, the cooperative has led users in the area to demand that the rental rate conform to the cooperative standard. The project has decided not to sell a thresher to a government cooperative or group of farmers again.

Finally, a meeting was held with Linda Oldham and Taha Abu El Dahab of FINTECS Consultants. The following points emerged:

a) They share my reservations about the reliability of survey data. Pre-questionnaires will be written and tested, answers checked and the instrument reworked where gaps and inaccuracies exist. Some in-depth field work in villages will be required to corroborate the survey data. Figures of any kind are notoriously difficult to get.

b) According to FINTECS personnel, my counterpart may demand a salary approaching LE 500. I am surprised by the amount. It will be necessary to talk to Dr. Hosery to discuss how much he is willing to pay and discuss among ourselves how much additional money we may have to provide. Nawal Messiri of the Social Research Center at the American University in Cairo, and Mohammed Abbas, formerly Director of the Agricultural Training Center, may be able to supply names.

2. January 1981 Objectives

a) Locating a counterpart: I now have the names of a number of people who may be useful in my finding an Egyptian with whom to work. These include Dr. Nicholas Hopkins and Dr. Cynthis Nelson in the Department of Anthropology at AUC. Both are working as sociology consultants on projects in Egypt. There are also the two people who were suggested by Linda Oldham of FINTECS. Finally, Dr. Hosseri has suggested that I talk with Dr. Salah El Abd in the Ministry of Land Reclamation. I also expect to discuss the state of land reclamation with him.

b) Agricultural mechanization: I have an appointment to see Diana Detreville at Catholic Relief Services. Diana has been in Egypt for five years working with CRS as an anthropologist and is familiar with the country. CRS also has a mechanization component and Diana may have useful insights. I want to talk about the nature of data-collection in Egypt, the reliability of data, and strategies of getting quantitative information.

I also want to make contact with other people working in mechanization projects and possibly visit the sites. Dr. Hosseri may be helpful in arranging a visit to Sohag or Menufia to see the World Bank project. I have already talked with Mr. Bahgat (CRS) about visiting the Delta and Assiut sites of his thresher project, but unfortunately, the project does not gear up until the spring harvests.

c) Communications with other development projects: I intend to introduce myself to people working on other projects in Egypt. Some have sociological components, and I think it will be worthwhile to know about the projects and their implementation strategies. More specially, we might be able to arrange a trade-off in which they collect data for us and we add a few questions in our surveys which reflect their interests. There is a Michigan State Project on local (non-agricultural) industries in Fayoum and Menufia. Another project is just beginning on integrated social services in Upper Egypt and the Delta, which has a large sociological aspect.

d) Collecting data on the Governorates: The social data is not readily available. I have visited the Central Agency for Public Mobilization and Statistics. Most of what is available is nationa-wide. Still, they have a library which I will visit in search of more detailed information. I have spoken with Dr. Sakr Ahmed Sakr of the National Planning Institute. I have given him a list of the data I would like, and he believes he may be able to provide most of it. I have a meeting with him on the 12th. The migration data may be difficult to retrieve, but he seems to have some contacts. There are also agricultural census reports, the last being 1976, which I intend to locate with Zaki's assistance.

e) FINTENCS and the survey instrument: In a meeting with FINTECS people, Taha Abu El Dahab is already pressing us to draw up a description of our survey requirements. While this is fine, I did tell him that we on the Project need to make a number of decisions about the nature of our Project and our survey needs. (I believe he would like to know particularly in order to judge the cost of the work.) We will have to decide soon how we are going to approach the survey, that is, how many governorates, whether we will select one or a number of villages in each, and how we will select the villages, whether it will be by household or by key informants. We will also need all of the members on the Project who are here to indicate the kinds of data they would like. By the end of next week I hope to give you a description of the survey design and a plan for its implementation. We might like to wait until after the Farm Management Advisor arrives in mid-January and I want to talk about the survey with Carl. I am expecting that the survey will be my responsibility. One essential part of that, as I see it, will be working with the different members of the team to see what data they would like, in order to make sure that the instrument reflects those interests.

f) Trips out of Cairo: I continue to believe that some of the project's best interests can be served by my visiting the projected sites as well as other development efforts. On the way to Alexandria this coming weekend I plan to stop at the Land Reclamation Station in Amiriya and I intend to make such visits a regular part of my schedule. There is an Integrated Social Services project in Menufia and I believe that a visit to the project site can be arranged through Samiha El Keshe at the Social Research Center. I have already mentioned the Sohag and Menufia World Bank projects. Hopefully the latter can be arranged in conjunction with a visit to the Integrated Social Services project. Unfortunately, many of the projects are being carried out in governorates which we have already ruled out. Still, the survey to be designed will be much improved if I begin to visit rural areas and speak to farmers and government representatives informally. I am still hoping to visit the two villages in Giza where Mme Dorreya is working. However, it has been difficult to reach here, and I am a bit concerned that I overstepped myself when I asked her to take me there.

g) Arabic lessons: I have received funding for the classes from DAI in intensive Arabic which begin today, 5th January. Classes meet Sundays, Mondays, Tuesdays and Wednesdays from 3 to 5 p.m. At this point I expect that they will not interfere with other project duties.

3. January 1981 Reporting Period

My activities in January focused on the preparation of the baseline survey which I hope to begin conducting sometime in March. We have, at this point, settled certain basic points about the questionnaire. The most important of these is where the survey and the initial implementation efforts will be conducted. Although the Mechanization Project is described as being nationwide, it was immediately determined that we cannot reasonably begin a project over such a widespread area. Of the 25 governorates of Egypt, nine were chosen as potential locations based on such characteristics as residence patterns, soil types, cropping systems, and access to team members. That number was further reduced to four, three in the Delta (Beheira, Qalubia, Gharbia and possibly the southern part of Sharqia) and one in Upper Egypt, Minya. It is believed that these governorates represent generally the soil range and cropping patterns of Egypt as well as labor problems and migration patterns. In fact, for the sake of the survey, it was simply necessary to choose that number of governorates so that we could be more directed in our data collection activities.

A second important decision was made about the survey, that it be as limited in scope as possible. A plethora of data already exists on land holdings, agricultural production,

prices, wages, and labor in Egypt. A duplication of these data would be a waste of time, even more so since we have little assurance that the data we collect will be any more accurate than what are now available. Beyond accuracy, the major problem is access. It has been an extremely frustrating month trying to find the infomration I know exists somewhere in the government labyrinth. To that end, I have had a number of meetings with government responsibles. These include Dr. Yehia Moheddin, Undersecretary for Agricultural Economics and Statistics; Dr. Affaf Abdelaziz, a statistician in the same division; Ismail Rafaat, Vice President of the Central Agency for Public Mobilization and Statistics (CAPMAS); Ibrahim El Azab, a statistician in CAPMAS; and Dr. Sakr Ahmed Sakr, Institute of National Planning. While data at the national and governorate levels are useful for drawing general trends and distinctions, they are inadequate for the selection of districts and villages within those governorates which we have chosen. The conversations were pleasant, and the individuals seemed interested, but the data have not been forthcoming. At this point, Ibrahim El Azab appears the most likely to provide me with information, at least at the governorate level.

It seems clear now that I shall have to visit each governorate, undersecretariat and credit bank to get detailed information at the lower levels of organization. There appears to be little information at this level in Cairo. I now have letters of introduction from the Ministry of Agriculture to the Undersecretary of Agriculture in each of the governorates as well as letters to the Credit Bank branches. From there, I shall go to the district level and, if need be, to each village in potential survey areas.

While in the short run it may actually take less time to act as though no data do exist and simply ask every question necessary, it would still be a repetition and merely self-serving activity. For the sake of our project and those in others, it would be very useful to delineate some data-retrieval strategy from the national to local level. I have accordingly decided to take one governorate, Qalubia, as a test case. Having already found out much of what I can at the governorate level, I shall visit the Undersecretary of Agriculture and the Cred Bank in Benha, the governorate capital. Of the governorates, Qalubia is the most accessible to Cairo, being less than an hour's drive, and one of the smallest, both geographically and administratively, having only seven districts. It seems reasonable to make it the test case. Next week, once my section of the AID Inception Report is completed and following a meeting with a farmers' group in Alexandria, I plan to make several trips to Qaliubia to locate the available information. I intend to get whatdata there are on the village level. This will likely entail visiting the cooperatives in each district. I shall be making these trips with Mohammed Bahgat who is being assigned to the project by the Ministry. He is clever and was very helpful on a recent trip to the library of the National Planning Institute.

At present, I suspect that similar lines of information gathering will be possible in the remaining governorates.

The preliminary data collecting activities I believe will assist us in choosing those areas of each governorate which generally represent it. However, it would be a fruitless task to try to come up with the perfectly representative unit, no more wise than looking for the "average Egyptian farmer." I think at best we can select villages which are broadly reflective of socioeconomic/agricultural conditions. Extended research in these areas will broaden and complement the survey activities.

The search for and collection of data ought to make the survey a more manageable operation. I have decided to limit the questionnaire to the presence of and responses to agricultural mechanization, with questions about basic personal attributes so as to situate the responses. In general, far too much information is collected by survey researchers. Little of it can be thoroughly analyzed once the arduous and expensive task of processing it is completed. I intend to avoid having the survey effort and the project bogged in a morass of unnecessary details, ones which are never adequately assimilated and utilized.

While conducting the machinery survey we may want to undertake a few other survey efforts, ones which are very narrowly defined, requiring a small sample of respondents. Given the difficulty of securing a farm management specialist for the project, we may want to do some preliminary data collecting on farm incomes and budgets as Mr. Shepley has suggested. It may be possible to integrate certain pertinent questions into the machinerysurvey or have a more detailed questionnaire targeted for a small number of people having different size land holdings. Mr. Shepley has information from the World Bank about 3-feddan farms and would like a broader range of information. This would be possible so long as we make every effort to keep the size of the survey as restricted as possible.

Operationalizing the survey continues to be a problem. We have met with Mohammed El Moghazi of FINTECS who has suggested that we use the National Planning Institute to do the design, questioning, and analysis of the survey. It now seems likely that this will be the degree of FINTECS' involvement in the survey--simply extending the contracting to a lower level. I have not yet received any sample of the Institute's work as requested. In the meantime I have met frequently with people (Dr. Hopkins, Soheir Mehanni) of the Social Research Center at the American University. They are similarly prepared to assist us. While I prefer SRC because of its reputation and experience (having done research on mechanization, new lands, and credit banks), we may be forced to use the Planning Institute because of FINTECS' adamant position. I have suggested dividing the work between them as a possible compromise but it is difficult to know how FINTECS will react. I have been searching

out the names of third party researchers and have found Sarah Loza and Suhair Mohsen who ought to be able to evaluate the performance of each. At the very least, I suggest that we have FINTECS hire Soheir Mehanna and possibly Dr. Hopkins as consultants to help design the questionnaire since they have both studied the social impact of mechanization in the Delta and Assiut. In any case, the work order which we gave FINTECS ought to be clearly defined, and for this initial effort only, even though we have tentatively set aside LE 100,000 for survey research. In this way we shall still be able to have some degree of control over subsequent surveys.

I have met with Mme. Doryea Ziada again and have finally been given copies of her two questionnaires. Mme. Ziada is conducting a study of the social impact of mechanization on two villages in Giza for a doctorat d'etat from the University of Dijon. While it has been useful talking to her about the general situation, I found her questionnaire to be disappointing, mostly asking for demographic information with very general questions about what machines the household head has. She, and others, have often told me how difficult it is to get accurate quantitative data, and while I appreciate and expect this, her questionnaire has made no attempt to get this kind of information, to devise a strategy whereby one can gain such data. Still, I have asked Mme Ziada if she would be interested in talking to the survey team one day in order to give them an idea of the difficulties involved in interviewing farmers. I would like to include her in some small way in the FINTECS budget.

Conversations with researchers and government people have in no way abated my suspicion of survey methods and data. I understand the need for "hard figures" but also realize they cannot be treated as accurate unless they are supported by extended research. Such research is a luxury we likely cannot afford, but I have repeatedly said that it will be necessary for me to live in the project sites for several weeks to months.

I have already visited one proposed location, Itay El Barud in Beheira Governorate. Along with the extension specialist, Ed Constein, I visited an apparently functioning government cooperative for that district. We then visited a number of villages and landowners attached to a local cooperative called Shaykh Ahmed. Eight villages of between 500 and 1000 people comprise the cooperative unit. Much of the land is in small holdings as a result of the agrarian reforms of 1952 and 1969, ranging mostly from one to three feddans. What impressed me most was the extent of private investment and local initiative in agricultural machinery. Many of the smaller landowners have been purchasing diesel pumps and small horsepower tractors for custom work. A house which belongs to the cooperative can be rented by me for a nominal price and would make a suitable lodging. The house adjoins one of the villages.

