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BANGLADESH AGRICULTURAL RESEARCH PROJECT PHASE-II

SIX MONTH PROGRESS REPORT - V (July - December 1983)

**Presented by
The Project Supervisor IADS**

**in cooperation with
The Bangladesh Agricultural Research Council**



**BANGLADESH AGRICULTURAL RESEARCH COUNCIL
INTERNATIONAL AGRICULTURAL DEVELOPMENT SERVICE
February, 1984**

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BANGLADESH AGRICULTURAL RESEARCH COUNCIL
INTERNATIONAL AGRICULTURAL DEVELOPMENT SERVICE

February 1984

The Six Month Progress Report - V (1st July - 31st December 1983) of the Agricultural Research Project Phase II presented on the following pages has been approved and authorized by the Bangladesh Agricultural Research Council.


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AGRICULTURAL RESEARCH PROJECT PHASE - II
SIX MONTH PROGRESS REPORT - V
(July - December 1983)

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INTRODUCTION

This report covers the period from 1st July to the end of December 1983. It comprises a summary and detailed reports of Project activities and progress towards the goals of each program area. These individual reports also identify constraints that have been met and proposals as to how they may be overcome.

There are tables showing the status of the expatriate staff positions in terms of the number of person months devoted to the Project during the reporting period, also a summary of consultancies and a financial statement for the same interval.

The progress recorded here has been achieved through cooperation between BARC and the staff of the International Agricultural Development Service. It is believed to be considerable and to have furthered BARC's role in developing and coordinating the national agricultural research system.

SUMMARYGeneral Activities

The last six months have seen further substantial progress towards project goals. The staff who arrived during the previous reporting period have become established in their positions and able to make important contributions, while the arrival of new specialist staff has further increased the Project's ability to address the needs of the agricultural research system. Work continues with greater coordination with BARC through the regular quarterly meetings; between the various institutions involved in agricultural research, and between the different program areas. Work is proceeding on the draft of the National Agricultural Research Plan, with inputs from the resident Specialists.

Staff

New staff members include Dr. Carlos Garces, Agricultural Engineering Specialist in the IWM program, who arrived in September and is posted at BARC, Dr. Dale Krigsvold, Plant Pathologist (October), and Dr. Edward Loomis Horticulturist (November), both of whom are posted at BARI but are assisting at all relevant research institutions. Mr. Harvey L. Carr, the BARC Maintenance Specialist, arrived in December. He is also posted at BARI but is responding to the maintenance and repair needs of the national research system through requests submitted to BARC. Mr. Ronald Stanley took up responsibilities as Associate Administrative

Specialist in August. Mr. Stanley, posted at BARC, is responsible for providing support services to the expatriate staff. There were no departures during this reporting period.

Major Activities of Program Areas

Regular staff meetings continue to play an important part in helping to coordinate staff activities and facilitate a multidisciplinary approach to agricultural research.

Project management has been strengthened by the appointment of Dr. Manzano as Deputy Project Supervisor. Dr. Manzano has been made responsible for the technical administration of the contract research component of the Project and in the absence of the Project Supervisor is in full charge. These duties are in addition to his responsibilities as Farming Systems Specialist.

Responding to the need for additional support in management of the Project, BARC and USAID authorized the hiring of a Program Assistant to help the Project Supervisor. The post, now filled on a contractual arrangement, will soon be formalized by contract amendment.

Good progress has been made towards reforming financial management and accounting procedures, a review of BARC's computer needs has been made, and a separate support unit for expatriate staff will soon be operational.

The areas under which the Project provides technical support are Farm Development, Maintenance, Training and Communications. The Farm Development program included assistance to BARI in inventorying equipment and drawing up plans for its optimal utilization; land development plans for a 10-acre fruit and vegetable area at RARS Ishurdi; assembling and putting farm machinery into operation and providing training in its use; drawing up a reorganizational plan to strengthen farm support services at BARI; and general assistance in installation and construction of new facilities at the regional stations.

The Maintenance Specialist arrived on post in mid-December and has already drawn up detailed maintenance procedures which should become operational within the next reporting period.

Major activities in training included both in-country and overseas courses. During this six months eleven degree scholars went to study abroad. Three of these are Ph.D candidates and eight are studying for Masters degrees. Another nine persons have been admitted to Third World universities and are scheduled for departure in 1984. Twelve short-term training courses have been held in Bangladesh and 15 abroad. Selection panels have been set up to award a further seven Ph.D and 27 M.Sc. scholarships. One sabbatical leave was awarded, and three persons went abroad on senior staff tours.

Other major activities included work on a Revised Manpower Report (a follow-up to the Preliminary Manpower Report), and preparations for a Master Plan for in-service short-term training in Bangladesh during 1984.

The main activities of the Agricultural Communications Program were directed towards celebrating the tenth anniversary of BARC, through publication of Agricultural Research in Bangladesh and This is BARC, preparations for the first National Symposium on Agricultural Research and a slide film program about BARC. Two issues of a BARC newsletter, Agresearch News, with a circulation of about 2,000 were published during this period.

The Farming Systems program is staffed by the BARC Specialist and three Associate Production Agronomists posted at the BARI sub-stations in Hathazari, Jamalpur and Jessore. Activities included monitoring and evaluation of seasonal work plans at Cropping Systems sites, assistance with collecting and interpreting data, with preparation of bulletins on technologies suitable for transfer to local farmers, organization of farmers' field days, and advice on experimental layout and design. Efforts are underway to achieve some integration of the IWM and Farming Systems programs at existing Cropping Systems sites.

The Farming Systems program was also involved with an evaluation of the progress of the National Coordinated Cropping Systems Program and of the Horticultural Division of BARI.

Evaluation of component technology trials at the Regional Agricultural Research Stations and the applicability of results to farmers' conditions continues.

There are three program areas in the crops sector, namely Agronomy, Crops and Horticulture. Agronomy activities included drawing up plans for a program of skills training for junior research officers; provision of training in applied statistics, field plot harvest and mechanical threshing techniques; plans for maize production on-farm demonstrations between BARI and the Agricultural Extension Department; plans for a 2.5 acre extension block; participation in an evaluation of the BARI Agronomy Division; and input on agronomic priorities for the national research plan for the next five years.

Activities in the crops program included extensive involvement in the preparation of the National Agricultural Research Plan; assistance in preparing a working paper on Pulses and Oilseeds and in drafting terms of reference for a study team on this subject; assistance to the Executive Vice-Chairman of BARC in drafting position papers and technical documents; monitoring of BARI's pulses program; setting up an analytical

laboratory at BARI for the rapid analysis of protein, oil, moisture and basic amino acids; publication of seven papers; and preparation of three documents for the Ministry of Agriculture.

The Horticulture program's activities mainly involved orientation for the new Specialist who was however able to make some contribution to formulating a national vegetable research program proposal at the Agricultural Research Planning Workshop in November.

Work in the area of Economics and Social Sciences involved: participation in evaluating BARI's Agricultural Economics Division; assistance to the BARC Member-Director (AESS) in the preparation of a Proposed Annual Plan 83-84; completion of a paper on income analysis; presentation of a short course on socio-economic data analysis and application of partial budgeting to cropping system data; preparing workshop proposals; assisting in preparation for a short course on applied statistics to be held in January-February 84; and participation in a revision of the National Agricultural Research Plan.

The Soil Management program continued with a wide range of activities: carried out follow-up work to improve the quality of contract research; assisted in preparing a policy paper as a basis for the National Soil Fertility Evaluation and Improvement Program;

worked on an improved version of the Fertilizer Recommendation Guide; assisted in organizing and participated in various training courses; evaluated research and held discussions with scientists at a variety of institutions; designed and advised on the construction of a shadehouse - headhouse for BARI; initiated greenhouse research at BARI; completed sampling of the major agricultural soils series; and spent considerable time in setting up a training/observation tour for four Bangladeshi soil scientists.

Work continued towards completion of a central soils laboratory at Joydebpur, and in making arrangements for the International Soil Science Society Commission IV meeting in February.

In the Irrigation and Water Management Program (IWM), discussions continued about suitable training, with various alternatives, including setting up of a training materials production and testing unit at Bogra Rural Development Academy, being proposed. Plans were discussed to link research on IWM with extension, and progress was made towards integration of the IWM program with Farming Systems.

Work was undertaken on a study of pumps, motors and wells; assistance given in the preparation of an Irrigation Management Program manual for use in the national command area development program for minor irrigation; participation in workshops concerned

with national research priorities; preparations made for consultancies, including that of the Cornell-CSU team which reviewed the IWM program at the Bangladesh Agricultural University; work on plans for a drainage and irrigation research project at Boro Biler Far; preparation of a work plan for surveying "Performance of different types of tubewells and LLP equipment"; initial contacts made to develop contract research, and current research evaluated. A program for an annotated bibliography and library purchase was prepared, and lists of research equipment needed at various institutes are being drawn up.

The Pest Management program got underway in October with the arrival of the Plant Pathologist. Familiarization visits were undertaken to SRTI, the regional research stations at Jessore and Ishurdi, BAU and INA Mymensingh, and BARD Comilla. Visits were also made to the cropping systems research sites at Jessore, Ishurdi and Daudkandi to see how pest management principles could be included in the programs. An informal review has been made of ongoing field research projects at BARI headquarters and the regional research stations; a training course in techniques of crop loss assessment has been identified as suitable for Bangladeshi scientists; laboratory equipment and facilities at the regional research stations reviewed and lists of additional equipment required drawn up with a view to setting up a diagnostic and research laboratory at each station; listing of publications related to pest management held at the major libraries completed, and a list of desired publications is in preparation.

