PL-NT-136

# IRRIGATION SYSTEMS MANAGEMENT RESEARCH PROJECT

## FIRST

## SEMI-ANNUAL REPORT

JANUARY 1, 1987

UNIVERSITY OF IDAHO

ISM RESEARCH SEMI-ANNUAL PROGRESS REPORT
JANUARY 1987

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# ISM/RESEARCH SEMI-ANNUAL PROGRESS REPORT
# JANUARY 1, 1987

The Semi-annual Progress Report, a contract requirement, is a management tool wherein the Contractor reports to USAID it's progress in satisfying the contract and in accomplishing the specific tasks specified in the Annual Work Plan. It's objective is to report progress, to identify problems and constraints and to make observations and recommendations that will lead to a better Project.

## 1 PROJECT STATUS

Anticipatory Approval providing funding through June 30, 1987 was received in November 1986. Project funds are now available to all sub-projects. The PC-1's from the three Ministries have been cleared through the Planning and Development Ministry and their approval is an agenda item for the next ECNEC meeting.

## 2 TECHNICAL ASSISTANCE

Technical assistance is specified in contract # 391-0467-C-00-5044-00 with the University of Idaho. All long-term advisors are provided for in the WAPDA PC-1. Short-term advisors are identified under each activity for which a need was anticipated; therefore they are provided for in each PC-1 depending on sub-project.

### 2.1 Long-term advisors

On January 1, 1987 four long-term advisors were in country and the fifth, the Research Program Specialist, had not yet been selected. A candidate for the position served a short-term assignment in Pakistan in Nov/Dec 1986. He has since decided not to accept the long-term position. The status of this position will be reviewed in February among USAID, GOP and the Contractor to determine if restructuring is called for.

#### 2.1.1 Progress in achieving contract objectives

The contract has a detailed Scope of Work for each long-term advisor. Specific responsibilities and duties are outlined. Because of delays in receiving GOP approval for funding of counterparts, meeting long-term advisor contract Scope objectives have likewise been delayed. The following Scope of Work items have not yet been implemented.

Chief of Party

1. Design a methodology to monitor the level of advisor effort on each sub-project.
2. Participate in in-country training programs.
3. Participate in review of Competitive Grants proposals.

Social Scientist

1. Work with MONA personnel in the "action" programs of the Integrated Watercourse Management sub-project.
2. Identify needs for additional sociological research in irrigation management.
3. Participate in in-country training programs.
4. Participate in review of Competitive Grants proposals.
5. Assist in preparing a water management newsletter.

Hydrologist

1. Provide technical assistance to projects other than those at SCARP Monitoring.
2. Prepare technical progress reports.
3. Participate in in-country training programs.
4. Participate in review of Competitive Grants proposals.

Irrigation Agronomist

1. Assist with preparation of technical materials.
2. Participate in in-country training programs.
3. Participate in review of Competitive Grants proposals.

Research Program Specialist

Not in-country. Therefore entire Scope not implemented.

2.1.2 Progress in accomplishing tasks in Annual Work Plan

The Annual Work Plan indicated that the Project was underway with Anticipatory Approval through June 30, 1986, however, the follow-on Approval to provide funding beyond July 1 was not received until November 1986. Therefore, there were essentially no research funds available to researchers during this report period. This naturally affected the accuracy of the timing of tasks in the Annual Work Plan.

Most tasks expected to be started or completed by January 1, 1987 have been. Those pending are outlined below.

Tasks: Chief of Party

1. Recruitment of local office staff completed.
2. Establishment of Project Implementation Committee.
3. Water measurement training conducted.
4. Drainage research techniques established.

Status: Full staffing of the office has not been necessary because research initiation was delayed, advisor's arrived later than scheduled and no equipment or vehicles were received during the report period. Field office staff should be at full strength at the end of the next report period.

Even though the Implementation Committee was not formally established, several informal meetings have been held. The Federal Coordinator has agreed to formalize the Committee during the next few months.

Training and drainage research techniques were not done because insufficient counterparts were assigned and in place. Other planned research tasks have proceeded on schedule.

Tasks: Social Scientist

1. Complete recruitment of PCRWR staff.
2. Supervise field research.
3. Orient and train Farmer Involvement sub-project staff.
4. Train Social Scientists.
5. Help prepare newsletter.
6. Train in data collection and analysis.
7. Assist with creation of Special Studies Unit.