I propose to spend one to two months in that area once the survey and its analysis have been completed. During that period I expect to return to Cairo on a bi-weekly basis to meet with members of the project team to discuss developments. Itay Al Barud is no more than a two hour drive from Cairo, and also only about 45 minutes from Alexandria where the Research Center is being established. As with certain features of the survey research, I intend to make this period in Beheira a test case with similar case study efforts undertaken in the other three governorates in which we work.

It is our plan that after one month's research, Mr. Constein will begin to bring in a team of extension people to set up classes for machinery maintenance and use. I do not think that we ought to be too terribly concerned with the degree to which this area is representative of Egypt or Beheira. In terms of land holdings, land source, and production patterns, it does not appear to be anomalous. Our survey may give us an idea of the range of activities, income, and attitudes. Given that range, we can begin to situate the case studies and also use them to establish an economic and social context for other information gathered from the variety of sources.

A number of trips out of Cairo are planned for next month. On the 16th and 17th I shall be in Alexandria. The chairman of the Extension Department at the University of Alexandria has arranged a trip with a student in his department who has written a master's thesis on extension services and mechanization. He will take me to some of the villages in which he did his research. This will give us an opportunity to see other areas of Beheira and start comparing them to Itay El Barud. I expect to be spending the rest of the month visiting the districts and villages of Qalubia gathering already collected material.

Finally, concerning a counterpart: a list of potential counterparts has been created by Dr. Hossery's office. One, the only non-engineer, was asked to speak with me. I found him to be inadequate. It was not his grasp of English which I found discouraging (although we did have to speak in Arabic), since he will be paid by AID to study English at AUC, but his general demeanor. I prefer to wait until someone more appropriate is nominated. I realize the importance of working closely with an Egyptian, not only to assist in daily business but also leave a trained staff in Egypt once the project has ended. In the meantime, I intend to work with Mohammed Bahgat and the counterparts already assigned to the project.

b. Preliminary Data Collection Activities

1) During the Period: The primary effort was a week's trip to Minya, one of the governorates where the project will begin. I spent that time talking to a wide range of government officials in the Ministry of Agriculture (including Ali Saada, General Manager of the Minya Agricultural Mudiriya, people from village cooperatives, and researchers at the Agricultural Research Station at Mallawi); local small manufacturers/mechanics who make the archimedes screw, threshers, and chisel ploughs; the General Manager and the Director of Planning at the Minya Bank for Development and Agricultural Credit; a representative of the Bank's agriculrual machinery exhibition in Minya; and farmers, small and large landowners and renters.

This was also the first attempt to gather already collected data about different administrative levels. On this trip, data about the districts was available. People at the Mudiriya promised to gather information about machinery at the village level and have it ready by mid-month.

Thus far we have been translating the material in preparation for analysis. These data will be worked through and a short report about the trip written before I return there. Similar trips are planned to the other four governorates.

2) Followup for April: A return trip is planned to Minya. I must retrieve the data that have been promised. In addition, I intend to meet with faculty members at the College of Agriculture, University of Minya, since I was unable to last time. There are also geographers and social scientists I would like to meet. I want to continue my trips out into the villages to meet more farmers to discuss their problems and perspectives on mechanization.

The trip to Minya raised a number of interesting issues that need to be explored more fully. Probably the most important has to do with the credit options of farmers renting land and those who have rented all of their property. Current Bank of Agricultural Credit policies make them ineligible for loans. This problem ties in directly with the project's large credit fun for the purchase of pumps. It is important to examine the consequences of the agrarian reform laws which eventually limited the size of landholdings to 50 feddans and which fixed tenant farmers on the land of others. I intend to have Magda Marzouk, one of the team members, do a literature search on the issue at the universities and libraries. I shall also have her make a list of people with whom to discuss the situation. Having worked on this, I may ask her to research other important points such as government restrictions on cultivation, land reclamations, and subsidy policies.

I shall also try to get to at least two more governorates to explore the agricultural situation therein in a manner similar to what I have done in Minya.

c. Trips to Other Areas

1) During the Period: Three trips were made to other areas. One to Itay El Barud in Beheira, where I met Mr. Contein twice (Extension subproject leader). The Extension team is doing seedbed preparation for cotton cultivation on 50 feddans. I went on the initial trip and a later planning meeting at the cooperative. During the second trip I thought that it might be advisable for me to interview the 50 farmers who are giving land to the project for this work. It was my intention to get information about the previous year's activities so as to compare cotton yeidls in the two periods with the additional factor of our tillage work. However, later talks with Mr. Contein have made it clear that little if any change will be noticed: the proper chisel plow was not available, so the ploughing was not as deep as had been expected, the ploughing was late, and the project's activities are restricted to this one activity. Therefore, I have decided that the work required for such an undertaking of interviewing is not warranted. I shall instead make every effort to return to Itay El Barud at regular intervals for informal discussions with farmers.

A second trip was to Abu Hommos, also in Beheira. I was accompanied by a graduate student in extension at the University of Alexandria who wrote a master's thesis on the role of extension in agricultural mechanization. We went to the district in which he had done his research. The most crucial problems he found were the maintenance of machinery and poor training of extension people. Few extension agents had had even one course in machinery and those who had said that it was not helpful. Most machinery breakdowns result from minor upkeep requirements such as oil and oil filter changes.

The third location was in the Western Desert, at Matruh, where EPA and Ford Foundation are financing an ecological study of 15,000 square kilometers. Now inhabited largely by recently settled nomads, the government has hopes of settling two million people there by the end of the century. Large farms of barley and fig trees are planned which will require a high level of mechanization.

2) Followup for April: I would like to arrange a trip to the large reclaimed land farm on the road to Ismailia run by the contractor Osman Ahmed Osman. It is said to be one of the few successful large scale reclamation projects in Egypt.

5. April Reporting Period

a. Farming Survey

1) During the Period: I have written a work order (see overleaf, included in the body of this report) for a

farming activities survey which willbe conducted by the Social Research Center of the American University in Cairo. I have chosen Dr. Nicholas Hopkins and Sohair Mehanna to be the senior investigators. Although I have been discussing the survey with them for several months, our delays have led to their being hired by the California Project until September. This means that the survey will be delayed three months. This is an unfortunate development, but I continue to think that SRC will do a better job than any other consulting/research firm in Cairo. Other research activities that I am involved in will provide the project with necessary information in the interim. Dr. Hopkins, who is presently studying mechanization in Middle Egypt (Assiut Governorate), has offered to give a seminar on his research to the team in late May.

In preparation for the survey I have been discussing data needs with other members of the project staff. It is essential that the information collected be of immediate use to them in their design of project activities. I have been trying to arrange a trip with Carl Reaves, but it has been difficult because of a long-pending and frequently delayed trip to Israel that he is to make. If the trip is not again delayed, he ought to return in mid-May. I am hoping that we can go to Minya in early June.

I have also discussed the survey at length with Steven Shepley who is planning a farm management survey now. I had chosen Gharbia for the pre-test site because it appears to be the most typical of the Delta. Steve is now changing the location of his survey to Gharbia and hopes that we can coordinate our research efforts. This will be particularly pertinent to the village studies to be discussed in this report.

2) Followup for May: I have a meeting planned with Dr. Hopkins and Carl Scherin, Financial Director of SRC, to discuss the survey cost. The budget will then be submitted to FINTECS for its overhead and fee, although in fact it contributes nothing else to the survey effort, and this is to be sent to AID for approval.

b. Village Studies

1) During the Period: My most important contribution to this project in the area of data collection will be the establishment of research teams in each of the five governorates and the monitoring and direction of those teams.

It is my firm belief that this project needs detailed information about farming practices and attitudes based upon in-depth interviews and observations. As a single researcher, I cannot hope to cover such a large area. Instead, I have come up with a strategy which gives us optimal research possibilities. In each governorate I shall set up a team of three to five researchers who will be recruited out of the local agricultural offices in the governorates and from

Work Order Number Two

Agricultural Mechanization Project

FINTECS Subcontract

Purpose: To conduct a randomized survey of mechanized farming practices in the Governorates of Gharbia, Beheira, Qalubia, Sharkia, and Minia.

Research Unit: The survey will be conducted by the Social Research Center of the American University in Cairo.

Level of Effort: Thirty-three man-months.

Schedule of Activities: 15 May - 15 June, Design of questionnaire and selection of survey villages

16 June - 30 June, Pre-test of questionnaire in Gharbia Governorate

1 July - 31 July, Processing and analysis of pre-test data and redesign of questionnaire

1 August - 15 September, Conduct of survey in remaining four Governorates

16 September - 31 October, Processing and analysis of data and writing of final report.

Date of Completion: 1 November 1981.

Deliverables: One final report which is to be an anlysis of the survey data with accompanying appropriate tables of cross-tabulations and correlations. Also required is the presentation of all collected survey data in tabular and original forms, submitted in 20 copies.

Payment Terms: Reimbursement against actual receipts of all salary and operating costs plus applicable overhead and fixed fee costs. There shall be an advance of 20% of the total estimated cost paid by the contractor to the sub-contractor, FINTECS, as well as to the research unit, the Social Research Center, upon signature and acceptance of this work order. Invoices with receipts for all allowable costs plus pro-rated portions of the fixed fee payments shall be submitted monthly and shall be applied against the initial advance. Subsequent advances of 10% of the total estimated cost shall be paid and liquidated according to the above and fore-mentioned invoice procedure. A final 10% of the allowable costs shall not be paid until delivery and acceptance of the report and all collected survey data. Each week delay beyond the report due date shall be subject to a 2% penalty charge.

Allowable Costs: Salaries of ten enumerators and per diem,
_____ L.E./week x 10 x _____ .

Salaries of two senior investigators:
L.E. _____ /month x _____
L.E. _____ /month x _____

SRC overhead at ____%
FINTECS overhead at ____%
Vehicle rental, L.E. 500 x 2
Data coding and processing
Report typing
Report copying
SUBTOTAL _____

SRC fee at ____%
FINTECS fee at ____%

Grand Total: _____

Scope of Work: The Social Research Center will conduct a survey of mechanized farming experiences and needs in five governorates. Four villages will be selected in each of the governorates which together exhibit the range of cropping patterns and landholding patterns of the governorate. Fifty farmers will be interviewed in each village. The farmers should be randomly selected, although the sample ought to be consistent with the landholding pattern of the village. The number of farmers may be changed in accordance with the final design of the questionnaire. A pretest, to be conducted in Gharbia Governorate, may result in a further modification of the sample size and instrument design.

Data to be collected should reflect the aims and interests of the different components of the Agricultural Mechanization Project and cover the following topics: social and economic context; present means of land preparation, cultivation, and harvesting; agricultural equipment in use; access to repair and maintenance services; availability of credit facilities; and role of the extension service.

Each enumerator shall receive orientation training provided by the Social Research Center. The Contractor shall reserve and exercise the right to interview and approve all personnel prior to assignement and to conduct periodic inspections of the work during execution. The Contractor further reserves the right to make any required modifications in the scope and content of the work order and its execution.

This work order is executed on the day of 1981.

LOUIS BERGER INTERNATIONAL, INC. FINTECS

Dr. David Gaiser
Project Technical Director

WITNESSES:

the universities. They will be assigned full time to the project for one year during which time they will be trained in data collection and analysis. Those who are good may be kept on for a longer period. The final objective is that they come to form some permanent unit of analysis and evaluation within the Ministry. At the least, I shall be training a large number of Egyptians who may serve Egypt in a variety of capacities.

Each person will be assigned to a village near his own village, although the two are not to be the same. He will begin collecting information about the infrastructure of the village, agricultural cycle, machinery, landholding pattern, animal population, etc. It is important that he begins with a clearly defined task as a way of working into the position. My counterparts and I will be working closely with the teams, supervising their research, discussing how they are to collect the information, and suggesting future points of interest.

Each team will have additional local supervision. It will still be difficult for me to supervise the teams adequately since close monitoring is essential. I have proposed that someone connected to a local university be hired on a part time basis to keep in touch with the team members. I have already found two prime possibilities: Ahmed Wagdy Zeid, a PhD candidate in agricultural extension at the University of Alexandria, who wrote a master's thesis on extension and mechanization, and Dr. Bahgat Maksoud who teaches Rural Sociology at the University of Assiut, having written a dissertation on technological innovation in agriculture at the University of Reading, England.