The Specialist also participated as a member of the pest management work group in the Bangladesh Agricultural Planning Workshop, and has been appointed to the BARC Banana Task Force, in connection with which he has helped to prepare a national survey questionnaire and two leaflets for national distribution.

International Travel

During the reporting period, specialists undertook official overseas travel: Dr. Hutchcroft made two visits to Singapore in connection with the publication of Agricultural Research in Bangladesh; Dr. Kaul visited Indian universities to collect information on organizing agricultural education at post-graduate level; Dr. Greene visited the CSR sites of the Integrated Cereal Project in Nepal; and Dr. Portch attended a Biological Nitrogen Fixation workshop in Bangkok.

Consultants

There were 16 consultancies during this period, including two separate visits from Mr. Daunys. Table 2 shows the consultants' names, their dates of arrival, duration of consultancies, and names of their reports.

Table 1

Program Area	Total Person Months	Person Months 1st July '83- 31st Dec. '83	Person Months Accumulated up to 31st Dec.	Balance of Person Months
1. RESEARCH SYSTEMS MANAGEMENT				
1.1 <u>Project Supervisor and Administrator</u>	60			30
1.1.1 Murray D. Dawson		0	19	
1.1.2 David M. Daugherty		6	11	
1.2 <u>Administration Specialist</u>	60			40
Raphael Semmes		0	20	
2. TECHNICAL SUPPORT				
2.1 <u>Farm Development Specialist</u>	36			6
D.N. Sharma		6	30	
2.2 <u>Maintenance Specialist</u>	24			23.5
Harvey Carr		0.5	0.5	
2.3 <u>Training Specialist</u>	24			0.5
Dorsey F. Davy		6	23.5	
2.4 <u>Communication Specialist</u>	36			26.5
Theodore Hutchcroft		6	9.5	
3. FARMING SYSTEMS RESEARCH				
3.1 <u>Farming Systems Specialist</u>	60			32
Alejandro H. Manzano		6	28	
3.2 <u>Production Agronomist</u>	36			24
Ishurdi				
Robert Drew		0	12	
3.3 <u>Production Agronomist</u>	24			4
Jessore				
Leopoldo M. Villegas		6	20	

Program Area	Total Person Months	Person Months 1st July '83- 31st Dec. '83	Person Months Accumulated up to 31st Dec. '83	Balance of Person Months
3.4 <u>Assistant Production</u> <u>Aronomist Jamalpur</u>	24			3.5
Timothy G. Kelley		6	20.5	
3.5 <u>Associate Production</u> <u>Aronomist Hathazari</u>	24			5
R.N. Mallick		6	19	
4. CROP RESEARCH				
4.1 <u>Agronomy</u>	48			34.5
Russell D. Frazier		6	13.5	
4.2 <u>Crops</u>	30			13
Avtar K. Kaul		6	17	
4.3 <u>Horticulture</u>	30			28.5
Edward Loomis		1.5	1.5	
5. ECONOMICS AND SOCIAL SCIENCE				
5.1 <u>Agricultural Economist I</u>	60			36.5
Brook A. Greene		6	23.5	
5.2 <u>Agricultural Economist II</u>	36	0	0	36
6. LIVESTOCK RESEARCH				
6.1 <u>Livestock Specialist</u>	24	0	0	24
7. SOIL MANAGEMENT				
7.1 <u>Soil Fertility Specialist</u>	24			11
Sam Portch		6	13	
7.2 <u>Soil Plant Analysis</u>	24	0	0	24

Program Area	Total Person Months	Person Months 1st July '83- 31st Dec. '83	Person Months Accumulated up to 31st Dec. '83	Balance of Person Months
8. WATER MANAGEMENT				
8.1 <u>Water Management Specialist</u> Jan Gerards	60	0	10	50
8.2 <u>Water Management Extension Specialist</u> David Gisselquist	48	6	12	36
8.3 <u>Agricultural Engineer</u> Carlos Garces	48	3.5	3.5	44.5
9. PEST CONTROL				
9.1 <u>Plant Pathologist</u> Dale Krigsvold	24	3	3	21
9.2 <u>Entomologist</u>	12	0	0	12

Table 2

LIST OF USAID ARP PHASE-II CONSULTANTS
1st July - 31st December 1983

<u>Name</u>	<u>Arrival</u>	<u>Duration</u>	<u>Name of Consultancy Report</u>
Mr. Alexander Daunys	27-7-83 6-12-83	45 days 22 days	Financial Management System Administrative and Financial Procedures
Dr. Gil Levine	5-8-83	4 days	Feasibility of Water Management Workshop
Mr. Edward Rosentel	15-8-83	2 months	Administration and Financial Accounting
Dr. Fernando Bernardo	21-8-83	6 weeks	National Agricultural Research Plan
Dr. Donald Barton	23-8-83	6 weeks	National Agricultural Research Plan
Dr. George Radosevich	11-9-83	1 month	Groundwater Development in Bangladesh: Institutionalizing a Strategy (Draft)
Dr. Florence E. McCarthy	13-9-83	1 month	Review of Irrigation Water Management Program at Bangladesh Agricultural University, Mymensingh
Dr. Ramchand Oad	16-9-83	1 month	"
Dr. Duane Johnson	16-9-83	1 month	"
Dr. Michael F. Walter	17-9-83	1 month	"

<u>Name</u>	<u>Arrival</u>	<u>Duration</u>	<u>Name of Consultancy Report</u>
Mr. Steven A. Breth	23-10-83	2 weeks	The Publication Programs of the Bangladesh Agricultural Research Council
Dr. Richard R. Howes	25-10-83	2 months	Options in Powering Irrigation Equipment for Tubewells and Low-Lift Pumps in Bangladesh
Dr. Stephen B. Harsh	9-11-83	9 days	An Evaluation of the Bangladesh Agricultural Research Council's Computer Needs
Dr. Frank C. Byrnes	11-11-83	2 weeks	Training and Communication in and for the Bangladesh Agricultural Research Council and the Constituent Institutes
Dr. S.C. Pearce	28-11-83	3 days	Tentative course outline for three-week short course on the application of statistics in agricultural research

AGRICULTURAL RESEARCH PROJECT PHASE-II
STATEMENT OF EXPENDITURES AND COMMITMENTS
FOR THE SIX MONTH PERIOD ENDED DECEMBER 31, 1983

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LINE ITEM	Disbursed through 12/31/1983	Accrued Expenditures through 12/31/1983	Total Expenditure through 12/31/1983 (1 + 2)	Committed as of 12/31/1983	Expenditures and Commitments through 12/31/ 1983 (3 + 4)	Budget FYE June 1984
1. Specialists and Consultants	842,470	178,729	1,021,199	2,000	1,023,199	2,709,100
2. Local Support	116,588	23,751	140,339	20,000	160,339	320,000
3. Overseas Training and Travel	66,727	4,593	71,320	12,000	83,320	856,000
4. In-Country Training and Sabbatical Studies	20,097	1,163	21,260	-	21,260	492,400
5. Contract Research and Evaluation	76,985	-	76,985	10,000	86,985	542,300
6. Commodities and Construction	375,243	13,163	388,406	30,000	418,406	1,250,200
SUB-TOTAL	1,498,110	221,399	1,719,509	74,000	1,793,509	6,170,000
Contingency	-	-	-	-	-	230,000
Headquarters Staff and Expenses	43,370	-	43,370	-	43,370	-
Management Fee	218,856	40,000	258,856	12,000	270,856	-
Procurement Fee	26,267	-	26,267	2,000	28,267	-
Pre-Contract Expenses	-	-	-	-	-	-
	1,786,603 ^{1/}	261,399 ^{1/}	2,048,002	88,000 ^{2/}	2,136,002	6,400,000

^{1/} IADS invoice and financial statement dated December 31, 1983

^{2/} Approximate or estimated amounts

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4.1 Research Management

A. Major Activities and Progress

- * To address the urgent need for more adequate financial management of the Project we contracted for the services of Mr. Alexander Daunys. Mr. Daunys developed a financial management plan which met two of our most urgent needs: 1) He designed a system which will provide the Project Supervisor with adequate information upon which to make management decisions; and 2) a system of accounting and fiscal management which will adequately serve a project of this magnitude. His recommendations are being implemented.

- * During a two-month consultancy Mr. Rosental reviewed and evaluated the system of accounting now in use by IPSU for the Project and made a series of recommendations to tighten fund control, and increase accounting efficiency. He identified serious delays in posting of project accounts and in trial balances. We immediately employed the services of a local accounting firm to correct the deficiencies and to bring all account books up to date. This work is to be completed shortly after the first of the year.

- * Significant progress has been made to strengthen the contract research component of the Project and a system was designed to guide such research irrespective of donor: 1) Dr. Manzano has been given responsibility for guidance of the program; 2) a consultant reviewed the system of fund accounting and provided an up to date review of commitments and expenditures; 3) IADS and USAID representatives provided extensive comments and revisions to a new contract research manual being produced by BARC, which will supersede the "Yellow Book"; and 4) BARC is now in a position to exert the needed influence in approving, monitoring and funding contract research activities. We have assigned one or more IADS Specialists continually to monitor progress and constraints of Project funded individual contract research projects.

- * The Draft of a comprehensive National Agricultural Research Plan has been completed by BARC with substantial input from IADS consultants and Specialists. While the draft is exhaustive, it is not yet in a form which can provide the clear, concise plan for addressing the research priorities of Bangladesh. Resident Specialists will reduce, rewrite and reorganize the document in cooperation with BARC to meet the requirements of Bangladesh. It is extremely important that this document be on target. Properly designed and carefully implemented the plan can give BARC the guidance needed truly to coordinate the national research system.