Status: The advisor has assisted with recruitment but progress has been slow. The appointment of the PCRWR Chairman should expedite recruitment.

Remaining tasks not complete because staff have either not been assigned or collaborator agreements not been signed.

Tasks & Status: Hydrologist and Irrigation Agronomist

All tasks in Annual Plan have been started or completed. It was recognized during preparation of the Plan that they would arrive late in this report period. Since research is now underway their work plans should be accurate.

Tasks and Status: Research Program Specialist

Not in-country. Short-term advisor has completed tasks.

2.2 Short-term advisors

Short-term technical assistance has been provided approximately according to the Annual Work Plan. There have been some delays due to slow approval of the Project and not having key research personnel in place. Following is a summary of short-term technical help provided during the reporting period.

| NAME | SPECIALITY | TASK ASSIGNED | MONTHS |
|---|---|---|---|
| Nordin | Civil Engineer | Irrig. Research Institute | 2.37 |
| Robinson | Civil/Irrig Engr. | Irrig. Research Institute | 2.53 |
| Harson | Science Librarian | Documentation Center | 1.70 |
| King | Agri. Engineer | Equipment & drainage | 1.23 |
| Brockway | Agri. Engineer | Equipment & gw. models | 0.77 |
| Bassett | Irrig. Agronomist | Farm Water Management | 0.97 |
| Johnson | Hydrologist | Ground Water Models | 0.97 |
| Hamilton | Agri. Economist | Beyond Watercourse Improv. | 1.37 |
| King | Agri. Engineer | Drainage | 1.43 |
| Dow | Irri. Agronomist | Farm Water Management | 1.40 |
| Wiese | Research Mgnt. | Competitive Grants | 2.17 |
| Bondurant | Hydr/Irrig. Engr. | Irrig. Outside Indus Basin | 1.43 |
| | | TOTAL | 18.34 |

## 2.3 Level of effort

This summary table represents the levels of effort in the contract and the status on January 1, 1987. Since the contract termination date is October 1, 1989, there are 33 months remaining after this report period.

| CATEGORY | IN CONTRACT (mos) | USED (mos) | REMAINING (mos) |
|---|---|---|---|
| FIELD STAFF (EXPATRIATES) | | | |
| Chief of Party | 48.00 | 21.00 | 27.00 |
| Social Scientist | 46.00 | 16.00 | 30.00 |
| Research Program Specialist | 36.00 | 0.00 | 36.00 |
| hydrologist | 40.00 | 3.00 | 37.00 |
| Irrigation Agronomist | 36.00 | 3.00 | 33.00 |
| TOTALS FIELD STAFF | 206.00 | 43.00 | 163.00 |
| LOCAL STAFF | | | |
| Assistant to COP | 48.00 | 0.00 | 48.00 |
| Research Officers | 144.00 | 10.00 | 134.00 |
| Administrative Officer | 48.00 | 11.00 | 37.00 |
| Secretary/Bookkeeper | 48.00 | 16.00 | 32.00 |
| Other Administrative Staff | 624.00 | 62.00 | 562.00 |
| TOTALS LOCAL STAFF | 912.00 | 99.00 | 813.00 |
| SHORT-TERM ADVISORS | | | |
| Irrigation Agronomy | 22.00 | 2.37 | 19.63 |
| Agricultural Engineering | 21.00 | 3.43 | 17.57 |
| Agricultural Economics | 15.00 | 1.37 | 13.63 |
| Irrigation Engineering | 12.00 | 2.90 | 9.10 |
| Sociology | 10.00 | 0.00 | 10.00 |
| Hydrology | 10.00 | 1.40 | 8.60 |
| Information Management | 6.00 | 1.70 | 4.30 |
| Research Management | 5.00 | 2.17 | 2.83 |
| Computer Science | 4.50 | 0.00 | 4.50 |
| Civil Engineering | 3.00 | 3.00 | 0.00 |
| TOTALS SHORT-TERM | 108.50 | 18.34 | 90.16 |
| HEAD OFFICE SUPPORT | | | |
| Program Director | 14.25 | 9.00 | 5.25 |
| Training Officer | 15.00 | 0.50 | 14.50 |
| Program Assistant | 48.00 | 8.00 | 40.00 |
| Records Clerk | 24.00 | 0.00 | 24.00 |
| TOTALS HOME OFFICE | 101.25 | 17.50 | 83.75 |

The actual level of effort for the Program Director and the Program Assistant have been 12.75 and 12.50 person months respectively. The amounts shown in the table are the times charged to the Contract. The University has supplemented these levels from other funding.