Budget Considerations and Ministry Support

I have discussed the research project in several meetings with Dr. Ali Hossery who has approved the plan. He has offered to pay the salaries of the team members from Ministry funds. He has also allowed me to hire local Ministry personnel and university graduates in his name. I have drawn up a budget for the research team for the next four years. The budget includes salary incentives for Ministry staff and salaries for graduates. Each governorate will have contributed one middle-level Ministry official who will work part time for the project, providing government documents, running small government-paid surveys, and making links between people in the governorates and members of the project. The total cost of the four-year research effort, starting in June 1981 and ending in June 1985 is LE 84,850. An additional LE 50,000 has been requested in the Inception Report for long term research to cover transportation and meeting costs. I expect to have the team members in each governorate meet together once a month and to have all of the researchers meet every three months to present and discuss their findings. It seems to me that it would be very useful if they can get together to talk about the problems they have getting data and to compare notes.

Selection of Researchers

It is important that the researchers be natives of the governorates where they will be assigned and that they come from neighboring areas.

I have made the most progress in setting up a team in Minya where I have the greatest number of contacts and have spent the most time. I have spoken to Ali Saada, General Manager of the Mudiriya el-Zerai about choosing staff there for the research team. I have already selected one person from the Mudiriya as a definite member of the team, and he has agreed. Upon my return to Minya Mr. Saada will give me a list of others who would be interested. I have also met with members of several departments at the University of Minya and have arranged to return there to interview students. These students are soon to graduate from the departments of Geography, Agricultural Economics, and Sociology.

I have also discussed the matterwith Dr. Koreyam, Chairman of the Department of Agricultural Engineering who is collecting resumes of interested students for me. I have a meeting arranged with them for May 14th. I have arranged a meeting with Dr. Hussein El Kholy of the Agricultural Extension Department to discuss the possibility of recruiting recent graduates from his department.

The present schedule for setting up the research teams to begin the village studies according to governorate:

Minya	June 1
Gharbia	August 1
Qalubia	September 1
Beheira	October 1
Sharqia	November 1

2) Followup for May:

(a) Submission of budget to Dr. Hossery for approval

(b) Return to Minya to interview students from the university for the research team

(c) Return to University of Alexandria (May 13-14) to interview students from the Departments of Agricultural Extension and Engineering and to meet faculty members in Sociology and Anthropology

(d) Trip planned to the Mudiriya and University of Tanta in Gharbia to start setting up a team there

c. Data Collection

1) During the Period: I have met with the Undersecretary of Agriculture in Qalubia. The labor shortage, the seriousness of which is yet to be determined, is, according to Mr. Mohamed Mamdouh El Zahawi, acute in Qaliubia because of its

proximity to Cairo. The most interesting point to emerge is that between 300 and 400 feddans of land are lost each year because of new construction. The government has recently passed a law which stipulates that the use of agricultural land for all but food security projects is illegal. However, the agricultural land continues to be eroded. Agricultural land in Qalubia sells on an average for LE 20,000 a feddan (several times what it is elsewhere) and for as much as LE 100,000/feddan bordering Cairo.

Another conversation was with Mr. Farouk Afify, Special Assistant to the Minister of Agriculture. Mr. Afify has served as Undersecretary of Agriculture in Minya and most recently as Governor of Minya. He has offered his services to the project through Dr. Hossery and will help me in any way to set up the research as well as other assistance. He is a great supporter of electricity in agricultural operations and would discourage us from using diesel engine pumps although the project has a fund of $2 million for them. He would prefer to install small generators in the fields to which an electrically driven pump could be attached. Dr. Mahmoud El Shahat, Chairman of the Department of Agricultural Economics at the University of Minya was present. I had missed him on my last trip and will see him next week there. He shares my doubts about the government's carrying the burden for both diesel and electrical power. However, it is obvious that in a country where government subsidies can change without warning, long term planning is limited.

2) Followup for May: I plan to meet with the General Secretary for Agriculture in Minya, Mohamed El Gamal, when I return. I also want to extend my conversations about Qalubia with the Mudiriya General Manager.

I have been asked to talk to the social scientists on a Ford Foundation funded project in the Western Desert on ecological relations in the area. Dr. Samir Ghabbour of Cairo University who has written on mechanization in the Middle East has asked that I address them.

Following is an itemization of the data requested from Minya and Qalubia Governorates.

Minya
April 22, 1981

A. From the Mudiriya Zerai (Undersecretariat of Agriculture)

1. Area and production by district, 1975-1980, for Cotton, Berseem (1976-80), Sugar cane, Soybeans, Fava beans, Garlic, Onion, Wheat, Fruits (1980), Vegetables (1980)
2. Number and size of landholdings by district (1979-80)
3. Number and size of landholdings (1976-77)
4. Renters and owners of land by district (1977-80)
5. Threshers, tractors, and pumps: number and kind by district; horsepower (if applicable); date of purchase
6. Machine rental prices, 1980
7. Agricultural labor wages, 1980
8. Number of draft animals by district, 1980
9. Costs of winter and summer crops, 1975-80
10. Prices of winter seeds, 1979
11. Prices and uses of fertilizers, 1980
12. Prices and uses of pesticides, 1981
13. Crops, governorate-wide: periods of cultivation and harvest; area, production, fertilizer requirements, irrigation requirement, prices (government coop, farm gate, black market)
14. Census of farm machinery for every village in Minya
15. Cultivated area of every village in Minya
16. Crop structure for winter and summer crops to be cultivated during 1980-81
17. Detailed maps of every district in Minya (used for airplane pesticide spraying)

B. From the Bank for Development and Agricultural Credit

1. Credits given by district in 1978, 1979, 1980
2. Credits for agricultural machinery, 1978, 1979, 1980

C. From the Agricultural Bank's Machinery Exhibition in Minya, a listing of every machine exhibited with horsepower and price

Qalubia
May 1, 1981

From the Mudiriya Zerai:

1. Machine rentals (individuals and coops), 1980
2. Tractors, pumps and threshers by district, 1980

(Qalubia)

3. Area and production for 1975 and 1980 by district: Cotton, Wheat, Beans, Maize, Rice, Nuts

4. Landholdings by size and number of farmers in 1980

5. Number and kinds of draft animals by district, 1981

6. Labor wages, 1980

A.1 PLANNING AND EVALUATION SUBPROJECT

A.1.1 Planning/Financial Advisor and Project Economist:

Mr. Steven C. Shepley

15 September 1980 - 30 June 1981

This report covers the period from mobilization on 15 September 1980 to 30 June 1981. It is divided into sub-reports on specific activities within the several areas of assigned areas of functional responsibility.

1. Financial Administration

a. Establishment and management of project accounts: A local currency account was set up for receipt and disbursement of Louis Berger International, Inc. project funds. Monthly cash reports were prepared under my guidance and supervision which detailed all project expenditures and cash receipts. These reports were consolidated into monthly invoices and cash need projections for the Client and AID. I also supervised the preparation of Client invoices for foreign currency payments and arranged for AID approvals and subsequent payments.

b. Commodity procurement planning and management: I supervised and coordinated all procurement activities for project vehicles. This entailed specifications preparation, tender advertising, bid analysis, preparation of award recommendation documentation for AID and arranging with AID for payment disbursement to successful bidders. Following payment disbursements, I arranged for customs clearance and delivery of vehicles, vehicle inspection and assignment to project staff. I also participated in the formulation of vehicle operations policies and issued a number of policy memoranda governing vehicle use and responsibilities. To date, 13 vehicles have been procured and assigned to counterpart and expatriate staff for field operational use.

In addition to procurement management under the Louis Berger Contract, I also supervised and coordinated the planning for commodity procurement and use of AID financial local currency support of project operations. Under the terms of the project paper, AID is providing some $27.1 million for local commodity procurement and to cover local operating costs of project activities. These include funds for prototype research equipment, shop and laboratory equipment, pumps and threshers, in addition to other operating funds such as vehicle operations, extension training facilities, etc. I investigated Government of Egypt and USAID fiscal regulations and developed guidelines for formulation of a set of procedures for receiving, disbursing and comptrolling such funds. In conjunction with this effort, I also developed recommendations for

SOME BRIEF NOTES ON SUBSOILING REQUIREMENTS

Carl A. Reaves

There has been much energy, time and effort wasted by farmers and researchers in subsoiling land that did not need to be subsoiled because there was no restrictive layer. Subsoiling can be beneficial only when there exists within the crop root zone a layer of soil that is dense enough to restrict air and water permeability and crop root penetration.

This layer of dense soil may have been created by compaction from tractor or animal traffic, tillage tools, transport vehicles, or it may have been created naturally when the soil was deposited. Thus, subsoiling may be needed to aid drainage if the water table is too near or at the soil surface, or subsoiling may be needed to aid the permeability of irrigation water if there exists a manmade so-called "hardpan" within the crop root zone. On a large percent of agricultural soils where man has not created a hardpan the soil permeability is adequate for crop production and subsoiling can be detrimental.

Before doing any subsoiling one should determine if there exists within the crop root zone a layer of soil that is so dense that it needs to be loosened. This can be accomplished in a number of different ways. The easiest and quickest method to make a preliminary survey is to use a metal probe (penetrometer). Most engineers who have worked with soils have designed a penetrometer and there exist many models of varying degrees of sophistication. The most complicated ones use electronic components to record resistance to soil penetration. If one of these modern devices is not available, a pointed steel rod with a handle will suffice.

The American Society of Agricultural Engineers (ASAE) and others have spent great effort to standardize a soil penetrometer. The ASAE Yearbook contains the design, specifications, and procedures for use of this standardized penetrometer. The standard penetrometer has a 30 degree cone leading point with a 0.508 cm or a 1.270 cm projected area depending on the difficulty of soil penetration. The device also includes a dynamometer ring with an indicating dial that is calibrated in grams per square cm for soil penetrating resistance. Usually two people collect data with a non-recording penetrometer, one pushing the cone into the soil and the other recording penetration resistance at pre-selected increments of penetration depth.

If a standard penetrometer is not available, one can make a very preliminary survey with a 0.375 cm diameter steel rod that is sharpened in the shape of a 30 degree cone. With a little practice an inexperienced person can determine if there exists a hardpan within the crop root zone.

(Report on Subsoiling, cont.)

The use of a penetrometer to determine if a hardpan exists in a soil profile is only the first step to planning an actual subsoiling operation. If a dense layer exists, a trench should be opened several feet deep and wide enough for a man to get in and make a visual examination of the soil profile. If the stubble of a previous row crop exists, the length of the trench should extend perpendicularly across a minimum of two rows.

On the visual observation of the soil profile one should first determine if penetration of the crop root has been restricted. Normally, crop roots tend to grow downward and if there is a servere restriction the roots will be forced to grow laterally along the top of the restrictive layer. Secondly, if a restricted layer exists, one should determine at what depth it occurs and the thickness of the dense layer. Also, the cause of the dense layer, man made or natural occurrence, should be determined for future reference. At the same time, soil bulk density and moisture samples should be obtained in the same vicinity at increments throughout the soil profile. Samples should be taken above the dense layer, within the dense layer, and below the dense layer for a reasonable distance.

There are several ways to obtain samples of soil bulk density and moisture content. I recommendthe Modified Lutz technique which is included in the ASAE yearbook. This sampler uses USA commercially available tin cans with a volume of 470 cc and sample depth of 6.35 cm. These samples are convenient to process by placing the lid on the can as soon as it is taken, getting the wet weight within a few hours, and then at any future date oven drying at 105 degrees C plus obtaining the dry weight in the laboratory. Samples of light textured soils should be dried for a minimum of 24 hours and samples of heavy soils should be dried for a minimum of 48 hours.

Assume that the preliminary survey has been completed and that it was determined that there is a need for subsoiling. Before subsoiling is started, several questions should be answered:

1. Is there any technical data available on the land to be subsoiled? If not, (a) make a mechanical analysis on a representative sample of soil. If the soil is layered in a vertical direction an analysis should be made for each layer. (b) Has the soil type been classified by a properly trained person? These data should be stored in a data bank for guidance on future work.

2. What crop will be grown after the land is subsoiled? If a row crop will be grown, subsoiling should be done directly under the row. If wheat or some sown crop is to be grown some preliminary subsoiling should be done to determine the nature of soil breakout. Loosened soil should be excavated to determine the area and shape of breakout. This should indicate the spacing needed between subsoilers.

3. Traffic management should be planned for all equipment to be used including primary tillage, secondary tillage, planting, cultivating, spraying, and harvesting. After crop rotation and agronomic requirements have been considered, every effort should be made to select machinery and outline the use of the machines such that the wheels of any equipment will not operate within 30 cm of the subsoiled slot. If the wheels do operate nearer than 30 cm there is danger that the subsoiled slot will be closed and in many situations, the slot may be compacted to a higher degree than it was before subsoiling. All equipment wheels that contact the soil should use the same path throughout the cropping system. In the worst situation, every other spacing between crop rows should not be trafficked by equipment wheels. One pass of an equipment wheel in some soils will compact the soil excessively and cause crop stress due to lack of moisture and/or aeration. In sown crops the traffic pattern should be planned such that a minimum of soil is compacted. This includes doing the minimum tillage required to create a good seed and root bed. Timely operation of secondary tillage to reduce sizes of clods formed by primary tillage can reduce the amount of required tillage.