- * As a result of a review and study of BARC's need for computerization by an IADS consultant, a clear perception of an appropriate system was obtained. The consultant, Dr. Harsh, stressed the requirement that a computer system for BARC would be adequate only if attention was given to all components, namely training, maintenance, software and hardware. We are awaiting USAID concurrence with Dr. Harsh's recommendations before implementing the planned system.
- * The activities of the Associate Agronomists of BARC serving at the Regional Research Stations of BARI have been evaluated by BARI and BARC. They found their work to be important components for progress of the Regional Stations and have recommended that their appointments be extended throughout the life of the Project. Accordingly, we will amend the appointments of those Associate Agronomists who are willing to stay on, and recruit necessary replacements. It was recommended that Mr. Mallick, who has served so well at the Hathazari Station, should shift to the Ishurdi Station for the next two years.
- * More easily to document progress of the Project and maintain a record of IADS Specialists' inputs, all consultancy reports are being bound and 50 copies of each reproduced. All significant position papers and other documents with contributions by Specialists are also being filed and a method of indexing is being studied.
- * Bangladeshi students at the University of the Philippines at Los Banos reported that because of inflation in the Philippines the maintenance stipend was not providing adequate support. The combined efforts of USAID, IADS headquarters and our local staff resulted in re-evaluation of the stipend rate and a subsequent increase to our students in the Philippines. Officers from IADS headquarters visited each of the Bangladeshi students studying abroad, including the Philippines, to review progress and to resolve any problems they were facing.
- * Agreement has been reached between IADS and BARC on the activities which are the responsibility of the contractor and those which are the government's, represented by BARC. Both sides recognized the need for IADS to provide its own support services. Meetings between the USAID and BARC attorneys have explored the areas of difficulty and agreed that solution could be reached by a memorandum of understanding or by contract amendment.

- * Near the close of this report period BARC agreed that the IADS support unit could be staffed with personnel selected by the Project Supervisor under an agreed salary ceiling. In a subsequent meeting with the USAID Deputy Director BARC agreed that all matters concerned with the Project Support Unit would be the responsibility of IADS if personnel costs associated with the unit were funded from the management fee.
- * In December BARC issued an advertisement soliciting applications for a number of IADS local support personnel including administrative assistants, accountants, clerk-typists, etc. Selection criteria and procedures have been developed and interviews will be held early in January. An organizational chart for the support unit and job descriptions have been prepared for all new employees. In addition to support for Housing, Transport and Office Management, an IADS accounting group has been added.
- * All commodities which had been warehoused in New York as well as the soils analysis instruments and equipment have now arrived in Bangladesh. We are awaiting clearance from customs.
- * From the several lists of commodities to be ordered under the Project over the past year and a half, a new rationalized list has been sent to BARC for approval. The original list was submitted at the request of BARC to document the need for provision of CDST. While even the new rationalized list is badly outmoded it can serve as a basis for the preparation of a new list which will be finalized in January.

B. Constraints and Action Required

- * Financial management and accounting problems continue to be troublesome. Because of inadequate record keeping and accounting it is difficult just now to: determine the current status of accounts by program activity; monitor volume of outstanding advances; and determine at a glance the status of reimbursements on advances and other financial control issues. Removal of these constraints will require establishment of our own accounts section, hiring and orientation of newly employed accountants and bookkeepers and implementation of more efficient accounting procedures.

Accounting and bookkeeping applications are now being received, and Mr. Rosentel, our new Administrative Specialist, will arrive at the end of January. We can expect dramatic results in alleviating many of our financial management problems by the end of the third quarter this year.

- * Constraints still persist in the administration of the Contract Research program. Records of both technical and fiscal aspects of the program are kept by BARC and financial records, though maintained by IPSU, are not integrated with the technical progress reports which apparently are maintained by the concerned Member-Directors. Similarly only records of our project are maintained by IPSU. Control of World Bank and other donor-supported contract research projects are kept by BARC accounting office. Action required to relieve these constraints: 1) The BARC accounting office should maintain financial records of all contract research projects irrespective of donor agency; 2) BARC should establish an office to administer the BARC contract research program, integrating both technical and fiscal aspects of the program; and 3) each donor agency should require copies of all fiscal, technical and field monitoring reports, etc.
- * Temporary but persistent cash flow problems have become an obstacle to progress of the Project. Rising expenditures and slow reimbursement of advances for contract research, workshops, seminars, etc. provide less and less flexibility for making necessary payments while staying within our \$200,000 rotating fund limit. Solution of the problem requires action in two areas: 1) Strong effort to reduce outstanding advances by collection efforts and stringent control; and 2) by increasing the level of the current revolving fund. Better control of advances is underway and we have requested IADS headquarters to increase our revolving fund.
- * A number of factors constrain provision of commodity items needed for Bangladesh research institutions, and commodities for Specialists. In August it was agreed that commodity purchases could proceed even though there was no provision by Government of CDST. In September and October, we combined all commodity lists which had been held for nearly a year, deleting duplications, etc. because we had been informed that only items submitted through BARC earlier could be imported.

Later we were informed that the list of commodities to be ordered for the life of the Project was only illustrative of the kinds of equipment to be ordered. Two actions are required to overcome the constraints: 1) A new list of commodities must be prepared and orders placed; and 2) the Bangladesh Government must provide the required customs duties and sales tax funds for clearance of the goods. Project staff are now preparing a new revised list of commodities, and orders will be placed in the first quarter of 1984.

4.2 Technical Support

4.2.1 Farm Development

A. Major Activities and Progress

- * Assisted Principal Scientific Officer (E & RP) and Agricultural Engineer, BARI to prepare an inventory of physical facilities, field equipment and other farm resources for all sub stations in the North-West region. The recommendations submitted to the Director, BARI included critical analysis of farm resources, redistribution of surplus field equipment for proper utilization, and assessment of additional physical and manpower needs at all stations.
- * Assisted Regional Agricultural Research Station, Ishurdi to prepare a land development plan for a citrus and vegetable area (10 acres) which includes land development, extension of existing irrigation system, drainage system and internal layout for efficient farm operations.
- * Assistance has continued to strengthen the farm support services at BARI central station and regional station. A cultipacker and a corn planter were assembled and put into operation at Joydebpur and Ishurdi for primary tillage operations and maize planting respectively. Training in proper calibration and operation of various equipment was provided to the engineers at Joydebpur, Jamalpur, Ishurdi and Hathazari. This has resulted in extensive mechanical planting of wheat and maize at all the stations and has demonstrated the benefit of precision operations in obtaining uniform plant growth. It has also resulted in considerable savings in operational expenses.
- * A reorganizational plan to strengthen the farm support services at Joydebpur was discussed with the Director and Associate Director, BARI. The final organizational chart with job descriptions of all staff members and their linkages with the various research divisions was presented to the Director, BARI for inclusion in the revised master plan. It is expected that the plan will be implemented soon and should greatly improve the quality of operations at the central research station. A similar exercise has been carried out for the four regional stations.

- * An assessment of field equipment at Raikhali and Khagrachari field stations has been made and assistance was provided in finalizing the specifications of equipment and tender document for purchase of equipment under an ADB project.
- * General assistance was provided to various research programs in BARI to support their research needs. Installation of greenhouses for the Potato Research Centre, field equipment specification and sprinkler system design for Wheat Research Centre, and no tillage planter for Agricultural Engineering Division are major supports given to the research divisions.
- * Assistance to the Project Director (Engg.), BARI has continued in monitoring the progress of minor construction works at regional stations. Joint visits to some of the stations has resulted in acceleration of construction works and improved quality. Assistance was also provided in formulation of technical specification and estimates for a fruit tree nursery at Hathazari, and minor works at Jamalpur. The proposals have been submitted to BARC/IADS for final approval.
- * Two in-country training proposals were discussed with the Associate Director (ICP) and Associate Director (Res.). The proposals have been accepted and the training should be held at Joydebpur and Jamalpur in February/March 1984.

At the request of BARC, the Specialist participated in an external evaluation of the research programs of the Agricultural Engineering Division, BARI. The final report has been submitted to BARC and consists of several recommendations to improve the quantum and quality of research in all related fields.

- * At the request of the Principal, Bangladesh College of Agricultural Sciences, assistance was provided to prepare a topographic map of the farmland and for collection of preliminary information for development of a land use layout plan for the college experiment station.

B. Constraints and Action Required

- * Two of the constraints stated in the last six months report, namely lack of operational funds and lack of manpower, have been resolved or are in process of being resolved. PL-480 funds are now available and have lifted the operational fund constraint. The Farm section has recently been upgraded as a full Division with expanded mandate and provision for additional manpower. It is hoped that the plan will be implemented soon and manpower considerably increased.

- * The only constraint which remains is the difficulty in importing field equipment, hardware, and irrigation equipment required to develop the stations for precision operations. It is hoped that BARC will give this issue high priority and solve it urgently.

4.2.2 Training

A. Major Activities and Progress

- * Ten short-term trainees were sent out of the country under USAID auspices. These persons were enrolled in training courses in Cropping Systems-4, Research Management-2, Agricultural Engineering-4, and Pest Management-1. Other donors sponsored five additional short-term trainees. Of these, three were enrolled in Soil Science, and two in Plant Breeding. Three studied in Australia and two in Eastern-bloc countries.
- * Twelve short-term trainings were held inside the country. Of these, four were in the field of Agricultural Information. Two courses dealt with Agricultural Engineering, two were courses directly planned as research extension linkage in that extension persons were trained in ways of working through applied research in oilseed crops and in general crops research work. Another training day involved a farmers' field day at the Jamalpur Regional Station. One course addressed Cropping Systems research methodology and one course involved potato production and ways of extending the use of potato in the local diet of villagers. One course in the soils area dealt with ways of making fertilizer use more efficient.
- * Eleven degree scholars were sent out of the country during this report period. An additional nine scholarship awardees have been admitted to universities in the Third World. Three of these nine were oriented and prepared for departure and scheduled to depart Bangladesh on January first 1984. Fields of study for those who have departed are, for Ph.D studies: one in Agronomy, one in Agronomy (Plant Breeding) and one in Irrigation Water Management. For M.Sc. studies: four in Agronomy, one in Soil Science, one in Horticulture, one in Research Management and one in Agricultural Economics. Follow-up of twenty-one returned and returning scholars funded under IDA credit has begun. Three of these have been visited at their work sites.