Obviously the contracted level of effort for the Program Director will be insufficient unless Project management methods are changed.

## 3 PROCUREMENT

Procurement of equipment is through the sub-contract with Development Alternatives, Inc. Most equipment will be procured in the United States and shipped to Pakistan where it will be distributed to the concerned institutions. A small amount of locally made equipment will be procured in Pakistan. All equipment specifications are prepared in Pakistan in consultation with the concerned researchers. A data base program has been designed to track procurement and to inventory all equipment during the life of the project.

### 3.1 In process

Equipment items requiring approximately one-half of the budget have been identified, specified and are under procurement. The items are those urgently needed to initiate the sub-projects and represent much more than half of the number of items to be purchased since some large special equipment items are still being specified.

Project vehicles were specified in April 1986, however procurement has been very slow. USAID procures all vehicles for all projects in Pakistan. The first vehicles to be delivered to the project are expected in January 1987.

The bids for computer equipment were received on December 31, 1986. Evaluation and selection will be in January 1987. The performa calls for 20 days delivery which will be to a central location in the United States where completeness and correctness can be readily checked. Shipment to Pakistan will then be initiated. Delivery is expected in March 1987.

Bids for photographic equipment will be received by February 6, 1987. This equipment will be shipped with the computer order.

The remaining field and laboratory equipment was being processed for bidding in December 1986. The bidding deadline will be in March 1987 with delivery expected in June 1987.

### 3.2 Identification

About one-half of the remaining items of equipment are being specified. This should be complete by February 1987. Procurement will begin immediately after specifications are finalized. Procurement for this, the second order of equipment, should proceed much more rapidly because many of the equipment items are similar or the same as those purchased in the first order.

## 4 RESEARCH SUB-PROJECTS

Progress was severely limited during this report period since practically no Project funds were available to any sub-project. However, many Principal Investigators allocated some resources and exceptional progress was made considering the circumstances. This is surely a reflection of the importance placed on the Project by the research agencies.

### 4.1 Integrated watercourse management

Five activities have begun as follows:

Buried Pipeline--A watercourse area served only by a SCARP tubewell supply was chosen. A pipeline is being designed to deliver water to 15 turnout points within the command. The design is such that the tubewell flow has been divided into two equal parts to create two warabandi groups, each with one half the previous supply. This design is more economical to construct, but more importantly it might give the farmer a more efficient stream size. It is expected that there will be much less wasted water. Field surveys have been made and water losses from the present open ditch system determined.

Effective Water Distribution--A canal supplied watercourse has been selected to install the same type of "splitting the chak" as with the pipeline study. The command area has been divided into two equal parts and the watercourse flow will be split below the canal turnout so that there actually will be two warabandi groups operating on the one watercourse area. The objective again is to provide each farmer with a more manageable stream size which hopefully will create a much higher overall irrigation efficiency. Benchmark data have been taken and the division structure is being designed.

Mechanical Construction of Watercourses--The watercourse has been selected, a profile survey made and the farmers have removed the trees and shrubs from the watercourse area. The necessary tractor drawn equipment, ditcher and scraper, have been assembled and made in good working order. The construction will start immediately after the first of January.

Matching Cropping Patterns--Cropping patterns have been determined on two watercourse areas. Discussions have been held regarding how best to determine the effects of different cropping patterns given a fixed supply of water. Obviously computer simulation will be an excellent tool, however until the arrival of computers and training has taken place it will be impossible to use this method. Data are being collected on the irrigation requirements for the important crops. A desk study will first be made on the relationships between crop needs and water supply given several selected watercourse cropping patterns.

Monitoring Irrigation Water--Water and irrigation measurements were started in December. Water flows in a distributary are

being taken as well as the area irrigated during the night and day times. Methods of computer analysis are being developed.

4.2 Farm water management

This study is being done by several institutions including Mona, LIM and five institutions coordinated and financed through PARC.

Biotic Reclamation--Cooperators are the University of Agriculture, Faisalabad, the Land Reclamation Directorate, the University of Karachi (all through PARC) and Mona. Sites have been selected. Field experiments are underway at the Land Reclamation Directorate and at Mona and greenhouse studies at the University of Karachi. There is a current need for a short-term advisor to assist with chemical analysis techniques.