B. December Reporting Period

1) Progress: I visited three agricultural equipment dealers in Tanta, Gharbia Governorate. The General Manager of Tanta Machinery Co. is an engineer and has a very good knowledge of problems in heavy textured soils. He expressed interest in cooperative research, and is a good candidate for an applied research project. He does considerable fabrication of some tillage equipment and has a machine shop capability of making major modifications of research equipment.

I visited one of the New Lands projects, 6,500 feddans, in light textured soils. This project is approximately one year old and is supposed to be fully mechanized. At present, only primary tillage is mechanized. Planting, cultivating, and harvest is yet to be mechanized but I am not sure what part we can play in this. They are experimenting with overhead irrigation which does not require land leveling.

I visited with Dr. Gaiser the Gianaclis Co. in Beheira Governorate to observe mechanization in grape production, and to serve on the Tasting Committee. This is a nationally owned company that grows one-third of the grapes in Egypt. They are proud of their record but have done little engineering in production mechanization. Weed control is considered to be the major problem. Visited the Minister of Agriculture in Beheira Governorate to discuss farming and especially mechanization problems. His opinion, as generally heard, is that rising costs and shortages of labor require mechanization at a much faster rate. Major needs include a good rice combine, more subsoiling to improve drainage, powered and more versatile machinery for small farms, better field crop transportation systems, and better machinery management. There is a good possibility of cooperative research in this heavy textured soil. We visited the Land Improvement Group, also in Beheira. They are doing a lot of subsoiling, making a lot of drainage ditches, and seemed to be interested in cooperative research.

I visited the Ministry of Agriculture office in Alexandria to get acquainted with what assistance they offer the farmer. From a mechanization standpoint, they rent the farmer equipment for primary tillage, irrigation ditches, and drainage ditches. Equipment for planting, secondary tillage, spraying, cultivation and harvesting is very limited. Visited Gianaclis grape processing plant in Alexandria and a nursery that is anxious for help on mechanization.

A three-day trip was made to Minya Governorate to observe drainage problems. They have several 5000-feddan areas along the Nile River where crop production has decreased drastically due to poor drainage. We visited one area near Samalut that has deteriorated so badly that people have left their farms. The Land Improvement Group is going to start reclamation in January. They claim that they can reclaim this land by

subsoiling and cleaning ditches for a cost of LE 200 which is approximately 10 percent of the cost for reclaiming New Land. I took pictures of certain areas and plan to observe the progress. Causes of the serious drainage problem appeared to be soil compaction, clogged ditches, and seepage from reclaimed New Land at a higher elevation. This New Land has been sold to college students and they seem to be doing a better job of farming. I visited a seed production unit and made tentative plans for cooperative projects on potatoes. They have a good selection of tillage machinery and have agreed to cooperate on a mechanized project from primary tillage through harvest.

I have spent considerable time trying to assess what I have seen and to develop a project plan, apart from completing the subsoiler report. Routine matters such as driver's license, visas, telephones, etc. are unbelievably time consuming.

2) Major Activities for January: Design a cooperative research tillage project with Noba Seed Co.; visit Baltim with the intention of designing a research project on sugar beets in cooperation with the Land Improvement Group; complete the project plan; and pursue more specific projects for the contract research phase.

(Copy, Field Trip to Minya Report)

FIELD TRIP TO MINYA TO OBSERVE DRAINAGE PROBLEMS

December 28-30, 1980

Carl A. Reaves

I left Alexandria December 28 at 8 a.m., arrived in Cairo about 11 a.m., visited the Berger office until 1:30 p.m., left Cairo at 2 p.m. with Mr. Kassem of the Soil Improvement Association and Mr. El Naggar of the Tractor Testing Station, and arrived in Minya about 6 p.m.

We visited Eng. Mohamed El Said El Gamal, General Director of all agricultural operations in El Minya Governorate. We looked at two possible sites for a new facility for the Egyptian Land Improvement Association, and visited one of several of the approximately 5000 feddan areas that have been vacated near Samalut because of poor drainage. Apprent causes of the poor drainage are compacted soil, clooged drainage canals, unlevel soil, and seepage from reclaimed area at a higher elevation. The Soil Improvement Group is supposed to start subsoiling and cleaning drainage canals in January. The anticipated cost of this reclamation is LE 200/feddan which is less than 10 percent of the cost of reclaiming new desert land, taking into consideration the fact that buildings, utilities and roads exist and are usable in the poor drainage area. I took pictures of certain locations that show the poor drainage and will follow up with pictures of the same areas each six months or so.

We visited the reclaimed desert area above the poor drainage area at Samalut. This is one of the areas that was reclaimed and then turned over to college graduates, and supposedly they are doing a better job than the usual farmer. This project is supposed to be fully mechanized, but as far as I could tell, this means only primary tillage. They are growing lots of grapes and the project is about one year old. Onions and english peas looked very good, interplanted with the grapes for the first two years. Housing was very poor.

I visited a 25,000 chicken layer facility scheduled for completion in January. The system will produce its own replacement chicks and the facility is fully automatic, including manure removal. Predicted production is 245 eggs per year per layer. Each Governorate is installing one of these units.

I visited with the General Director of Irrigation of Minya Governorate, Eng. Alaa Rafik.

The trip to Minya gave me an opportunity to observe and to discuss things with Mr. El Naggar and Mr. Kassem, who have an abundance of knowledge of Egyptian agriculture. One of the most interesting things I noticed is that a lot of newly set tomato plants are staked to protect them from the wind. At some later

date when the plants are larger the sticks are removed. I would like to pursue this further, because it does not seem that this should be necessary. If the tomato plants do have to have some protection it should be possible to accomplish this with tillage by making beds which could be leveled after the plants are large enough that protection is I. longer needed. If the required protection cannot be given by tillage then the placement and removal of the sticks should be mechanized.

C. January 1981 Reporting Period

1) Progress: I completed the Research and Development Project Plan and submitted it to Dr. Gaiser. It was not possible to accomplish the tillage and planting of potatoes this season at Noba Seed Co. because the irrigation water was cut off for cleaning ditches immediately after their regular planting season was completed. The present plans are to establish these tests during the summer planting season. I visited the Land Improvement Group at Kafr el-Sheikh and they discussed land reclamation for 50,000 feddans of sugar beets. They also drove us to near Baltim and gave a demonstration of their land reclamation techniques, which is primarily land leveling and subsoiling with open ditches at 90 degrees for drainage. We plan to start some cooperative research on this project during February. Our primary objective will be to determine soil structure before reclamation and then to monitor the effects on structure of each reclamation process. If time permits, the stability of the subsoiling effects will be monitored for several years. Measuring soil bulk density or penetration resistance will require most of the time and effort expended on this project.

I visited with Dr. Moss of the Rice Project and discussed possibilities of cooperative research. Seed or plant bed preparation is one phase in which cooperation might be beneficial to both projects. I visited with Dr. Illsley of the Major Cereal Grain Project and discussed the possibility of their assembling a large quantity of field equipment at the Tractor Testing Station. We agreed that this could be beneficial to both projects. His equipment is scheduled to arrive in February so it will be assembled before our equipment arrives. He plans to use some young employees of the Tractor Station, which will provide them good training with both machine shop tools and with the details of machinery components.

I visited the computer center for six cotton export companies in Alexandria to determine what facilities they have that may be of use in the analysis of our research data. At present their programs are very limited, but they expressed a willingness to develop programs especially for us and saidthat the cost would not be excessive. They are using only 30% of the available computer time at present.

I selected most of the equipment for the Soils Laboratory at the Tractor Testing Station. This list of equipment has been sent to the Soiltest Co. for price quotations. A set of full scale field research equipment from the literature of a company in Israel was selected. Dr. Gaiser and I expect to make an on-hand inspection of this equipment in February. If we can get a waiver to purchase this equipment we should be in a position to initiate research several months earlier than we can get equipment manufactured and delivered from the U.S.

The Louis Berger office in Cairo was visited to discuss procedures for implementing the Contract Research and Collaborative

Exchange phases of this project. I also discussed with Mr. Shepley what should be the nature of the research data that we collect in order to be compatible with his computer program.

2) Major Activities for January: Arnold Radi will be visited to get more specific details on the procedures for using the Contract Research funds. Dr. Ali Korayem, Head of the Department of Agricultural Engineering at Alexandria University will be got to submit at least one project proposal. Planning a project to determine soil conditions during reclamation plus one cropping season in the sugar beet area near Baltim will be continued. Southern Egypt will be visited to observe soil types and existing agricultural mechanization. Specific areas will include Aswan (Ieb. 7) to observe the Behera earth moving project and Kom Ombo to observe sugar cane mechanization. I will visit Israel with Dr. Gaiser to inspect fullscale tillage equipment that may be useful in our research project. At least one meeting with small farmers will be scheduled (with Peter Reiss and Ed Constein) to determine precisely what their most urgent needs are with respect to mechanization.

(Copy, Project Plan 1981-85)

AGRICULTURAL MECHANIZATION PROJECT

RESEARCH AND DEVELOPMENT PROJECT PLAN, 1981-1985

General Objectives for the Project Plan:

1. Land leveling
2. Subsoiling
3. Primary tillage
4. Seedbed preparation
5. Planting
6. Ditching and irrigation
7. Cultivating and fertilizing
8. Spraying
9. Harvesting
10. Transportation
11. Processing and storage

It is believed that the quickest and greatest contribution to be made through mechanization, at least during the earliest stages of this project, is the turn-around time between crops. Of course, shorter growing varieties should be developed, but this is time consuming and involves more than mechanization.

The second most important contribution to be made through mechanization is proper timing and management of tillage operations and machine traffic patterns to promote adequate water and air permeability to a depth below the crop root zones. These two factors will have a large influence on the design of each experiment.

Priority of General Objectives for the Project Plan

At the present, the most usual extent of mechanization is primary tillage. If an effective mechanized system is to be developed, each phase must first be evaluated thoroughly and then all phases integrated into a system. The General Objectives are listed in approximately chronological order for any mechanization project, and for the project to be effective they must be accomplished in this order. But to accomplish this list of objectives will require a large variety of machinery, personnel, shop equipment, instrumentation, and land areas of different soil types. It is not reasonable to expect to assemble this size of operation in 1981, but it is reasonable to expect to have research in progress for all phases in 1982.

Considering the fact that the earliest date which we can expect research equipment to be delivered and assembled is late fall of 1981, we are suggesting some cooperative research to begin in the spring of 1981. All of the equipment will have to be furnished by the cooperant, but we have discussed our objectives with certain people and they have expressed a willingness to do anything that is necessary. We feel that some

valuable time can be gained through this effort even though we will not have complete control of all operations.

Objectives for 1981

1. Noba Seed Co. in Beheira Governorate has expressed a willingness to do some cooperative research on mechanization of irish potato production and to begin this project at the end of the planting season this year (end of January or first of February). The proposed land area has already been leveled and can be surface irrigated. Variables to be included are plant population, subsoiling depth, row spacing if possible, hand planting versus machine planting, and time of harvest. Equipment traffic patterns will be varied as much as possible and their effect on soil compaction will be monitored by taking bulk density and moisture samples from before tillage begins until after harvest. Yields will be obtained.

2. The Soil Amelioration Group is reclaiming through drainage a large area of land near Baltim for sugar beet production. They are leveling the soil to within plus or minus 2 or 3 cm, subsoiling 55 cm deep on a 1.4 m spacing, and opening a surface trench 90 cm deep perpendicular to the subsoiler tracks. A cooperative project is suggested to include such variables as subsoiler design, subsoiler spacing, subsoiler depth, and moisture content at time of tillage. Soil bulk density and moisture content will be monitored from just before tillage until after the first crop has been harvested.

3. By late fall, the research equipment should be on hand and assembled. Project areas will be selected in at least three soil types (sandy, loamy sand, and heavy clay). The surface will be leveled, soil tilled, and a row crop planted under fully mechanized conditions. Every attempt will be made to select areas where the project will have complete control of all research for the duration of the Mechanization Project up to 1985.

4. The first project under the Contract Research will be started by late spring 1981.

5. The first participants of the collaborative training program should be starting at the beginning of the fall quarter, 1981.

6. Short projects will be conducted at the Tractor Testing Station as the need occurs. There is one Yugoslavian tractor scheduled for tests at present. A high priority will be given to tillage machinery manufactured in Egypt for tests to evaluate their effectiveness and if possible to improve their design. Before any agricultural machinery is imported to Egypt for sale it will be evaluated at this Station. Suitable test procedures will be developed to evaluate both power units and machinery for their adequacy of design and performance under Egyptian agricultural conditions.