- * Advertisement for the award of thirty-four incountry degree scholarships has been prepared and placed in newspapers. Fifty-eight applications for seven Ph.D scholarship awards have been received. One hundred and twelve applications for twenty-seven possible M.Sc. scholarships have been received. Selection panels for the screening of these applicants have been formed and a selection interview schedule issued at the time of this writing. A total of 170 candidates will be reviewed. IADS Specialists are members of each selection panel.

- * A Handbook for Research Manpower Development has been sent to the printers and will be ready for use in January 1984. Additional copies of the Preliminary Manpower Report have been printed in order to fulfil requests for this publication. Data has been collected for a Revised Manpower Report. Cross checking for accuracy and completeness of this data is underway and the new report is scheduled for early 1984.

- * Two evaluation reports were written for the use of the Secretary of Agriculture. The first of these is a critique of the new syllabus designed for the upgraded curriculum of the agricultural training institutes which train extension personnel and are expected to produce technician-level workers. The second paper was directed at possible causes for what is deemed low return for the inputs of effort and expense in the total training effort by the Ministry of Agriculture.

- * A discussion paper was written for USAID delineating the conditions which are associated with a lack of productivity resulting from an attempt to develop a training cadre in Cropping Systems Research.

- * Information has been gathered for the preparation of a 1984 incountry inservice short-term training Master Plan. As the year ended preparation of this Plan was underway. The plan is designed to include all institutes within the BARC complex of institutions.
- * One new Sabbatic Leave candidate was awarded financial support for research studies. This BAU professor is engaged in research in Biochemistry at the Bangladesh Agricultural Research Institute at Joydebpur.
- * Three persons were awarded Senior Staff Travel grants. Two of these involved visits to the Indian Council of Agricultural Research and one involved travel to China.
- * Concerted urging by USAID and the World Bank has resulted in some action being taken towards solving the staff shortage in the Training Cell, to the extent that three persons have now been appointed on a temporary basis.

3. Constraints and Action Required

- * The total productivity of the research potential which the BARC complex of institutions represents is contingent upon the basic research competence and organizational ability of the personnel involved. Senior level Bangladesh Government officials have noticed and stated that an observable lack of research productivity exists. Desire on the part of middle level research managers to make an intensive commitment to become involved in raising research productivity is a continuing constraint. Action to overcome this barrier will have to involve scientists and administrators within the government at multiple levels and could enlist the services of consulting agencies as well as the in-depth involvement of donor agencies.

- * There appears to be a lack of any feeling of urgency in approaching the tasks of agricultural research. Action which might well go far to overcome this barrier to productivity could be a series of consciousness raising meetings produced and conducted by those persons within the government who do feel this sense of urgency in making the research system productive.

4.2.3 Agricultural Communication

A. Major Activities and Progress

The major activities of the period were directed toward the accomplishment of the observance of the tenth anniversary of the establishment of the Bangladesh Agricultural Research Council.

- a. The tenth anniversary book, Agricultural Research in Bangladesh, was compiled, edited and published. The Agricultural Communication Specialist coordinated the project, also wrote four sections of the book and oversaw its printing. Mr. Steven A. Breth of IADS/Arlington was a consultant, providing three weeks' service. The first copies of the book were distributed at the inaugural ceremony of the National Symposium on Agricultural Research. A total of 3,000 copies has been printed.
- b. The first National Symposium on Agricultural Research was held on December 22-23 to commemorate the tenth anniversary of BARC. The Agricultural Communication Specialist coordinated preparations for the event, working with the Executive Vice-Chairman, Member-Directors and Directors of BARC. More than 300 officials and scientists took part. There were eleven keynote papers presented and more than 70 contributed papers given at the technical sessions. These will be published in the proceedings, to be edited and produced by IADS for BARC. The Symposium was well received by the participating scientists, and a tentative commitment has been made to hold a similar event in about two years.
- c. A slidefilm program on BARC was produced by a contract with Mr. John Paul Kay. This was given its premiere showing at the inauguration of the Symposium, and was well received. It is about 12 minutes long, and is a general introduction to the objectives and activities of BARC as the apex of the national agricultural research system. Additional copies of the program will be duplicated and provided to other governmental and donor groups.

- * A BARC Newsletter, Agriculture News, was launched in July with a second issue published in October. A copy is provided for each scientist in the national agricultural research system (through the directors and in-charges of the research stations) as well to officials in other national and international organizations. The circulation is about 2,000 copies per issue.
- * The booklet, This is BARC, was published in November. It is 24 pages plus cover. It is a general description of BARC and its activities. The distribution is being handled by the National Agricultural Library and Documentation Centre (NALDOC) of BARC.
- * A paper on "Technical Writing in the Agricultural Research Process in Bangladesh" was presented to the Training Course in Agricultural Librarianship and Information Management, sponsored by NALDOC/BARC.
- * General editing and publication assistance was given to several projects, including papers and recommendations of the First National Workshop in Livestock Research in Bangladesh, for the "Inventory on Donor Support in Agricultural and Related Research", for "Pulses in Bangladesh", and similar publications. Background briefing papers were prepared for the visit of Queen Elizabeth II to Bangladesh, and of CMLA Lt. Gen. Ershad to the United States.

A more detailed account of these and other activities has been provided in the bimonthly reports for this period.

B. Constraints and Action Required

- * The accomplishments described in this report have contributed to the Project goal of improving the effectiveness of the national agricultural research system, emphasizing the leadership and coordination role of BARC. However, the concentration necessary to complete the assignments for the tenth anniversary commemoration required that many of the activities scheduled for the Specialist during the period were not accomplished. BARC has minimal staff capacity in communication, so the Specialist is required to handle

personally nearly all steps of most of the projects, rather than being a part of a consultant-and-training process. IADS has been able to assist BARC at the highest administrative level through the Agricultural Communication Specialist, and this is useful in meeting project goals. However, this service function does not meet the objective of developing a communication capability in BARC and the national system that will continue to perform after the Project has been terminated. This is the primary constraint to fulfilling the Work Plan. The Specialist will work with the Executive Vice-Chairman of BARC on plans to set up an effective communications unit. This has been delayed because of a heavy workload, itself the result of the lack of a communications staff capacity at BARC.

- * Another constraint is the necessity of following Governmental regulations to complete printed projects, as there are limitations in this process which make it difficult to achieve the "international standards" for publications that are the goal of the Executive Vice-Chairman. It appears however that modification of these regulations is beyond the scope of the Project.

4.3 Farming Systems

As in previous reports, the activities of the Farming Systems Specialist posted at BARC and of the Associate Production Agronomists posted at BARI's regional research stations are presented separately.

4.3.1 Farming Systems Specialist

A. Major Activities and Progress

- * Visits to the Cropping Systems research sites at Trishal, BAU (1), Kishoreganj, BJRI (1), Jamalpur, BARI (1), Hathazari, BARI (3), Jessore, BARI (2), Sahpur, SRTI (1), Kalikapur, BARI (1), Manikganj, BJRI (1), Daudkandi, BARI (1). The general objective of the visits was to observe progress in implementing the seasonal (early and late kharif) work plans.
- * Meetings with the cropping systems research sites' staff in order to: a) review the data collected in the monitoring forms distributed to the participant institutes in the first semester of this year; b) discuss and plan the elaboration of bulletins with descriptions of those technologies found suitable for transferring to other farmers in the project area or to areas with similar agroclimatic and socio-economic conditions; and c) discuss and provide guidelines for on-site data interpretation and subsequent preparation of charts and reports from the results.
- * Participated in the organization and took part in a monitoring tour to visit the Cropping Systems Sites. The Principal Investigators of BARI, BJRI, BAU, BWDB, the co-ordinator of the program and one SSO from BARC participated in the tour. The main objectives of the tour were: a) to observe the progress of the cropping systems research at the different sites; b) to discuss with the staff at each site the constraints encountered in implementing the program; c) to observe and/or assess the level of interaction between the farmer and the staff; and d) discuss the progress achieved in

transferring the technology to the farmers. The Principal Investigators will put together a report from this visit to be submitted to BARC.

- * Reviewed one contract research proposal for the establishment of three new cropping systems research sites in Pabna, Rajshahi and Bogra Districts. A technical review of the proposal will be presented to the Member-Director of Crops and Forestry.
- * Encouraged the participation and/or collaboration of IADS Specialists of the different Program areas in planning research at the existing Cropping Systems Sites. The location selected for the implementation of the Integrated Irrigation Command Area Development Project, within the Hathazari Cropping Systems research project area, was visited with the IADS Agricultural Engineer. The main objective of the visit was to look for a way to achieve effective integration of the research projects under the Soils & Irrigation and Crops & Forestry Divisions of BARC. This coordination will assure an effective use of the information existing in the Cropping Systems research areas which have been in operation since July 1980.
- * Participated as a member of the committees to evaluate the progress of the NCCSP and of the Horticultural Division of BARI. The evaluation of the NCCSP was based on the work plans and the annual progress reports presented by BARI, BAU, SRTI, BJRI and BWDB for the year 1982-1983. The evaluation reports were submitted to BARC by the Chairman of each committee.
- * One visit to each of the regional research stations of BARI (Hathazari, Ishurdi, Jessore, Jamalpur), and to the experimental farms of BAU and SRTI to observe the component technology studies (variety trials, fertilizer trials, effect of planting dates, etc.). The applicability of the results of the experiments to farmers' conditions was discussed with the research station and Cropping Systems staff.