Nitrogen Management--Cooperators are the Sind Agricultural University, the University of Agriculture Faisalabad, and the National Agricultural Research Center, NARC (all through PARC) and Mona. Crops and sites have been selected. Rabi crops have been planted at the NARC and Mona sites. Greenhouse studies are underway at the University at Faisalabad.

Brackish Groundwater Use--Cooperators are Mona and LIM. Research on cotton was carried out at Mona during the 1986 kharif season. Field plots are in progress at both sites during the present rabi season. Both sites have been planted to wheat. The use of sprinklers for germination could not be done because equipment has not yet arrived, however germination is good at both sites.

Strategies for Poor Drainage Sites--Cooperators are Mona and LIM. All sites (three at LIM and two at Mona) have been planted to wheat. LIM has also introduced irrigation methods at all sites. The treatments are conventional flooding and broad beds of varying widths.

Salt Balance--This study is at Mona. No field work has been initiated because there is still discussion on how to conduct such a study given the fact that closed groundwater basins are impossible to find within the Indus Plain.

4.3 Irrigation outside the Indus Basin

Several field visits to Baluchistan have been made and a research plan has been developed. Field data collection will start in January 1987. The research team has been sanctioned and posted.

The research plan is comprised of work in Sailaba irrigation, karez rehabilitation and improvement, rehabilitation of small-scale systems and flood utilization and abatement. The initial study will be that of karezes. Two sample areas in the Quetta area have been selected for benchmark surveys.

Lack of equipment, especially vehicles, has been a major constraint since mobility is essential when working in so many diverse areas.

4.4 Beyond watercourse improvement

Research officers have been sanctioned for the project and with the exception of the Senior Economist have been posted.

Some monitoring data for 56 watercourses have been organized for analysis which can be started with the arrival of computers.

This sub-project will include "Special Studies" dealing with various aspects of water use on the watercourse system. Three topics have been selected and some data collection started. The topics are (1) trading canal with tubewell water, (2) the extent of under and over irrigation and its impact on wheat and cotton production and (3) existing flows in channels compared to design discharges in Punjab and Sind.

4.5 Ground and surface water models

A room in the existing SCARP Monitoring building is being furnished to accommodate the computers. In the meantime, a building addition has been designed with construction to start in February or March. This will house the SCARP Monitoring sub-projects.

Data collection for the simulation model of the Mona Scheme in SCARP-II is still in progress. Hydrologic data in the Khanqah Dogran Scheme of SCARP-I is also in progress but the Mona Scheme has been selected as the first simulation model.

Training will be initiated in February 1987 with a course in Groundwater Concepts for eleven participants. A Fortran IV/77 computer language course will also start in February.

4.6 Public and private tubewells

SCARP-III was selected as the area for data collection on public tubewells. Data of the available 1090 tubewells have been collected. The data include design capacity, lithologic logs, casing schedule and slot size. Some private well data have also been collected.

Progress in this sub-project is especially dependent on the special equipment for analyzing tubewell deterioration. The equipment is not expected for several months however and in the meantime emphasis will be on field data collection not requiring special equipment.

4.7 Drainage and water table control

Most staff positions have been filled. Project funds are not yet available at the sub-project level.

A small-scale farm-sized drainage system has been designed to serve as a water table control as well as a surface drainage mechanism. Three sites have been selected for installation of the drains. These are all near Tandojam in the Sind Province. At least one drain will also be installed at the Mona site in the Punjab.

### 4.8 Farmer involvement in water management

Collaboration with the University of Agriculture-Faisalabad, the Applied Economics Research Centre (Karachi), the University of Agriculture-NWFP and the Pakistan Institute of Development Economics (Islamabad) is being finalized. A draft agreement for use between PCRWR and each institute has been approved by PCRWR and sent to the concerned parties for review. Formal agreements are expected soon.

Several posts relevant to the sub-project are yet to be filled and the sub-project does not yet have funds available.

## 5 INSTITUTION BUILDING

Institution building is an integral part of the Project and it is handled in much the same manner as research, through specific activities.

### 5.1 Documentation center

The Center has been made into a National Documentation Centre, Library and Information Network (NADLIN). The Centre plans to accommodate much more than water resource material.

All potential collaborators have been identified, notified and visited. Draft agreements have been finalized. A building has been rented to provide space for the Centre.

Some posts have been filled, however at this time it is not clear which posts relate to the ISM Research project and which are for the more general operation of the National Centre.