7. Basic information on some typical Egyptian agricultural soils will be collected. Measurements to be made include strength properties such as cohesion, adhesion, friction, and shear. Bulk density, moisture content, and mechanical analysis will also be measured.

8. Existing mechanized operations with present tractors and locally manufactured machinery such as 50-60 hp tractors with chisel plows, stationary grain threshers, levelers, furrowers and sprayers will be evaluated.

Objectives for 1982

1. Crops planted in the fall of 1981 for full mechanization will provide an opportunity to test harvesters and to get a first approximation of the minimum turn-around time required between crops.

2. Projects to incorporate full mechanization of the major spring field crops (maize, cotton, potatoes, etc.) will be installed. Since the U.S. has had experience in excessive soil compaction by machine traffic, all research will be planned to include the effects of traffic patterns by various equipment on changes in soil conditions. Projects will also be planned to monitor the lasting effects of deep tillage on reclamation.

3. Some projects will be begun that permit controlled irrigation, if necessary sprinkler, to determine tillage requirements under different moisture conditions. Under normal conditions, irrigation is stopped before harvest and is not started again until after the soil has been prepared and another crop planted. In many cases this time is long enough that the soil becomes very dry, which causes excessive energy requirements for the primary and secondary tillage operations. There is a possibility that the addition of some water prior to tillage will decrease the energy requirements significantly and at the same time decrease the turn-around time between crops.

4. By mid-1982, enough information should have been gained on the nature and degree of tillage requirements to prepare a good seedbed and rootbed to start designing specialized equipment for the small farm. It is suspected that in the heavy soils large equipment will always be required for primary tillage but all equipment for secondary tillage, planting, cultivating, spraying, and possibly harvesting should be designed small enough that each farmer can own his own. This will give the small farmer more control over the timeliness and exact operation that his crop needs.

5. Both the Contract Research and the Collaborative Training projects should start the second series this year.

6. Projects at the Tractor Testing Station should be more numerous by this year due to other (foreign) countries wishing to enter the expanded market for agricultural machinery.

(Copy, Project Plan, cont.)

Objectives for 1983, 1984, and 1985

Many of the projects started in 1981 and 1982 will be continued to obtain replications and more confidence in results. Other projects will be initiated as the need arises to modify some phase of the mechanized system of machinery and machinery management. New varieties will be tested in an effort to increase the yields. Of course efforts to improve all phases of the system will be continuous.

It is anticipated that during these last two or three years, considerable effort will be directed toward more efficient irrigation, since use of excessive water in the past has created extensive drainage problems. Another area that will need attention is mechanization of the minor crops with small acreage. Special equipment for weed control and harvesting vineyards will be developed.

D. March Reporting Period

1) Progress: I visited Itay El Barud village with Ed Contein to observe some seedbed preparation. They were using a common chisel plow that was operating approximately 10 cm deep after 3 or 4 passes. In an attempt to operate deeper, we rented a larger tractor from the Land Improvement Group in Damanhur and borrowed a larger chisel plow from the Beheira Co. Unfortunately the chisels on this plow were too close together for the soil type, and clumps of soil would not pass through the machine. We had hoped to till 30 cm deep, but maximum depth we could operate was approximately 20 cm. In the future we will have to be more selective on tillage tools, especially in the heavier soils. After two or more passes with the chisel plow and several passes with a disk harrow an acceptable seedbed was obtained. I borrowed some soil sampling equipment from the Soil Salinity Laboratory (Min. Agriculture) and also got Dr. Ghamry, soil physicist, to go with us and take moisture and bulk density samples. The surface 20 cm wasvery dry, which caused the soil to break out in large lumps. We dug several holes to observe root penetration by the previous crop of berseem and found that there had been satisfactory proliferation to a depth of 20-25 cm. The soil bulk density was in the range of 1.4 gm/cc which means that the roots had been stressed or retarded to some extent. We brought samples of roots back to Alexandria for microscopic observation and they did not appear to have been stressed to an extent that their shape was altered.

I met Dr. Mashali of the Land Improvement Group and Dr. Abou-Sabe in Kafr El Sheikh to observe some drainage work. We held a work session in Dr. Abou-Sabe's office with Dr. Korayem to discuss and plan a potential project for the Applied Research Fund. Dr. Mashali is supposed to prepare these plans in detail as a cooperative project with Univ. Alexandria Agricultural Engineering Department and present them at Dr. Gaiser's next staff meeting.

Drs. Abou-Sabe, Shaalan of Alexandria U. Agronomy Dept., Dr. Aly of Alexandria U. Pesticide Dept., Korayem of Agricultural Engineering, Dr. Moss (IRI) and I met to discuss a potential project for the Applied Research Fund. This project is to address all crops for a 3-year rotation. Representatives from the three UA departments are supposed to present detailed plans later at a called conference. If this project develops it will be a large one and rather expensive for our Mechanization Project, the primary source of funds.

I met several times with Dr. Korayem to work on a proposed thresher project for the Applied Research Fund. This has promises of being a worthwhile project with a potential for quick and precise results at a reasonable cost. It should already have been presented for consideration and we hoped it would be approved, funded and initiated in May 1981.

I visited several times with Dr. Larson of Montana State University who was in Alexandria for three months, and Dr. Korayem to develop a proposal for the Collaborative Research phase. They have completed a well planned and worthy project titled, "A Highly Maneuverable Tractive Power Unit for Egyptian Agriculture." This proposal is ready for typing and presentation and I hope it can be funded for the fall of 1981.

I visited Dr. Basily of Cairo University and discussed the Applied Research Fund. He plans to present some proposals for this phase. I attended Dr. Gaiser's staff meeting in Cairo, and have spent considerable time on writing equipment specifications.

2) Major Activities for April: Further planning sessions will be held in Alexandria on proposals for the Applied Research Fund. Guidelines for R&D will be developed. Visits will be made to the International Center for Rural Development in Maryut, to Chrm. Osama Khalil of the Mechanization Farm in West Nubaria to discuss possible cooperative projects, to Zagazig and Mansura Universities to discuss possible projects. Hopefully there will be a first meeting of the R&D guidance committee, we will get bids for making soil samplers and a rotating soil sieve, specifications for all equipment except instrumentation will be presented, and I will help Graham Sparrow of the Service Subproject get settled in Alexandria. I hope to hire a secretary and that the telephone will be made operable.

E. April Reporting Period

1) Progress: Further planning sessions in Alexandria on proposals for the Applied Research Fund did not develop. It seems that since the Guidance Committee has been appointed officially, everyone is waiting until after its first meeting. I completed the R&D guidelines and gave them to Dr. Gaiser.

I visited the International Center for Rural Development located in Maryut. Holland is cooperating with Egypt to set up field size mechanized production of several crops for farmer demonstrations. The area is located near the Center but they are just now getting started. Apparently their idea is to keep machinery and farming systems as simple as possible. They have a reputable soils department that has done considerable soil classification and has made measurements on soil profile drainage properties. They have a person from Switzerland who has developed an effective method of communicating Extension Department recommendations to village farmers.

I visited the Mechanization Farm in West Nubaria with Samir Younes of the Agricultural Engineering Dept., U. Alexandria. We had a lengthy discussion with Mr. Osama Khalil, Chairman

of the 11,000 feddan farm. They are just now determining the feasibility of introducing short staple cotton in Egypt. Plans are to fully mechanize cotton production on 1500 feddans. It was decided that we could make a contribution by determining the best tillage system. Samir Younes and I spent considerable time after returning to Alexandria in planning for the first year effort a series of tests on type and depth of tillage. Time is very short since the cotton has to be planted in June, but we will establish tests on approximately 10 feddans.

I was not able to schedule visits to Zagazig and Mansura Universities this month. The R&D Committee did not have a meeting. Drawings on the soil sampler and rotary soil sieve are about 50 percent complete.

2) Major Activities for May: To: continue with the Mechanized Farm research project; go to Israel to select research equipment; try to get drawings completed and bids for the fabrication of soil sampler and sieve; visit Mansura University, and make as much progress as possible toward getting shop and soil laboratory equipment ordered.

F. May Reporting Period

1) Progress: Research plans in cooperation with the Mechanized Farm in Nubaria have been finalized. Time did not permit leveling the soil surface, so test layout had to be modified considerably. It was not possible to get any soil sampling equipment and soil strength characterization had to be abandoned. With the available time desirable, research could not be established, but it is hoped that this crop season will be a start of much cooperation with the Mechanization Farm. Tests to be installed with this cotton crop include the effect of depth of tillage operations, to a maximum of 30 cm, with a chisel plow and a moldboard plow. A disk harrow operating at a depth of 5 cm will be considered the control.

Detailed drawings on the soil rotary sieve and soil sampler were completed, copied, and discussed with engineers at the Beheira Co. They are trying to locate the required stainless steel and sieve mesh and will give us a quotation on constructing one sieve and two samplers the first week in June. They will also give a quotation on supplying two simple soil penetrometers.

I visited the Agricultural Engineering Department at Mansura University. The Department Chairman was involved in a meeting and we did not get to see much activity. I was hoping that they had made progress on drying of crops with solar energy but apparently it is all still in the planning stage and they have no funds for starting a project. They expressed interest in presenting a proposed project on soil tillage and one on solar drying to submit for the Applied Research Fund.

While in West Nubaria we visited the Behera project to observe the effectiveness of sprinkler irrigation. I believe that Egypt must eventually eliminate furrow irrigation for several reasons. For example, the serious weed control problem and cleaning of irrigation channels will be eliminated and 10-20% more land will be available for crop production to feed the anticipated large increase in population, and the farms can be mechanized to offset the shortage of labor during peak seasons.

I visited Israel with Dr. Gaiser to examine equipment that will be suitable for research in Egypt. We selected equipment that will be adequate for most of the mechanization. Items that are not available include tractors, certain moldboard bottoms, grain drills, and adaptable spray equipment.

Dr. Gaiser was in Alexandria for two days discussing activities of the R&D subproject. We visited the West Nubaria Mechanized Farm.

The first meeting of the whole R&D Committee was set for June 11, 1981. The Executive Committee has held three meetings.

I made the first successful telephone call (local) on May 20, and visited Clarence Hansen in Cairo to discuss possible cooperative research in the future.

2) Major Activities for June: To: install the tillage tests on the Mechanized Farm in West Nubaria; try to issue a purchase order for construction of the soil sieve samplers and penetrometer; visit Zagazig University; ask for quotations on shop equipment and soil laboratory equipment; and try to visit the Minya area to observe progress made on the drainage problem that we observed during the first of the year.

(Copy, Field Trip to Kafr El Sheikh)

FIELD TRIP TO KAFR EL SHEIKH AND BALTIM TO OBSERVE LAND RECLAMATION FOR SUGAR BEETS, 1 May 1981

Carl A. Reaves

I left Alexandria at 8 a.m. and returned at 8 p.m., traveling with Mr. El Naggar and Mr. Mousa. We were to meet Mr. Kassem in Kafr El Sheikh but he did not show up so Mr. Mohamed Baha El Din, General Director of the Middle Delta Sector Soil Improvement Projects, accompanied us to near Baltim and discussed the sugar beet project. The soil was too wet to work so all of the equipment was assembled in one area.

They gave us a small demonstration of their procedure in an area near the equipment. The sugar beet project is going to be fully mechanized so they are preparing rows 200 meters long and the cross drainage ditches are 20-30 meters apart depending on the soil. First, they level the soil with small scrapers and finish with laser controlled land levelers. Then they subsoil 55 cm deep in one direction with two tines spaced 1.4 meters apart; each tine is placed behind a tractor wheel. Next, a single subsoiler tine is used as deeply as possible in a direction perpendicular to the previous tines to loosen soil for the Dondi ditching machine. Usually, two passes are required for this tine to get maximum penetration. Without the subsoiler, three passes with the Dondi are required to open the drainage ditch approximately 90 cm deep, but with the subsoiler only one pass is required with the ditching machine. A little loose soil falls to the bottom of the trench but they say that this is negligible. Finally, large land levelers made by the Eversman Co. (U.S.) is used with lasers to accomplish the final leveling between drainage ditches. We did not have the necessary equipment with us to determine recompaction by the tractor tires pulling the ditchers or the final leveling operations, but this should be investigated soon. They have reclaimed 12,000 feddans and plan to reclaim another 38,000 feddans.