- * Elaboration of the annual work plan 1983-1984 for the Farming Systems project area. This plan included: a) activities of the Farming Systems Specialist; b) projections to get the services of two consultants in Farming Systems; c) training and travel plans; and d) in-country training and sabbatical studies.

B. Constraints and Action Required

- * The expected level of organization has not been reached in some of the Cropping Systems Sites. The appointment of the scientific staff on a temporary basis is one of the reasons for this situation. BARC should encourage and support the agricultural research institutes (SRTI, BJRI, BAU,) to organize a Cropping Systems research unit as part of their organization to assure the assignment of permanent staff. Permanent posts for at least one agronomist and one economist should be organized.
- * The farmers (and sometimes members of staff) are not always aware of the objectives of cropping systems research and the technology under evaluation (names of varieties, rates of fertilizer, planting dates). The interaction between the Principal Investigators, site staff and the farmers is limited. Regular visits to the plots with the farmers participating in the program and their neighbours are required. Training courses for the field assistants and farmers must be organized by the Principal Investigators.
- * Socio-economic studies are in progress only at BARI sites (Jessore, Hathazari, Jamalpur). Other sites must be staffed with an economist.
- * The lack of a full-time Cropping Systems program coordinator continues to be a constraint to better coordination. A meeting of BARC Member-Directors will be held in January 1984 to discuss the present status and prospects of the NCCSP. The main objective is to discuss the future organization of the program.

- * The "specialized" nature and specific mandate of each agricultural research institute limits the scope for the inclusion of components other than crops in the studies at the present Cropping Systems Sites. The step to include livestock in the research plans for 1984-1985 must be taken, with the collaboration of the institutions involved in livestock research.

Hathazari

A. Major Activities and Progress

- * Assisted in formulating the research plan for the Regional Station, sub-station and Cropping Systems Site at regional and central levels.
- * Discussions with the scientists at RARS about the importance of following a cropping systems research rather than a commodity approach.
- * Assisted in establishing and collecting data from experiments on intensive cropping systems (one), residual effects of phosphorus and potash (four) and cowpea improvement research trials (nine).
- * Research emphasis was given to the improvement of cowpea, which is a major regional winter crop. Nine field trials were established this season whereas only one was initiated last year and none the previous year.
- * Co-ordinated day-to-day activities of the cropping systems research and of 54 field experiments involving mustard, wheat, maize, pulses and other winter crops.
- * Assisted in identification of zinc and sulphur deficiency. The application of zinc sulphate and gypsum produced the best crop of rice in the history of RARS.
- * Assisted the scientists at the RARS in compiling, reviewing and writing their 1982-83 annual reports.

- * Assisted in modifying the CSR research program according to regional needs and potentials: (i) boro rice, which is grown in 42% of Chittagong District, was included in the program; (ii) winter maize, which has highest potential for increased yield among the cereals, has been included in the pattern.
- * Assisted in establishing three mini-production blocks on proven suitable technology for BR 11 rice-based system. These blocks were used to demonstrate to the extension agent, credit and input agencies, planners and administrators that this technology can be used for production purposes on a large scale.
- * Assisted the Cropping Systems research staff in conducting a survey to assess the adoption of BR 11 rice and its associated technology. It was found that 18% of the project area was planted to BR 11 in the late kharif season, by 123 farmers on a total area of 30 ha. All the farmers used urea, 59% used TSP and 39% used MP. The average rate used was 64 : 36 : 31 kg NPK/ha.
- * Assisted in organizing the monitoring tour program for the Asian CSP monitoring group on 15th November 1983.
- * Assisted in harvesting rice trials and planting winter crops on CSP site trials.
- * Assisted in observing, compiling data and establishing rice and potato crops in potato-based Cropping Systems trial at sub-station Pahartoli.
- * Participated in Asian cropping systems monitoring tour to Sri Lanka and exchanged with the other participants the idea of CSP pre-production verification trials.
- * Assisted in publication of technical report of Cropping Systems entitled "Report of the cropping systems research for 1982-83"
- * Assisted in use of data monitoring forms prepared by BARC/IADS at CSP site.

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- * Assisted in organizing field days on 3rd July at CSP site, 3rd November at Pahartoli, 4th November and 12th November at RARS Hathazari for farmers and extension personnel.
- * Assisted in planning on-farm varietal trials of groundnut and maize in collaboration with extension.
- * Assisted in technical back stopping to extension officers about performance of BR 11 rice under late sown conditions. The performance of BR 11 demonstrated that the problem of late rice planting in flood affected areas can be overcome.
- * Served as resource person to talk on "Cropping Systems Technology" in the Nitrogen Efficiency Research Training Program of BARC/BARI/IFDC at Joydebpur and prepared a handout on cropping systems, potential cropping sequences, their advantages and disadvantages, criteria for consideration, research accomplishments and needs.
- * Assisted in organizing training on CSP technology for eighteen Subject Matter Specialists working in extension in the Chittagong region. Prepared two handouts for training: (i) Potential of utilizing cropping systems research results in Chittagong Division; (ii) Cropping systems research and its success in Asia.

B. Constraints and Actions Required

- * The humidity of the Chittagong area is high so seed viability is very low. A consultant on seed processing and storage might be able to suggest suitable measures to overcome this problem.
- * Most of the winter crops are new to Chittagong District, so production of HYV seed and large-scale testing in farmers' fields is needed.

- * Irrigated areas in Chittagong District are not well utilized. The farmers grow boro rice followed by aman rice. A third crop can be fitted in but research is needed at the experiment station. Intensive cropping systems trials have therefore been started at BARS. Farmers and extension personnel will be encouraged to observe these trials in large numbers, by organization of field days.

Jamalpur

A. Major Activities and Progress

- * Helped to initiate and organize the BARC-funded Cropping Systems Site Research Project at Jamalpur. Specifically involved with: selection of 35 farmers for cropping pattern studies; supervising the management of 12 t. aman rice and 20 rabi season crop trials; training field assistants in field plot monitoring, data collection and yield sampling; preparing Jamalpur District Soil Maps, identifying areas for the extrapolation of results gained at the Cropping Systems Site; organizing a cooperating farmers' field-cum-training program at the Cropping Systems site (a two-day program); assistance in organizing the inauguration of the Cropping Systems sites, attended by over two hundred farmers, extension agents and scientists, including BARI Director and Associate Director, Research, and IADS staff.
- * Went on a Cropping Systems site tour program with IADS Farming Systems Specialist. Visited the Cropping Systems sites of BAU (Trishal), BJRI (Kishoreganj), and BARI (Jamalpur). Reviewed progress of individual project sites, and held discussions with the site staff, site coordinator and Principal Investigator.
- * Accompanied Dr. J.A. Jackobs, visiting from the International Soybean Research Program, University of Illinois, to BAU. Had meetings with Head Plant Breeding, and Vice Chancellor BAU to discuss plans for investigation team to visit Bangladesh to evaluate potential for widescale soybean production.

- * Developed Training Program Schedule for 1983-84 at RARS Jamalpur. Submitted it to BARI Director for approval. Training Program areas included: Farmer Training and Field Days, Scientists' Bi-weekly Seminars, Guest Lecture Program, and Quarterly Production Training Programs for field assistants, block supervisors, and progressive farmers.
- * In collaboration with IADS Soils Specialist, developed and supervised implementation of a potassium response study in t. amon rice - to evaluate the effects (direct and residual) of high rates of K_2O as recommended according to soil analysis.
- * Assisted in developing the regional research program proposals for agronomy and cropping systems. Presentation of these programs at BARI headquarters meeting in August to finalize the regional and national research programs at BARI (10-day program). Assisted RARS agronomist in executing field research program at the station: cropping pattern/residue management study, relay planting of four different crops into t. amon rice at two locations, cheena and kaon plant spacing study, sweet clover observation trial and time of planting/variety study with wheat.
- * Had responsibility for overall supervision of the BARC/IFDC Coordinated Fertilizer Efficiency Project study, "Nitrogen and Phosphorus, source/rate/time of application study in t. aus and t. amon rice", at RARS Jamalpur. Hosting visits regularly.
- * Responsibility for planning and organization of Scientists' Bi-weekly Seminar Schedule. Presented seminar on "Intercropping maize and soybeans for crop yield stability".
- * Participated in the "Pilot Production and Multilocation Testing Monitoring Tour" held in Sri Lanka from the 19th to the 25th November 1983. Presentation of group summary paper.

- * Visited the Coconut Research Institute in Lunawilla, Sri Lanka, for discussion with Dr. M.R.J. Navaranath, Head Breeding Division, to collect information on newly released improved coconut lines. Submitted a technical report concerning the discussion to Member-Director for Crops and Forestry.
- * Gave assistance to RARS scientists: 1) in preparing rab season regional research programs, submitted to BARI headquarters for approval; 2) by writing reviews/critiques of the scientists' reports, papers for publication, and Masters theses.
- * Co-authored a paper presented at the BARC National Symposium on Agricultural Research: "Yield Potential in Four Varieties of Cabbage taken from Sprouts".