During the next report period, the details of how the ISM Research Project relates with the Centre will need to be finalized since apparently the Centre is no longer a part of PCRWR.

### 5.2 Competitive grants

The Project Director visited potential collaborators at Universities and explained the program. A draft set of Guidelines has been prepared with the help of a short-term consultant and this is being finalized.

A list of possible cooperating institutions and possible research topics has been prepared. The selection of a Technical Review Panel is in progress.

A draft agreement to be used with successful proposers and the Council has been approved by the Ministry of Science and Technology.

The post of Assistant Director (Liaison) has been filled and remaining positions should be filled during the next quarter.

## 5.3 Training

The Annual Training Plan was submitted to USAID in July 1986 with the misunderstanding that the training year started on July first. Since then, two amendments have been made based on knowledge of short courses received after July 1986.

About 50 possible participants have taken the TOEFL test and 3 have qualified and taken the intensive English training course provided by USAID. Several candidates are presently being processed for training abroad.

### 5.3.1 In-country

Training in the use of computers is of first priority. An assessment of training needs will be made early in 1987. This assessment will be a study of all institutions receiving computers to assess their possible uses for computers. From this assessment, a training program will be designed to start immediately after the arrival of the computers, hopefully by April 1, 1987.

The following additional training courses are planned during the next six months:

Socio/economic methods of research March Groundwater concepts February
Library/documentation techniques March/April
Groundwater simulation June

Of course, there has been hands on training during the report period. This has included training in design of pipe flow systems to Mona staff and design of drainage systems.

### 5.3.2 Abroad

Two long-term degree trainees were processed as follows:

Munir Bhatti; PCRWR; PhD; Water Resources Planning; Colorado State University; started September 1986.

Mohammad Akram; PCRWR; MSc; Irrigation Engineering; Asian Institute of Technology; to start in January 1987.

# 6 COORDINATION

Coordination has been carried out informally since no committees have been officially created. There have been three meetings of the Principal Investigators (the leaders of each of the ten activities) plus the higher level administrators of each of the institutions, WAPDA, PCRWR and PARC. There have also been coordinating meetings among the researchers carrying out the Farm Water Management sub-project.

A proposal has been sent to the Federal Coordinator to appoint a Technical Advisory Committee and a Project Implementation Committee. The former, with high level country-wide participation, is to address

points of policy and to communicate research results and activities to all Provinces. The latter, is to include representatives of the institutions implementing the Project, and is to deal solely with project issues and constraints. It is felt that these Committees could greatly facilitate good project coordination.

## 7 CONTRACTOR ACTIVITIES NEXT 6-MONTHS

During the next 6-month period the tasks outlined in the Annual Work Plan will be completed. The specific role of and tasks for each long term advisor is much clearer now that the Project has begun and research agencies are preparing to implement each sub-project. The planned activities for each advisor are as follows:

### Chief of Party

1. Plan and participate in a quarterly meeting of Principal Investigators in April.

2. Organize and install a program for receipt, use, maintenance, protection, custody and care of non-expendable property purchased with contract funds.

3. Finalize the field office staffing and fill all vacancies.

4. Visit all research sites.

5. Plan and participate in the Annual Review and prepare the Chief of Party work plan for the next year.

6. Supervise the preparation of next year's Annual Work Plan and updating of the Master Plan.

7. Provide technical help to the Integrated Watercourse, Beyond Watercourse Improvement and the Outside Indus sub-projects.

8. Finalize all required Task Orders needed during the period.

### Social Scientist

1. Participate in the Annual Review and prepare his individual work plan for 1987/88.

2. Provide technical help to the Farmer Involvement sub-project. Finalize agreements with all collaborators and initiate research.