Visual observations in the opened ditch indicated that the ditching machine did not recompact the subsoiler trench excessively, since the soil was easily removed by hand. There was an obvious dense layer approximatley 20 cm thick from 20 to 25 cm below the original surface. Workers in attendance had no suggestions as to what may have caused this dense layer. The area was cultivated about 15 years ago but has been neglected for the past 10 years. The best that I could determine was that "neglected" means that the area grew up in weeds. I suggested that some tillage operations during the reclamation period or during the first few years following the previous reclamation had created the dense layer. Compaction may have been so severe that it restricted water percolation and thus cuased a perched water table too near the soil surface. If this is true, crop

roots could have been damaged to an extent that they severely reduced yields. This of course is pure speculation and with new more knowledge than I have on tillage history in the area, more factual information should be obtained if possible.

Soil structure below the dense layer seemed to be sufficiently open for adequate drainage, but this should be confiremd with laboratory tests to determine bulk density plus initial and sustained percolation rates. The subsoilers were rupturing only a small percent of the dense layer between them. It is possible that the spacing should be less than 1.4 m between tines. The best that I could determine is that more effort should be spent to determine just what condition the soil is in immediately following reclamation. A lot of energy is being spent to reclaim each feddand and for this large area, a small percent increase in efficiency would be significant.

We were supposed to see a vibrating subsoiler that has been imported from England. It is claimed that this unit ruptures considerably more soil than the conventional static subsoiler but there were no suggestions on relative efficiencies. This unit was at some other place and we did not get to observe it.

G. June Reporting Period

1) Progress: The cotton tillage research project was installed on the West Nubaria farm. Five replications were made with a moldboard plow and chisel plow at 10, 20, and 30 cm depth; a disk plow could only be operated at 20 cm depth, and a disk harrow--considered as conventional tillage--was operated at 10 cm depth. Original plans specified leveling the entire area before tillage to eliminate part of the irrigation ditches but time did not permit this.

Unfortunately, the tillage tools were not adjusted and not operated properly so as to produce a level soil surface, and as a result, too much soil manipulation had to be performed after tillage and before planting.

Tractors traversed the area after tests were installed to pull a disk harrow, apply treflan, apply fertilizer, pull a land plane, pull a steel drag, and to plant. The soil will have to examined after irrigation to determine how much the tillage effects were modified by all of this machine traffic. Data collected while installing the tests include draft requirements, tractor fuel consumption, and time required to till.

The Beheira Company made for us simple penetrometers at no charge. They have not been successful in locating a source of stainless steel to make the soil sampler, but they plan to give us a price quotation for supplying two sampling units and 300 sample cans by the end of June. They have not prepared a quotation for the rotary soil sieve.

The R&D Guidance Committee met at the Tractor Testing Station on June 11, 1981. This was the first meeting of the committee and I believe that it was as successful as could be expected: all members were present. Establishing priorities was perhaps the most significant accomplishment, but it was also agreed that these priorities could be changed as need arises. Dr. Hosary listed the Ministry's priorities as seedbed, irrigation, harvesting, and pest control. It was noteworthy and interesting to us that the first committee priority is seedbed.

The Mechanization Project Staff Meeting was attended in Cairo on June 3. Considerable time was spent on reviewing literature, starting a preliminary report on the tillage tests, and with the staff at the Alexandria University Department of Agricultural Engineering.

2) Activities for July: Examine soil conditions in the cotton tillage plots at West Nubaria and if possible, establish another series of tillage plots for corn on land leveled with lazers. It is hoped that the R&D Guidance Committee will meet again and that the tillage and shop equipment can be purchased.

A.3 MACHINERY EXTENSION SUBPROJECT

Agricultural Engineering Extension Technical Director

Mr. Edward J. Constien

January - June 1981

A. Reporting Period 16 January - 30 April 1981

1) Summary: Mr. Ahmed El Behery joined the Machinery Management subproject. An overall approach for implementing the extension program was developed. Detailed plans for some parts of the program were developed and some programs were started.

Conferences were held with various MOA officials, farmers, and persons involved in machinery distribution and repair to gain a greater awareness of the machinery situation and to enlist support and invovlement in the program.

Three areas were selected for initial educational and implement introduction activities. Meetings were held with MOA officials in these areas. Meetings were held with farmers in one of the areas to develop a program oriented toward needs within the general framework of mechanization. From these meetings a plan was developed with the initial efforts aimed at improved seedbed preparation for cotton. With the use of cooperative owned tractors and implements in the area seven plots were prepared for cotton.

Other activities included: a training session aimed at machinery introduction and correct machine use was conducted utilizing the machinery on exhibit at the Cairo International Fair; two cotton planting demonstrations using a small, push type planter, a soybean planting demonstration using a small row planter, and a field sized grain drill were conducted.

Visits were made to:

a) DIABCO (Rumanian tractor sales company) tractor storage area and service center under construction;
b) Tanta Motors (David Brown, plus several short lines from Italy and Japan and some implements and pumps manufactured in Tanta), and two locations in Tanta;
c) Saad El Aguisy (Massey Ferguson and some short lines from several countries);
d) three locations in an near Cairo;
e) one "tractor selling station" on the Cairo-Alexandria Delta highway;
f) two "distributors" in Kafr el Dawar in Beheira;
g) the Land Reform Training Center at Mamuria;
h) the MOA mechanization station near Saddieen village in Sharqia;

i) the MOA mechanization station in Mit Khallaf in Menufia Governorate;
j) the El Shaykh Ahmad Cooperative Society in Beheira Governorate;
k) the cooperative society at Abu Humus in Beheira;
l) ICON (John Deere) sales room and office in Cairo;
m) Nubaria Company farm in the New Lands;
n) Zagazig Agricultural College;
o) Agricultural Engineering Department, Alexandria University;
p) research station at Bahteem;
q) research and demonstration farm in Menufia;
r) Beheira Co. manufacturing plant near Alexandria;
s) a number of farms and farming areas.

Observations and Comments

Education and machinery introduction: Comments by farmers and cooperative employees indicate an interest in pump sets, planters, backhoes (or other ditch cleaning equipment), threshers, inter-row cultivators, pesticide application equipment, harvesting or cutting equipment, and leveling or soil moving equipment. The present tractors and tillage equipment indicates an already accepted mechanization practice and does not appear to demand as much immediate attention as the operations that have not been mechanized and still demand heavy labor inputs.

The conept of replacing or mechanization of "saqqias" (water wheels generally animal run) is generally accepted, though many farmers have been unable to make the change.

A group of 32 farmers were brought in to the Cairo International Fair and taken to those exhibits showing implements that appear to have potential for agriculture. The implements were individually evaluated for the farmers with respect to how they might be useful in their individual farming operations. In the evaluation session following the sessions around the imlements, the farmers indicated an interest in the small thresher, pump sets, planters, and ditch cleaning equipment.

Seedbed Preparation: A trial training/machinery-introduction program was started in the Beheira Governorate near Itay El Barud village. The program was developed with and through a committee of farmers from Shaykh Ahmad village. The initial phase of the program is centered around seedbed preparation for cotton. Local cooperative-owned tractors and implements were used. The program will be used to gain information on production practices, experience in working with farmers in an educational framework, and to aid farmers in that area to develop greater knowledge and awareness of improved farming techniques. Seven different areas within one village area are involved in the program. Attempts were made, with the local farmers involved in each step of the program, to develop a better seedbed through deeper and more intensive tillage. These areas will be the locations for field meetings in the fall.

The soil in this area is a heavy clay that is difficult to till. The previous crop was berseem clover. Observations were made on the depth of root growth of the previous crop and for indications of a compacted soil layer of "plow pan." No compacted layer was found. Clover roots were found to a depth of 20 cm with some roots down to 40 cm. When this soil is allowed to become very dry, a great deal of cracking occurs with cracks to 40 cm deep. The locally manufactured chisel plow was able to go about 8-10 cm deep on the first pass. After 2-4 passes the tilled depth was about 13-15 cm deep. Efforts were made, only partially successful, to till down to 20 cm. A 100+ hp tractor with a chisel plow from Beheira Plant was brought in to attempt to till to a depth of 20 cm or more. Because of the design of the plow plus the heaviness of the clay soil this plow was not able to till any deeper than the locally owned plow.

The heavy clay soils are difficult to till. Low soil moisture levels tend to add to the draft requirements and large clods after tillage. One irrigation seems to effectively break up these clods. Comments by farmers indicate that these soils work easier later in the year. Mechanical planting will be difficult in the poorly prepared seedbeds.

Soil and Water: Plans have been made to precision land level approximately three feddans for rice and maize in Beheira Governorate. Some checks have been made on land elevations in the area and arrangements have been made for the use of Beheira Plant manufactured land leveling equipment. It appears that land leveling will enhance the probability of successful mechanized farming in the Delta. Land leveling and ditch cleaning equipment is being included in the initial sets of demonstration/introduction equipment.

Comments by farmers and cooperative employees indicate that farmers would like to change from animal powered saqqias to diesel powered pumpsets or mechanized saqqias. It appears that the adoption of pumpsets is happening much faster in some areas than in others. Educational programs on credit programs available to farmers, pumpset demonstrations, and meetings held to show the proper use of pumpsets should accelerate the movement to mechanized water lifting.

It appears that farmers continue to apply irrigation water until the highest point in the field receives sufficient water. Land leveling should reduce the total amount of water without reducing yields.

Soybean and Cotton Planting Trials: Several plots were planting in cotton and soybeans to gain experience and knowledge of mechanical planting. On February 9 a small plot was planted in cotton by hand and by a small push type mechanical planter. This was about three weeks before the normal time cotton

planting is started. Farmers observing the planting thought that it was too early to plant but were later impressed that some of the seed did germinate and emerge.

The intended plant population was about 10 plants per meter length of row. Actual emergence was 3-4 plants per meter in the mechanically planted cotton and 2-3 plants per meter for the hand planted cotton. On March 23 more cotton was planted in a nearby plot with the same planter. Plant population has not been checked but oral reports from persons who have seen the plots indicate that the second planting resulted in the desired plant population. This site is one of the locations where training sessions will be held this fall.

The same planter was used to plant several plots in cotton at Bahteem Research Center on April 8. It was also used to plant soybeans in Beheira Governorate on April 22. The seeding rate on this planter is difficult to adjust accurately, making it difficult to seed at a desired rate. Large clods at or just below the surface make planting difficult. It appears that forward speed of about 2.25 km/hr is a good planting speed. With 60 cm row spacing and 60% field efficiency this is about 0.20 feddans/hr. At forward speeds above this, the planter operator experiences difficulties in keeping the planter at the desired depth. The planter leaves an occasional seed on the surface, uncovered. This is not a real problem but does cause some concern to farmers and research personnel. The small planter appears to hold promise as a soybean planter, though more precise metering will be needed.

An attempt was made to plant soybeans with an Italina manufactured grain drill. On level surfaces it appeared to do a fair job even though it is not designed for soybeans. On bedded land, planting depth and seed spacing are difficult to control. The first trial seeding was on a large private farm. Plant population was inadequate, though it appears that weather was a major factor. A later planting was made with both the drill and the small push type planter. The emergence rate of this planting has not been checked.

Implement Manufacture: Most chisel plows, leveling blades, markers, and threshers are manufactured in local shops. Most are copies of the impoements manufactured at the Beheira Plant. Typically, the implements are made after an order is placed. There are, however, some exceptions and the implement manufacturing industry shows signs of development. Some plants are manufacturing increased numbers and increasing their sales area. Comments by farmers and cooperative employees indicate that they are aware of some improvements in design and attention to manufacturing details, and they have an appreciation of the improved implements.

The steel used appears to be mild or low carbon content steel. This appears adequate for frames and some other components

but better steel is needed for chisel shanks, chisel points, etc. If implements such as planters, drills, mowers, etc. are manufactured here in the future, some higher carbon steel will be needed for certain components or the components may have to be imported.

Tractor and Implement Distribution and Service: Eng. A.F. Metwally is Managing Director of DIABCO. This company sells Rumanian (Universal) tractors and spare parts. The company basically sells tractors but is introducing a limited number of implements. This company has the major share of the tractor sales in Egypt. At the present time DIABCO does not have a workshop but does have a large facility under construction that includes a workshop along with a showroom, sales offices, spare parts storage and sales, etc. Eng. Metwally reports that DIABCO has a number of trained technicians and spare parts available at five locations.

Saad El Aguisy, owner and manager of the Massey Ferguson dealership has three locations in or near Cairo. The company carries several short lines including backhoes manufactured in the U.K. He has a large van equipped with training aids including cut-away components. He also has a fleet of small trucks for on-site service.

Dipl. Eng. Assem Abou Farika is the manager of Tanta Motors, dealer for David Brown and a number of short lines. He imports a 5 hp diesel engine from India, manufactures a pump in his workshop and sells the set for LE 600. This includes instruction on maintenance and operation when the pumpset is delivered, plus a followup check in about three months. Tanta Motors has two locations in Tanta plus one in Cairo. They have a workshop, spare parts storage and sales, showroom, a wide range of equipment and tools on display, etc., much like dealers in western countries.