B. Constraints and Action Required

- * Shortage of funds continued to be the major problem facing RARS Jamalpur in the last six months. This resulted, for example, in delays in salaries for scientists (up to two months), delays in labour payments, and shortage of inputs such as fertilizer and fuel. These problems have been largely alleviated by the PL-480 fund allotment, which has just recently been distributed to the stations. However, problems concerning inefficient management of funds or improper assessment of budgetary needs at the station need to be addressed. Simply providing more money may not be solving the root problem.
- * The BARC ARP II mandate is clearly to develop a national agricultural research capability in order to generate appropriate technologies for Bangladeshi farmers. It is thought that these technologies will best be developed and tested under the farming systems research approach. Little in the way of farming systems-oriented contract research has yet been put forth. In respect of this need, a draft proposal, "Coordinated Homestead Development Project" has been submitted to BARC. Six major study areas were identified for research around the homestead: vegetable production, small and large fruit tree production, pond utilization (fish and ducks),

fencerow management, bamboo production, and livestock management. A homestead development model is proposed. Already farmers have been identified willing to participate and cooperate in this research area.

- * Poor crop stands and lack of uniformity in experimental plots at research stations can oftentimes be traced to poor quality seed. Germination tests for many cropseeds below 70 per cent are observed. In view of the poor facilities existing at RARS Jamalpur, a proposal was submitted requesting funds for seed storage bins and a seed storage room - insulated and airconditioned - to store and preserve seeds more adequately at the station. These proposals were approved and work recently completed on these projects.

Jessore

A. Major Activities and Progress

- * Proposed and formulated the cotton thinning and plant population experiment presently in progress.
- * Participated in identifying regional research projects for the rabi season 1983-84. Twenty projects were identified and all were approved by the authorities at BARI headquarters, Joydebpur.
- * Attended the regional research review at BARI headquarters. Additional national research projects, to be conducted in Jessore Region, were requested. These plus the 20 mentioned above, along with on-going projects, total about 80 research/production projects now being conducted either at the Jessore research farm or in farmers' fields.
- * Participated in identifying areas needing additional operational funds. Approval obtained for about Tk. 400,000 of the amount requested. Additional request now in progress.

- * Monitored research activities of the Cropping Systems project. Participated in establishment of Cropping Pattern test plots. Initiated fertilizer superimposed trial on potato and mustard.
- * Supervised field assistant in data gathering, sample-cut processing (N-placement experiment), and in soil sampling for chemical analysis (cotton-blackgram experiment). There is a need to train other field assistants in field plot techniques.
- * Advised and supervised two research officers on seed soaking, incubating and seedbed establishment for 12 rice varieties (IRWIT Project).
- * Participated in the Crop Production Technology and Cropping System Training Program for 33 Subject Matter Officers of Jessore Region. The SMOs were divided into two separate groups, each of which had 15 days training.
- * Submitted two project proposals for E & RP:
 - a) Survey of major problems in crop production and progress of CSR as seen by the farmers at the CSR site. The survey will be done by the third week of January 1984.
 - b) Setting up of demonstration plots to show effects of fertilizer placement on potato. Postponed until next rabi season due to unavailability of potato seed.
- * Visited farmers' fields (upon request) to identify and remedy crop disorders, and to monitor some on-farm research trials.
- * Prepared sets of questionnaires for monitoring and evaluating activities of Research Officers, sub-Engineers, Accounting Clerk and clerical staff. Summary of responses will be completed by February 1984.
- * Participated in briefing visitors on research projects at the RARS farm and Cropping Systems sites.

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B. Constraints and Action Required

- * Additional land is needed at the RARS, Jessore, in view of the increasing number of research projects conducted there especially during the rabi season. BARI authorities at Joydebpur have been informed about this problem. Suggested short-term solution is to limit research projects according to priorities.
- * Some approved research projects were not established due to unavailability of seeds. Requests for seeds should in future be made well in advance. Also, in variety trials the seeds of some varieties had too low a germination rate to permit assessment of variety performance. Principal Investigators (Joydebpur) have been informed about this problem.
- * Field assistants need training in field plot techniques. There is a need to identify someone to train them and to decide whether each RARS should conduct its own training program.
- * There is a need for visual training aids, such as slide and overhead projectors, etc. Request has been submitted.
- * There is a need for additional operational funding. Perimeter fence needed for the station farm. Request has been forwarded to concerned authorities.
- * A land leveller is badly needed. Flood irrigation is difficult on unlevelled plots. Requested on additional operational funds.

4.4 Crop Research

4.4.1 Agronomy

A. Major Activities and Progress

- * Received BARC approval for a program of skills training in field station operations and methods for junior research officers. During official travel while on home leave, the Specialist visited three potential training sites, namely the University of Nebraska, Louisiana State University and the University of Florida. This last has been identified as the most suitable of the three possible training locations. While visiting the above-mentioned institutions also held discussions with scientists about applied research approaches, particularly in maize production, with a view to their potential application to the BARI agronomy program.

Working with Dr. Abdul Hamid of the BARI Salna College, developing a course outline and program using mostly local staffing from BARI, BIRRI and BAU for a basic course in field experimental technique and statistical training.

Gave a lecture and field "hands-on" training in applied statistics, field plot harvest and mechanical threshing techniques using a donor-supplied thresher (IFDC training course).

Gave a lecture to BARI Potato training course on field plot techniques, and a review of Agronomy research data and interactions with soil fertility factors.

Lectured the Jamalpur RARS station research officers on field experimental techniques and applications of statistical and design considerations.

- * A maize production proposal for on-farm demonstrations received BARI approval and has been presented to BARC. Dr. J. Abedin, PSO of the E & RP project is joint coordinator with the Specialist. The project will involve collaboration between BARI Divisions and Department of Agricultural Extension.

- * During the report period, the Specialist prepared and received approval at BARI to develop one 2.5 acre research block with soil profile drainage, subsoiling, basic fertility improvement, land levelling and systematic plot layout. The Farm Development Specialist assisted in drainage design. Field work can begin immediately upon receiving BARI funding. Completion should be before kharif season. The objective is to begin a pilot program to remove constraints to crop production which are affecting all research at BARI.
- * Worked with the Farm Development Specialist to put in operation a 4-row mechanized maize planter at the Jamalpur station. Basic equipment adjustments, fitting of seed plates, calibration of seed and fertilizer rates and planting of several acres were carried out. The objectives were not only to use the equipment, but also to demonstrate band fertilizer placement and more efficient use of station labor.
- * The Specialist has taken an active part in an evaluation of the BARI Agronomy Division, requested by the Executive Vice-Chairman of BARC. Evaluation criteria and format suggestions supplied by the Specialist have been used.
- * Met with BARC consultants and suggested priorities in agronomic research to be incorporated in the national research plan for the next five years.
- * Assisted in the BARI Agronomy Division's internal review and training, related to the 1984 winter research program.

B. Constraints and Action Required

- * Out of country training programs, both short-term and graduate training, are being seriously hampered by government policies regarding identification and selection of trainees and approvals to leave the country. It is necessary to convince government at appropriate levels to modify their policies so that short-term and degree-level trainees can be selected and trained outside the country with approvals at the Ministry level or below.

- * BARC, BARI and the research network have an ongoing problem in achieving efficient cash-flow from administration to the field or project level. Authority for expenditure remains highly centralized. Research programs are damaged by approval and funding delays. BARC and BARI research network fiscal and project approval systems must achieve more efficient and responsive management in order to improve cash-flow to approved projects and decentralize expenditure approvals.
- * Communication media (telephone) are not available adequately between Dhaka offices, BARI and the research network. Inadequate transportation hampers all research network operations. It may be possible to set up radio links between headquarters and regional research sites.
- * While BARI administration seems to be increasingly aware of soil nutrient, physical condition and drainage limitations, as yet no policy nor action plan has been developed to ameliorate these conditions. A field service support system should be created at all stations, and managed and administered so as to facilitate research. The research land resource has to be improved to the point that physical and nutrition factors do not limit crop response.
- * When commodities finally arrive at Dhaka, BARC policies of allocations, receipts, etc. require approvals for each item from the Member-Director all the way to the research officer, for items already approved as much as a year earlier when originally requested. This long delay in receiving commodities is a real restraint on research programs. Recommendations have already been made to the Project Supervisor about this problem.

In conclusion, the second half of 1983 began a period of increased activity and accomplishment for the Specialist, despite nearly six weeks home leave and official travel. Close involvement with the BARI Agronomy staff has facilitated important functions in training, station and staff development and field research programs. The Division itself has begun carrying out programs of self-evaluation and improvement.

Action plans are in place for future field research training and collaboration on contract research in maize production field demonstrations.

4.4.2 Crops

A. Major Activities and Progress

- * Assisted Member-Director (Crops and Forestry) in preparing a working paper on Pulses and Oilseeds. This paper served as a background in the drafting of a feasibility study for the CIDA-funded project on crop diversification.
- * Helped draft the terms of reference for the study team on Pulses and Oilseeds and assisted in the identification of crucial areas needing urgent attention.
- * Participated in the preparation of the National Agricultural Research Plan. This involved:
 - (a) providing necessary background papers to the consultants;
 - (b) visiting major agricultural research institutes and regional stations;
 - (c) helping to organize a national workshop on research planning; and
 - (d) contributing specific sections and subsections to the draft document.More than 50% of Specialist's time was spent on this activity.
- * Attended 19 meetings at the Ministry of Agriculture on subjects covering crops, forestry, soils, farming systems and planning. Provided working papers and other inputs to several of these meetings.
- * From time to time assisted the Executive Vice-Chairman, BARC, in drafting several position papers and technical documents.
- * Monitored BARI's Pulses Program and advised on the plans and strategy for Rabi Cropping. Also, helped RARS, Hathazari in the groundnut improvement program.
- * Set up the analytical laboratory at BARI for the rapid analysis of protein, oil, moisture and basic amino acids. The infra-red analyzer was assembled and put into action. The technique for toxin determination in Lathyrus was standardized. Training was given to BARI staff in the operation of various analytical machines.