3. Assist with a social research agenda for the Integrated Watercourse sub-project.

4. Provide assistance to PCRWR with implementation of the Competitive Grants and Documentation/Library programs.

5. Conduct an in-country training course in Socio/economic methods of research.

6. Provide technical assistance to the Beyond Watercourse Improvement sub-project.

7. Assist counterparts with preparation of Scopes of Works for needed short-term technical assistance.

Irrigation Agronomist

1. Participate in the Annual Review and prepare his individual work plan for 1987/88.

2. Provide technical help and training in the design and construction of closed pipeline delivery systems.

3. Supervise technical assistance to all research activities under the Farm Water Management sub-project.

4. Provide technical help to the Drainage sub-project.

5. Assist with disposition of research equipment.

6. Assist counterparts with preparation of Scopes of Work for needed short-term technical assistance.

Hydrologist

1. Supervise the work of the sub-contractor defining computer training needs and designing courses to meet the needs.

2. Participate in the Annual Review and prepare his individual work plan for 1987/88.

3. Conduct two in-country training courses in Groundwater Concepts and Groundwater Simulation.

4. Provide technical help to the Groundwater Modeling and the Tubewell sub-projects.

5. Assist counterparts with preparation of Scopes of Work for needed short-term technical assistance.

Short-term Technical Advisors

Task Orders have been approved for the following activities:

1. Assistance with the design and construction of watercourses using mechanical means. Advisors are Walter Moden and Niel Dimick. To be accomplished in January/February.

2. Library training. Advisor Donna Hanson in March/April.

Following are the anticipated needs for assistance during the next few months. Task Orders have not yet received clearance.

1. Tubewell monitoring design and groundwater simulation training. Dale Ralston in April.

2. Tubewell deterioration and rehabilitation. Advisor to be selected, timing in June.

3. Finalizing and advertising Competitive Grants program. Advisor to be selected, timing in April/May.

4. Micro-economist/data management. Hamilton, Quenneman or Whitelsy, timing in June/July.

5. Soil chemist and salt balance. Advisor to be selected, timing in July.

6. Anthropologist for farmer involvement. Advisor to be selected, timing in July/August.

7. Drainage construction and data collection. Larry King, timing in July/August.

8. Sailaba irrigation research methodology. Advisor to be selected, timing in July/August/September.

9. Surface irrigation technology/methods. Advisor to be selected, timing in September/October.

## 8 CONCLUSIONS

The project is presently progressing fairly well, however it is much behind the schedule specified for in the Contract. This has been mostly due to the delays in receiving PC-1 approval without which no research could get underway. There are still constraining issues, some of which could be eased and many of which are the natural process of creating new concepts and programs.

### 8.1 Observations

Task Orders for short-term advisors require about two weeks to obtain clearance from the requesting agency, from the Technical Coordinator, and from USAID. Experience has shown that the approval of the Federal Coordinator can require two to three months. It is therefore necessary to plan and prepare Task Orders far in advance. Sometimes this is not possible because, in any live system, emergencies often occur.

Although the Implementation Committee has not been formalized, the Federal Coordinator has called some meetings. These meetings have always resulted in resolution of several issues. Also there have been quarterly meetings of the Principal Investigators for each sub-project. These have been invaluable in conducting project business. The project is diverse with respect to institutions and research agenda and these meetings are essential for coordination.

The work load has increased immensely at the local office of the contractor. This is the result of the project finally getting underway, the procurement details and the fact that the expatriate field team is one member short and the local hire staffing is not complete.

Training is a continuing and complicated process. There are many aspects that need to be learned as participants are selected and finally placed in training programs. There needs to be more effort by all concerned, the advisor team, the research institutions and their administrative supervisors if the project is to take full advantage of the liberal training possibilities provided by USAID.

The contract does not provide for an adequate level of effort for the home office at the University of Idaho. That office has done an excellent job to date, but has needed non-USAID funding support and the Project Director's contracted time will be used up in less that one more year. Also allowance was not made in the contract for the time (2 to 3 months per year) for the Project Director to travel to Pakistan to assist with project planning and coordination. Without someone spending considerable time on assistance at the campus level, the advisor program must be altered or reduced. This issue will be critical at the next report submission.

8.2 Recommendations

1. The Project Implementation Committee should be formalized. In fact, the two Committee approach suggested by USAID should be adopted. With three Ministries involved, there are too many items that are actually firsts and need careful coordination to work out implementation details. Attempting coordination through the mail or over the phone simply is not adequate or efficient.

2. The remaining open position on the long term team should be reviewed soon to change the Scope of Work to more accurately match the present field office needs. This would undoubtedly also make it easier to recruit a suitable person for the position.

3. The field office should recruit and fill all local hire vacancies. This would relieve the present work load and is timely because equipment is soon to arrive and computer training to start.

4. The level of effort for the Program Director should be increased significantly. In fact, the contract needs to be scrutinized carefully regarding timing. The delay in start up of research will necessitate carrying the research work considerably beyond the termination of the technical assistance contract. This may not be serious, however it needs to be recognized.