ICON (Industrial Engineering Company for Construction and Development) is the John Deere dealer. Mustafa Abdel Rahman is Agricultural Equipment Sales Manager. They offer the full line of John Deere equipment but past sales appear to be mainly tractors.

Two "distributors" visited in Damanhur sell Universal tractors (apparently on consignment), pumpsets, sprayers, chisel plows and other implements. They each had a showroom with equipment on exhibit and at least one of the "distributors" had a workshop.

Eastern block tractors have an edge in terms of price. 60 hp tractors from the west sell for LE 12,000 or more. Universial (Rumanian) tractors sell for:

Model U 450 (approx. 45 DIN hp)...$4,300 cif
Model U 640 (approx. 64 DIN hp)...$4,850 cif
Model U 750 (approx. 75 DIN hp)...$5,250 cif

Farmers appear to recognize Western tractors in general are a higher quality and some farmers are paying the higher price.

2) Activities Planned for May:

(a) Finishing preparation of specifications for three sets of equipment for use in the education and implement introduction programs;

(b) Conduct a land leveling trial on three feddans near Itay El Barud in Beheira Governorate;

(c) Check cotton planting plots, soybean planting plots, and seedbed preparation trial areas;

(d) Analyze wheat harvest techniques and further develop plans for educational and implement introduction programs in this area;

(e) Continue developing details of the overall extension program.

(Copy, Visits to Sharqia, Menufia, Beheira)

REPORT ON VISITS TO SHARQIA, MENUFIA AND BEHEIRA GOVERNORATES

Ahmed El Behery

SHARQIA, 22 January 1981

Our first visit was to the Governorate of Sharqia on January 22, 1981. We visited the Faculty of Agriculture where we met Prof. Salah Abdel Maksoud, Chief of Agricultural Mechanization Division; we also met Assoc. Prof. Ahmed Hashish. The told us about their research on the situation of mechanization in Sharqia Governorate.

In Minia El Kamh district, we met the Director of the research station at Saddieen village. This village was established by the MOA in June 1980. Machines for the village were provided by the Ministry:

6 Universal tractors, 65 hp
2 MF tractors, 136 hp
6 chisel plows
3 land levelers
5 threshers
4 trailers
2 ridgers

The station Director is an agricultural engineer. Two assistants have BSc's in agricultural engineering; a mechanical engineer, bookkeeper, 8 drivers, a guard and a postman complete the staff.

The station is located 10 km from the center, or District (markaz). This station was established to serve an area of 15,000 feddans. The following is a comparison between the private sector and the service station's operational costs: One-pass ploughing in the private sector cost LE 3, while the service station cost was LE 2 per

The working rates for each tractor were: (a) first tillage, 6-7 feddans/8 hrs; (b) second tillage 8 feddans/8 hrs; (c) threshing 1 feddan/5 hrs. The total expenses, and total income as of 31 January 1981 were LE 2130 and LE 5847 respectively, or a profit of LE 3716.

The spare parts are repaired and made in the District.

(Above data from the books of the service station.)

Recommendations: There is need for a small workshop for repair and maintenance and at the same time providing the private sector with the same facilities. A new shed should be built for the implements. The station should be provided with: seed drill, planter, transplanter, moldboard plow, inter-row cultivator, 4-wheel mower. A short training course is needed by the staff.

The next visit was to dairy farms, the first owned by Mr. Adel Bearum who has 200 cows, 100 buffaloes and 3 bulls. This farm was established 2 years ago and the main crops are clover, sorghum, elephant grass. Another visit was to the farm of Mr.

Mahmoud El Alfy who owns 46 cows, 7 buffaloes. The dairy milk production of the farm is about 500 kg/day. The owners are concerned about the inefficiency of milking machines, as well as the difficulty in knowing the daily milk production of each cow.

Menufia Governorate

We visited the Mit Khallaf station, 3 km from Shebin el Kom, established by the Ministry of Agriculture in 1980. The MOA had provided the following machines: 13 Universal tractors, 6 MF tractors 265, 18 chisel plows, 3 ridgers, 2 land levelers, 2 moldboard plows, 17 threshing machines, 2 mowers, 3 trailers, and various hand tools.

The staff at this station include a Director (Agr. Eng.), an assistant, 3 mechanical engineers, a bookkeeper, a storekeeper and 13 drivers.

The comparison between the private sector and service station on operational costs per feddan are as follows:

		Private	Service Station
One pass plowing	LE	2.50/feddan	2.00
Second pass		2.00	1.60
Leveling		1.00	1.00
Furrowing		1.00	1.00

The main problems confronting the station are:

1. The 6 MF 266 tractors with small sized tyres (13-28) are inefficient compared to the Universal (Rumanian) tractors.

2. They own only two mowers for harvesting which creates problems as the land is not cleared completely; also, the steering mechanism is manual (by foot).

Beheira Governorate

We visited Beheira on Jan. 27, 1981 where me met Eng. Mohamed El Labny, Director, Land Reform Department, Itay El Barud district. The total area belonging to the Department is 12,000 feddans. This area is divided into 10 cooperative societies, and most of the land formerly belonged to the royal family. The area was distributed by the government to small farmers after 1952.

The first part of the visit was to El Shaykh Ahmad Cooperative Society located about 1.5 km from the town. The average unit owned is 2-5 feddans, in which cotton, rice, wheat, maize, and clover are the main crops.

The staff included a Manager (BSc Agricultural Eng.), two assistants, a storekeeper, and bookkeeper. This society has had agricultural machinery since 1972. They are using a seed drill, planter, inter-row cultivator, and mower. The number of machines available:

2 wheel-tractors
2 crawler tractors
2 chisel plows
1 mower
2 trailers

A comparison of private sector and service station operational costs per feddan is given below:

	Private Sector	Service Station
Seedbed preparation (2 pass+leveling)	LE 6.50/feddan	LE 4.00/feddan
Threshing	2.00	1.50
Harvesting path	3.00	2.00

Recommendations:

1. A small pumpset of 5 hp is needed to replace the present water wheel

2. A machine to clean the main canal is needed.

3. A number of implementers such as seed drillers, and a Rotavator land leveler, are needed.

4. A threshing and winnowing machine is needed.

The last visit was to Tanta Motors Co. which has a good showroom and workshop. We met Eng. Abed Abou Frakha, Director. This company is the representative of David Brown Tractors, Mitsubishi Tractors, and implements imported from Italy.

MENOUFEYA GOVERNORATE

Agricultural Mechanization Extension Station
In Meit Khalaf

Income and Expenditure data for Extension Station of Agricultural Mechanization from 1/1/1979 to 31/12/1979

Expenditures		Income	
Items	Amount L.E. Piasters	Item	Amount L.E. Piaster
Maintenance, Installation and Purchasing of Machines	1484,648	Land Preparation for Cotton	1772.524
Perdiem Transportation	111,640	Threshing wheat and ploughing of maize of land reform area	2717.135
Incentives for Labour	3170,735	Threshing of Agricultural Credit land(wheat)	1144.495
Communications	1.340	Threshing of maize in Agri Credit areas	1803.030
Wages and Transporation of Equipment	30.	Threshing of maize in land Reform area.	764.260
Price of Printing and Stationary	34.200	Threshing and Levelling of Credit	181.690
Cost of EnergyResource and petrolium	2737.355	Threshinf and Levelling of wheat in Pheronic Plantation	586.125
Wages and cost of Restoration	306.719	Income	460
Total Expenditures	7876.673		10876.363
Total Income till 31/12/1979	2999.690		
	10886.363		

MENOUFEYA GOVERNORATE
AGRICULTURAL MECHANIZATION EXTENSION STATION IN MEIT KHALAF

Expenditures and Income Items from 1/1 to 31/12/1980

Expenditures Items	Amount L.E Piasters	Income Item	Amount L.E. Piasters
Ploughing Expenses of Cotton in 1980	1331.235	Income of Cotton in 1980	3731.060
Wheat threshing expenses and maize ploughing	3408.980	Wheat threshing and ploughing of maize income	6360.440
Maintenance of ploughs and tractors	1133.950	Income of Berseem in 1980	5338.100
Cost of Tractor fuels	142.30	Wheat threshing income in 1980	3947.825
Cost of Solar in cash	605.670	Tractor trailors income	1863
Cost of the motor oil in cash	69.895	Tractor trailors income	.720
Cost of oil and solar	1448.150		
	8139.910		2196.425
Station Income in 1980	13820.515		
	21960.425		

MENOUFEYA GOVERNORATE
AGRICULTURAL MECHANIZATION EXTENSION STATION IN MEIT KHALAF

Expenditures and Income Items from 1/1 to 31/12/1980

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MENOUFEYA GOVERNORATE

Agricultural Mechanization Extension Station
In Meit Khalaf

Income and Expenditure data for Extension Station of Agricultural Mechanization from 1/1/1979 to 31/12/1979

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MACHINERY MANAGEMENT EXTENSION

It is the intent of the Machenery Management Extension Subproject to:

1. Assist the MOA in selecting and training a core of competent Machinery Specialists to work in both educational and advisory roles

2. Assist the MOA in developing and implementing an in-service training program for professional agricultural workers

3. Work with the Extension Department in establishing and institutionalizing a Machinery Education Program

4. Introduce selected machines in sufficient numbers, together with a demonstration/education program such that these machines will gain widespread use

5. Improve the quality of and distribution system of locally manufactured farm implements

6. Reduce animal use for water lifting through the sakia replacement or mechanization program

7. Develop a two-way relationship with all other subprojects, especially Research & Development, Soil Improvement, and the Service Center Subprojects.

Goal: To increase crop production, increase individual farmer income, and reduce drudgery in farming through increased and more effective use of machines.

Strategy:

More effective use of farm machinery: reduce down time through machinery maintenance and adjustment training meetings and the Service Center program

Increase machinery use and broaden scope of mechanization through the Machinery Introduction Program

Increase yields: through better seedbed preparation and timeliness of operations, resulting from demonstration and training

More effective water use and less salt buildup through land grading, changes in cultural practices and efficient use of pumpsets

More meat and milk production through replacement or mechanization of water wheels (animal driven)

More efficient implements, more readily available, through the Implement Manufacturing Advisory Program

Greater individual farm profits and better quality of living for individual farm families through farm planning, economic analysis ofmechanization and traditional practices and use of custom hire services

MACHINERY INTRODUCTION

Situation: Tractors are acdepted and widely used, primarily for tillage and transport. They are owned by private individuals, family units, cooperatives, and various government agencies. All privately owned tractors and cooperative owned tractors are used for custom work.

Primary tillage is approaching full mechanization. The basic primary tillage tool is the locally manufactured chisel. Designs are much alike and most are similar to the chisel plow manufactured at the Beheira Plant. Shanks are frequently bent due to the low quality steel used in manufacture and to the practice of leaving the chisel in the ground while turning. Chisel points are frequently made from used truck or car springs and typically are about 8 cm wide, and typically operate to 10-15 cm in heavy clay soils. In loam or sandy soils second or third pass operating depths may be 20 cm.

The tractor is used in secondary tillage to make a second (and sometimes a third) pass with a chisel plow. The tractor is also used in "leveling" either with a blade or a wooden beam. This operation is also widely carried out using animal power.

Bed forming may be done with the tractor but typically is finished by hand labor. This practice is an accepted role for a tractor but is presently carried out primarily by animal and human power.

Planting is done by hand.

Weeding and inter-row cultivation is done mostly by hand. Some inter-row cultivation is done by an animal powered, locally manufactured inter-row cultivator.

Insect control is done by the use of "John Bean" type sprayers, hand sprayers, and airplane sprayers.

Harvesting of all crops is done by hand. Rice is threshed by running tractor wheels over piles of unthreshed rice. Threshing of wheat is done with the locally manufactured drum type thresher. An IRRI type thresher has been introduced but is not generally accepted by farmers, primarily because of the low capacity compared to the tractor powered drum thresher.

Separating and cleaning of small grains is done with a hand powered winnower. Cotton is harvested by hand. Wheat is sown by hand broadcasting.

"Puddling" for rice is done primarily by animals. Transplanting is by hand, mechanical transplanting having been introduced only on a limited basis. It has not been accepted and may require a better job of puddling. Some testing of planting rice with a drill has been done and results show promise.

Some machinery shows have been held to introduce new machines but only on a very limited basis. The MOA has conducted some field demonstrations and field tests of new machines.

Implements that provide better seedbed preparation can have a positive effect on yields, on reduction of drudgery, and appear to be a natural extension of present trends.