- * Assisted the Extension Directorate in the translation of 'Pulses in Bangladesh' into Bengali. This book will be released in 1984 for the use of extension workers.
- * Continued following up the PL-480 (operational funds) proposal. The same was accepted and funds were released in the report period. Specialist participated in a number of meetings at the Ministry of Agriculture and USAID in this connection.
- * Helped establish sabbatic leave of Professor Dr. Mohammed Hossain of BAU at the BARI quality laboratory. Worked several days with him to get him started on his work on the biochemical analysis of Lathyrus.
- * Attended the Workshop on 'Agro-ecological consequences' of an embankment project at Matlob Thana. Contributed to the preparation of a long-term plan for the monitoring of agro-ecological changes in the embankment area.
- * Published following major papers:
 1. Islam, M.Q.; Kaul, A.K. and Begum, K. (1982). Phenotypic variability and correlation studies in indigenous chickpea of Bangladesh. Bangladesh J. Agri. Res. 7(1): 1-5.
 2. Kaul, A.K.; Islam, M.Q. and Begum, K. (1982). Variability for various agronomic characters and neurotoxin content in some cultivars of Khesari Lathyrus Sativus L. in Bangladesh. Bangladesh J. Bot. 11(2): 158-167.
 3. Khan, M.R.I. and Kaul, A.K. (1982). Screening of some Bangladesh cultivars of rice for their consumers' preference and nutritional characteristics. Bangladesh J. Agri. Res. 7: 64-88.
 4. Gowda, C.L.L. and Kaul, A.K. (1983). Pulses in Bangladesh. FAO/BARI, Dhaka, 472 pp plus 8 pp colour plates.

5. Kaul, A.K. (1982). South Asian Regional Cooperation. Recommendations of the First Meeting of the Working Group on Agriculture 29-31 March, Dhaka, Bangladesh.
 6. Kaul, A.K. (1983). Crop Diversification: A Means of Employment Generation. Invited Paper at the Bangladesh Agricultural Economics Society, September, Dhaka.
 7. Kaul, A.K. and Rahman, M.M. (1983). Crop Diversification for Intensive Cropping. Paper presented at the First Workshop on National Cropping Systems Research, BARI, Joydebpur, Dhaka April 10-13.
- * Prepared following documents for the Ministry of Agriculture
- i) Agricultural Planning in Bangladesh - an overview.
 - ii) Status of Soil-Science Research in Bangladesh.
 - iii) Farming-Systems Perspective.

B. Constraints and Action Required

- * The Council's role as a coordinating body needs review and discussion. Technical support at field level as a means of coordination, particularly through the involvement of IADS specialists, is yet to be tried.
- * BARI has undertaken a major exercise in reshuffling the manpower at its headquarters and at various regional stations. Other institutes also need to evaluate their manpower deployment.
- * Inter-institutional cooperation in research has not improve during the report period. The Council should work out ways and means to do so.
- * Junior scientists lack basic skills in plant breeding. Specialist has planned two condensed courses on Breeding Methods in self and cross pollinating crops in 1984. Two short-term consultants in Pulses and Oilseeds have been programmed for 1984.
- * Reorganization of office space must receive highest priorit

4.4.3 Horticulture

The Horticultural Specialist arrived in Bangladesh on 11 November 1983. Detailed terms of reference are currently in preparation.

A. Major Activities and Progress

- * Discussions were held with the Member-Director for Crops and Forestry (BARC), Head of the Horticulture Division (BARI), Principal Scientific Officer of the Vegetable Crop Section (BARI), and Horticulture faculty members at BAU concerning current status of vegetable research, limitations and constraints in the vegetable research program, and potentials for improved vegetable production in Bangladesh. These discussions were useful in enabling orientation and design of the Specialist's activities.
- * Held discussions with the Senior Scientific Officers and Scientific Officers in the Vegetable Crops Section and the Citrus and Vegetable Seed Research Centre concerning their specific projects and the constraints they have in conducting this research. Also held similar discussions with several groups, including CARE, the Mennonite Central Committee, and the Christian Reformed World Relief Committee regarding their programs in horticultural crops and arranged to visit several of their research sites.
- * Visited the Kashimpur Agricultural Estate and talked with CARE personnel concerning their work with BADC, also visited several small farms which are participating in their program to improve production of vegetable crops for income.
- * Participated in the Agricultural Research Planning Workshop on 25th and 26th November 1983. Provided input in formulating a national vegetable research program proposal.

B. Constraints and Action Required

- * Preliminary observations indicate a serious potential constraint on the development of a national vegetable research program due to the small number of scientists directly involved in vegetable research. This is compounded by the fact that these few scientists are expected to work on all the major and potential vegetable crops throughout Bangladesh. The Specialist plans to work with the Horticulture Division on developing a contract research proposal to alleviate this problem.

4.5 Agricultural Economics and Social Sciences

A. Major Activities and Progress

- * Completed a two-month (60 days) course on VisiCalc and Word Processing on Apple II plus at BARC (April 25 - June 25).
- * Took part in the evaluation of the Agricultural Economics Division of the BARI which involved visits there as well as to BAU, Mymensingh. During this evaluation, prepared two short papers:
 - July A Short Report on the Division of Agricultural Economics, BARI, Joydebpur (18 pages);
 - November Benchmark Survey and Socio-Economic Study Evaluation Report.
- * Assisted the Member-Director, AESS program area, BARC in preparing a Proposed Annual Plan, 1983/84 for BARC/AESS area.
- * Visited the CSR sites of the Integrated Cereal Project, Nepal with two research officers from BJRI and BARI, and Dr. Marlin Van der Veen, IRRI Economics and Cropping System Program Advisor.
- * Sat London University 'O' level maths exam. at British Council, Dhaka (obtained a Grade A).
- * Visited BIRRI with Member-Director, BARC/AESS as part of evaluation of all agricultural economics research over last ten years.
- * Completed Paper No. 9: Income Analysis from one year's Data, Jessore CSRS, 1981/82. This is part of the continuing process of applying descriptive statistics to field data from cropping system research sites.

- * Presented a six-day short course from November 8-14 at the BJRI on socio-economic data analysis and application of partial budgeting to cropping system data. There were 20 participants from three research institutions: BJRI, BARI and BWDB.
- * Prepared a proposal for workshops to be held several times a year at which technical papers on economic analysis of cropping system research site data will be presented by field personnel. This was a follow-up on the previous short courses in Descriptive Statistics and in Socio-Economic data analysis and partial budgeting.
- * As part of the above, visited Hathazari RARS for three days to assist SO R. Karim in preparation of a paper on the Agro-Economic Survey of Dolichos lablab (Hyacinth Bean).
- * As part of the Workshop proposal, visited Jessore RARS to assist SO M. Rahman to prepare a paper on Income Analysis 1982/83 from the Jessore CSR Site.
- * Supervised the completion of labour use standards, using MCC data. We have now finished Aus 1980, 1981, 1982 (Survey), Aus 1982 (observed), Aman 1980 (Survey), Aus 1982 (Case Farm). Work on Rabi crops still remains to be completed.
- * Participated in meetings on the contract research manual with the BARC.
- * Participated in a two-day conference on the revision of the Bangladesh National Agricultural Research Plan.
- * Participated in planning with Member-Director, BARC/AESS a short course on cartography to be presented by the Dhaka University Centre for Urban Studies early in 1984.
- * Attended several BIDS weekly seminars.

- * Began to learn how to use the TI59 programmable calculator. BARC/AESS program will use the TI59 to upgrade the quality of data analysis at CSR sites. This is an interim measure prior to shifting to a micro-computer system and eventually to the mainframe central system.
- * Prepared a proposal for a Workshop in partial budgeting to involve all agricultural economists who attended the six-day short course on partial budgeting at BJRI in November.
- * Assisted the Member-Director, BARC/AESS in preparations required to present a three-week short course in January/February 1984 by a team from the Applied Statistical Research Unit, University of Canterbury, Kent, England. This course will be on applications of Statistics to Agricultural Experimentation, include two levels - Level 1 for 10 Statisticians and Level 2 for 20 non-statisticians - and is expected to be held at BARI, Joydebpur from January 22 to February 9, 1984.

B. Constraints and Action Required

- * The Economics and Social Science program is in great need of micro-computer with statistical analysis capacity. Specific computer needs for BARC as a whole have still to be identified and ordered. When this has been done and the equipment arrives, data files will need to be built up in order to use the program. An assistant will need to be hired to do this as well as to help in CSR site economic data analysis.
- * There is a continuing need to motivate field personnel at the CSR sites to participate in data analysis and reporting. This should be not only in agricultural economics but also in other subject matter areas.
- * Delivery of previously ordered commodities remains delayed. This includes all TI59 calculators for field stations. This will hold up our field program.

- * Lack of agricultural economists to analyze CSR Site data. The amount of data from site monitoring has now been reduced to what is obtained from 10 farmers (27 in 1982/83, 45 in 1981/82). This should make it easier to maintain timely analysis of data. With greater involvement of field staff in data analysis, the quality of work as well as quantity should increase during 1984. But as much of the work is being done at BARI, more needs to be done to encourage this work at other institutions such as BJRI, BWDB, SRTI.