Harvesting and threshing equipment is needed but present conditions make the choice of machines with good potential difficult.

Planting and drilling equipment presently available and widely used in other countries appears to have potential for widespread use here; however, changes in cultural practices and land leveling are needed before these machines can gain widespread adoption.

Fertilization is presently done by hand and wheat fields indicate that application is frequently not uniform. Fertilizer application equipment could be helpful, especially in larger fields such as in the "New Lands."

Better pesticide application together with proper techniques could make pesticides used more effective and reduce health hazards to those applying the pesticides.

Goal: To assist the farmer to move from tillage mechanization to a complete or more nearly complete mechanized agriculture.

Strategy

Step one: Introduce three sets of quality, well engineered and manufactured equipment. Initially this would include tillage, planting, drilling, land leveling, and drainage equipment. Place these in three villages. Working in cooperation with local farmers, and MOA officials, select fields and develop a plan to demonstrate the effect of good equipment on yields. The total area selected will be of sufficient size to gain creditability among local farmers and to make an impact on the community.

Step two: After some confidence has been gained with the three farmer groups, additional machines with potential but with greater initial risks, are introduced on a limited scale. All machines are monitored closely and changes in both design and use are made as experience suggests. These machines will have been tested at the Testing Center or evaluated by personnel at the Station and Management Extension subproject

Step three: Place introduced machines in the hands of private custom operators. Because initial buyers will face higher than usual risks of customer acceptance as well as the costs of demonstrating to develop a profitable market, a rish and cost sharing arrangement will be worked out for each type of machine and set of circumstances.

IN-SERVICE TRAINING OF PROFESSIONALS

Situation: Efforts are being made to develop an educational program in mechanization. A director of mechanization has been named to the MOA Extension Department.

Land Reform (MOA) has a well planned training program that includes some training in mechanization. Five training centers are in operation and are giving training for "agricultural engineers" (agricultural advisors) for farmers or tractor drivers, and for village level and markaz level MOA agricultural, administrative and supervisorial personnel. The training centers tend to be more theoretical than practical and are badly in need of visual aids. They would benefit from a planned in-service training program that would allow them to keep up to date. The Extension Department needs a core, perhaps five, mechanization specialists with expertise not only in subject matter but in extension education methods.

The Undersecretariat for Engineering Affairs has several highly competent mechanization specialists. This group should however be enlarged by several persons and the scope of their expertise broadened with increased emphasis on farm management, water lifting, cultural practices and implement manufacturing, etc.

Goals: To assist the Extension Department in establishing and institutionalizing a capability in farm machinery; to assist MOA in devoloping a broad based educational structure oriented toward the mechanization aspects of agriculture; to work with MOA in selecting and training a number of mechanization specialists.

Strategy: The concept of "learning by doing" will be used. It is assumed that additional staff named will have had theoretical training but have limited skills in planning and implementing a nation-wide educational program directed toward adults. The Mechanization Project staff will include the newly named mechanization specialist in planning, demonstration, training, etc. activities, providing them with experience as they develop expertise in mechanization.

Schedule: Early planning began in March 1981. Complete plans will be formulated after all Advisors have joined the Mechanization Project and the majority of mechanization specialists have been named by MOA. The program will continue throughout the life of the project.

In-service training for village level, markaz level and governorate level personnel will be conducted on an intermittent basis with mechanization specialists participating. As the mechanization specialists gain experience and expertise, they will continue to develop and implement the program.

IN-COUNTRY TRAINING, NONPROFESSIONALS

Situation: Farmers and/or tractor drivers have had limited training and experience in proper operations and correct adjustment of farm machinery. Machinery that is not operated correctly reduces net yields, increase down time and increases machine operating costs.

Tractors are frequently operated at one half to three-quarters throttle, insufficient ballast, and excessive rear tractor tyre pressure often limits plowing depth and decreases field efficiency. Inadequate care and maintennace increases down time and operating costs. These and other similar factors are acting as restraints to effective use of machinery.

Farmers to not have access to basic information on costs and returns of owning or leasing farm equipment. As mechanization increases, farmers will need additional farm management training to make the most effective use of their limited resources.

Present cultural and irrigation practices make mechanized planting and harvesting difficult. Land leveling will be needed before cultural practices and irrigation practices can be fully adopted.

Animal powered sakias reduce the available meat and milk. Many farmers look forward to mechanizing this aspect of their production practices. Sakia replacement and/or mechanization will provide opportunities for training in optimum water use, reducing the total amount of water use and salinity problems.

The changing situation in mechanization provides opportunities for farm management training to assist families to set goals, develop family plans to reach those goals, and to provide the technical assistance to implement those plans.

Goals: To increase the ability of farmers and tractor drivers to properly operate and manage farm machinery; to increase the management ability of farmers to take full advantage of mechanization; to assist and provide technical information to farmers as they make the transition from animal and human powered agriculture to mechanized agriculture.

Strategy: Initial training sessions will be conducted in the three villages selected for demonstration/machinery introduction/training. Initial sessions will be conducted by members of the Mechanization Project with some involvement of the newly appointed MOA mechanization specialist. As the program progresses, training sessions will be held in other areas and the mechanization specialist will gradually assume full responsibility for the planning and implementation of the program.

Schedule: Planning is now in progress. Initial trial training sessions will begin in May 1981. Training subject matter and times will be planned to correspond to cropping patterns and farmer work load.

Subject Matter Areas: Content and subject matter will be developed by management extension staff, MOA mechanization specialist, and other instructors (Training Center personnel), college and university personnel, commercial sales and service persons, etc. The topics will include:

Seedbed preparation
Basic tractor maintenance
Implement adjustment and maintenance
Farm management planning
Cost and returns of mechanized vs. traditional farming
Care and maintenance of diesel pumpsets
Tractor and implement selection
Replacing or mechanizing sakias
Making efficient use of machinery

Length of training: Two hours to three days.

Locations:

On site
Extension training fields
Markaz training facilities
Training Centers
Research & Demonstration fields
Commercial dealers

PARTICIPANT TRAINING

Schedule

Sept 1981: MOA and the agricultural mechanization group selects 18 district and governorate agricultural officers for short training in machinery management

Oct 1981: The management extension staff (agriclutral engineering specialist and extension education advisor to provide leadership) conducts a workshop in or near Cairo for the selected 18 persons

The plan is developed for the role agricultural officers will have in machinery management education program upon their return to Egypt

Itinerary of participants planned; observation training in developing country with situations similar to those in Egypt; country selected will have a viable, on-going program on machinery management

Nov 1981: Participants will begin out-country observation training

July 1981: MOA and the agricultural mechanization group selects three middle and senior level MOA officials for observation training on machinery management

Aug 1981: Members of the mechanization group conduct a workshop for the selected persons

Itineraries of the participants are planned

Plan is developed for activities of participants upon their return to Egypt

Participants begin out-country training and assume planned responsibility relevant to the mechanization project upon their return

Jan 1982: MOA and the agricultural mechanization group select 15 project counterpart members for training in extension education methods related to mechanization

A workshop will be conducted by all members of the agricultural mechanization project with the extension education specialist to have the responsibility for planning the workshop

Plan is developed for utilizing information gained from observation training

Itineraries of counterparts are planned. Observation, short-term training will be in a developing country with a viable, on-going extension program on agricultural mechanization

Mar 1982: Counterparts begin out-country training on a staggered and following basis and assume planned responsibilities upon return to Egypt

B. May Reporting Period

Summary: Much of the month was spent in developing programs. Activities included:

a) Observed and checked two land leveling demonstrations

b) Checked the maintenance and operation procedures of a large farm

c) Meetings with dealers regarding educational needs and possible machines for introduction into Egypt

d) Meetings with members of the R&D and Service Center subprojects

e) Participated in a MOA-USAID meeting on agricultural extension needs in Egypt

f) Meetings with farmers in Beheira Governorate

g) Checked the seedbed preparation/cotton planting demonstration

h) Made plans for land leveling demonstration

i) General programs planning

In June, land leveling demonstrations, wheat harvest checks, direct rice seeding and transplanting demonstrations are planned.

C. June Reporting Period

Summary: The major emphasis of activities was on land leveling. Three implements were tried. Demonstrations were conducted. Farmer reactions were positive. Other activities included direct seeding of rice on land that has been "leveled;" mechanical transplanting of rice with manual and self-propelled transplanters; wheat harvest with a combine; mechanically baling straw; meetings with farmers.

Land Leveling: Three land leveler implements--a land plane, a soil mover and a hydraulic blade--were made available to the Extension subproject by the Beheira Plant. Each of these machines have been tested previously and found to work satisfactorily in Egypt. We tried each of these implements and found the hydraulic blade to be most acceptable for the conditions under which we are operating. It is not a "precision" leveling implement as we are using it, but appears to reduce the difference in elevation from the high and low spots in a field by about 50%. It also acts a secondary tillage implement. Tractor drivers are able to learn how to operate it quickly. Farmers appear to approve of it. One tractor owner has expressed an interest in purchasing one to do custom leveling in the area.

Approximately 30 feddans of rice were direct seeded with a grain drill in a field that had been leveled with the hydraulic blade. This field will be observed during the season and the results evaluated after harvest.

Mechanical rice transplanting will be demonstrated in the Shaykh Ahmad (Extension working area) village in July. During June, manual and self-propelled rice transplanters were checked. A two-row self-propelled demonstration unit will be used in the demonstration.

The seedbed preparation/cotton planting demonstration fields were checked and progress observed. Several wheat harvest methods were checked including harvesting with a combine.

Observations and Comments: The land leveling demonstration was successful but took a great deal of time to develop. It would be impossible to spend the same amount of time on each major item planned in the Extension program. To assure that the land leveling practice will continue in that area and spread to other areas, considerable followup programs would be needed. The early components of the mechanization education plan appear to work but it appears some reduction will be necessary in the scope of the program.

In July some rice transplanting demonstrations are planned. These fields will be compared with the direct seeded rice sowed with a grain drill in June. Checks will be made on the irrigation and cross furrowing practices used by farmers this year in the fields that have been leveled.

A.4 SERVICE CENTER DEVELOPMENT SUBPROJECT

A.4.1 SERVICE CENTER DEVELOPMENT ADVISOR

Mr. Graham G. Sparrow

a. April Reporting Period

I have received an introduction to the Project and other members of the programs, also members of the Service Center Development advisory committee.

I have had meetings with Dr. Ali Hossary, Abu Sabba and George Bassili.

I secured accomodations in Alexandria.

It is hoped that my counterpart will be chosen next month, and that we can have a meeting with the major tractor importers and visit some of their premises in order to assess what services are offered to the farmers. Project transport has been promised for next month.

b. May Reporting Period

I have discussed with the advisory committee the format of the Service Centers, which was presented to the tractor importers at a meeting in Dr. Hossary's office. Those present agreed to the plan in general. It was agreed that I would visit each in turn so as to understand their problems.

I have interviewed two candidates for the position of counterpart. The gentleman whom I have chosen is awaiting official release from his present employment.

I have been unable to visit any importers as yet, due to the delay in my counterpart's joining the project and unavailability of transport until the end of the month.

Next month, importers and local repairmen and farmers will be visited if possible.

c. June Reporting Period

This month we have held meetings with most of the major importers and have been shown their workshops, parts departments and stocks. Most have talked quite freely about their future plans regarding agricultural machinery.

We also visited some "would be" dealers in the markaz. So far we have been unable to form any kind of link between

these people and the importers. They do not want the importers moving from their present locations. We may find this point of view lower down the scale at the village level also.

It must be stated at this time that not all the importers are in favor of a branch in each of the governorates at the present time.

Before we can go much further we will have to have precise details as to the interest rates, etc., which must be the incentive; otherwise we will be shown the door.

I hope that as we expand our investigations, the current trend will change from: "Big fish can eat the smaller fish, but don't introduce any larger than myself."

Next month being Ramadan, our investigations may be curtailed. But, hopefully, we will have visited all the markaz's and most of the more promising villages.

A.4.2 EQUIPMENT REPAIR ADVISOR

Mr. R.E. Snyder

a. May Reporting Period

I arrived on post the 7th of May and stayed in Cairo May 7 through May . On May I went to Alexandria to locate living quarters, and returned to Cairo May . Most of the time in Cairo was spent acquiring an Egyptian driver's license, an ID/Security card, and getting my personal effects cleared through customs. I received transportation May 20 and left for Alexandria on May 24. As my flat was not available until June 1, it was necessary to rent temporary quarters; Graham Sparrow was very helpful in showing me around the city and introducing me to the various people working in the project.

I moved into my rented flat on June 1 and have spent most of the past two days unpacking personal effects. Other than briefings by Graham Sparrow and Carl Reaves, almost no time was spent on project business in May.