4.6 Soil Management

A. Major Activities and Progress

- * Follow-up meetings were held on contract research proposals previously reviewed and in need of modification. BARC and the respective authors agreed to the suggested changes and made these, thereby strengthening the proposals and the application of results.
- * The local instrumentation and laboratory equipment technician's activities have continued to be coordinated through the Soil Specialist. Three servicing reports have been filed by the technician indicating a wide range of problems that have been solved. It is recommended that this technician hold several short courses on instrumentation and equipment maintenance in the future.
- * The Soil Specialist combined a business trip with his home leave. The trip was successful because details of the training/observation tour for four Bangladesh soil scientists were finalized at eight institutes; the Soil Specialist was updated in minimum tillage and sulphur research as well as with Electro Ultra Filtration analysis for soils; technical details concerning the laboratory equipment purchase for BARI were finalized; and consultant contacts and cooperation were established at the University of Kentucky, IFDC, PPI, ASI, and the Buntehof.
- * A paper on "Soil Test Crop Response Correlation Research Modifications" with eleven pages of suggestions for: a) improving project understanding, b) a systematic methodology involving laboratory, greenhouse and field research, and c) improved experimental design to obtain more meaningful data for basing farmer recommendations, was distributed to scientists participating in contract research. Most of the suggestions were incorporated into research projects.
- * A thirty-six page policy paper on "Soil Fertility in Bangladesh" was prepared in cooperation with Drs. Z. Karim and M.A. Mannan as a basis for the National Soil Fertility Evaluation and Improvement Program.

- * Five different talks were given during two separate courses organized by BARC/BADC/IFDC for fertilizer dealers and research/extension personnel.
- * Assisted in the organization of the BARC/IFDC Fertilizer Efficiency Research Training Program.
- * Reviewed and suggested amendments to the revised Fertilizer Recommendation Guide. Work on an improved version was initiated but has not yet been completed.
- * Attended various meetings of contract research projects including problem soils, soil test crop response, sulphur and zinc, potassium, IFDC trials and BNF. Technical suggestions for improvements were made where applicable. Many of these were accepted by the scientists and incorporated into the projects.
- * The Soil Specialist continues to act as the local coordinator for the IFDC, NIFTAL and CIDA sponsored projects. This assures continuity and progress between the visits of the short-term consultants who manage or monitor these projects.
- * The Soil Specialist made several field trips to evaluate research and to discuss problems with scientists at INA, BAU, RARS Jamalpur, RARS Jessore, CARE Kashimpur, and BARI Joydebpur.
- * The laboratory equipment necessary for the farmer service facility to be located at BARI was purchased and delivered to Dhaka Airport only three weeks behind schedule. Customs clearances are delaying installation of this facility.

A final plan for the renovation of the BARI Soil Science Division's Soil Fertility Laboratory was prepared in consort with engineers. Funding for this work was approved.

- * The Soil Specialist spent considerable time working on documentation and follow-up activities related to getting approval for the training/observation tour of the four Bangladeshi soil scientists programmed to go to the US. This work spanned a period from June to December before final approval was obtained.
- * Designed and advised on construction of shadehouse - headhouse for BARI Soil Science Division. Funds were received from CIDA in July and the facility was inaugurated in early December.
- * Greenhouse research was initiated at BARI in November using the data obtained from Agro Services International (ASI). Two local technicians were trained in procedures. A course for people from other institutes is planned for February, 1984.
- * CIDA funds were used to order a van for BARC, to be used by the BARI Soil Science Division. Five motorcycles have been distributed to various institutes using Phase II funds. This will increase the mobility of soils personnel.
- * The sampling of the major agricultural soils series has been completed and the last samples are being prepared to be sent to ASI. A total of 75 samples will have been analyzed, funded by IADS, IFDC, and CIDA. This has accelerated the soils research by at least one year. It also gives a basis for calibration of the central soils laboratory at BARI.
- * Soil samples have been sent to Purdue University for X-ray diffraction. This will allow us to identify minerals involved in fixation of added fertilizer elements and allow for extrapolation of research results over large areas.
- * Attended a BNF workshop in Bangkok. Brought new concepts back to Bangladesh and had them incorporated into BNF contract research project. Was able to convince BNF Resource Center steering committee to expand to include one Bangladeshi scientist.

- * Along with Dr. D. Beck of NIFTAL, Bangkok, drafted plan for BNF course for research/extension personnel to be held in March 1984.
- * Continued active participation in the Soil Science Society of Bangladesh in arranging for International Soil Science Society, Commission IV meeting to be held in Bangladesh in February 1984. Major work has been in getting international invitational speakers and in Conference details.

B. Constraints and Action Required

- * In the last semi-annual report two major problems were noted. These were slow cash flow, and contract research quality. Action was taken in both of these areas but with less success in the former than the latter. Thus, the suggestion to improve the system used for getting money from BARC to project leaders is still valid. It is recommended that the new IADS Administration Specialist work on this problem with BARC and try to streamline the cash flow. As stated in the last report, delays in cash flow result in untimely activities in the field, producing questionable experimental results.
- * A second constraint to the soil management program has been time wasted in getting four leading soil scientists out for a training/observation tour to the US. The candidates were selected jointly by the IADS Soil Specialist and the Member-Director for Soils and Irrigation. These people were hand-picked for a purpose. Each has a specific role to play in the Bangladesh Soil Fertility Evaluation and Improvement program. Still, resistance to their training was found and one of the candidates even changed. Their papers were passed through so many committees and to so many people that the objectives of the training stated in the initial document were changed and misunderstood.

It is recommended that steps be taken to give the IADS specialists and BARC more authority in selecting candidates for short-term training. This does not mean

excluding Bangladeshi administrators, but only reducing the number of them involved. The IADS Specialist along with his Member-Director, his program counterpart and the institute director know where their program is going, where it is weak and where it needs trained personnel. They also know the people who can best fill the program's requirements. They should select the people for short-term training. The BAR training cell should assist in locating the proper type of training.

It is emphasized that this is only for short-term "program" training. Short courses, and degree training should remain with a broader selection base.

4.7 Water Management

4.7.1 Water Management Extension

A. Major Activities and Progress

- * A National Workshop on Research and Research Priorities in Irrigation and Water Management was held on 2-3 November 1983. Over 100 scientists and senior administrators participated in the meeting. Much of the time of the workshop was given over to small discussion groups to discuss and to develop priority topics for research in nine separate areas (groundwater hydrology; manual and animal powered pumps; economics of irrigation; crop water requirements; pumps and prime movers; irrigated soil and water management and saline water irrigation; irrigation structures, water conveyance, drainage, and distribution systems; technology transfer and human aspects of irrigation development; cropping system studies for intensive irrigated agriculture). The Specialist assisted in preparations for the workshop.
- * Based on recommendations from the above workshop, a committee established by BARC prepared a national research program "Priorities for Research in Irrigation and Water Management" (EARC: December 1983). The Specialist was a member of the committee and served as its secretary.
- * Assisted in preparation for a meeting about IWM issues held at BARC under the chairmanship of the Executive Vice-Chairman on 23 October 1983. The meeting was attended by senior scientists and administrators involved in IWM research and produced recommendations on important areas for research in IWM. Specifically, during the meeting a committee was established to prepare a study on pumps and motors to be sponsored by BARC. The Specialist was appointed a member of the pumps study committee.

- * A study on pumps, motors, and wells for irrigation was proposed and planned. Together with the IADS Agricultural Engineer, was member of the committee to organize the study and of the sub-committee to prepare a definite research plan including questionnaires. The committees met in November and December and a 21-page document was prepared as the design for the study, which is to be carried out in 1984-85.

Assisted in the preparation of an Irrigation Management Program (IMP) manual to be used by all Upazilla-level officers in the national command area development program for minor irrigation. In working on the manual, was a member of a committee including World Bank, DARI, FAO, Rural Development Academy (RDA), BADC, BRDB, DAE, and Macdonald's personnel. The IMP program has been endorsed by the MOA and BRDB as the program to carry government efforts and assistance for improved management of small-scale irrigation systems.

Worked to coordinate IWM research with cropping system research. In pursuit of this objective, called a meeting among PSOs and IADS specialists involved in cropping system research and the two Integrated Irrigation Command Area Development (IICAD) contract research projects in the IWM program. The meeting was held on 23 November; agreement was reached that of six proposed IICAD research sites efforts would be made to position two more (an increase from three to five) in or around ongoing cropping system sites. A follow-up meeting is scheduled for early January 1984 to discuss further selection of IICAD sites so as to facilitate coordination between IWM research and cropping system sites.

Continued to prepare for a tour of Indian minor irrigation projects to study distribution systems for DTWs, LLPs, and STWs. Dr. Rafiqul Hoque (Associate Professor of IWM, BAU) and Dr. M.A. Hannan (Professor, Water Resources Engineering, BUET) have been selected for the tour.

- * Dr. Richard Howes, a consultant in the IWM program, carried out an economic study of alternative energy sources for irrigation equipment. During his two-month consultancy Dr. Howes looked specifically at the options for substituting local fuels for domestic fuels. His final report recommended research and workshops to examine the development of electrification for irrigation and the possibility of liquefied petroleum gas for irrigation. Recommendations from his report can be used in the development of both economic and agricultural engineering activities under ARP II.
- * Participated in the National Workshop on Research Priorities in the group dealing with IWM research. Since the Workshop on Research and Research Priorities in IWM had already been held on 2-3 November, the BARC IWM group was able to contribute a prepared list of research priorities to the National Workshop on Research Priorities.
- * Continued to follow up on the program for an annotated bibliography and library purchase program in the area of IWM. In December, prepared, in consultation with Dr. Ahsan, Dr. Hutchcroft, and Dr. Garces, a list of criteria for local consultants to be hired for the job. At the end of 1983 the program is set to hire consultants and to get the activity underway.
- * In consultation with Drs. Daugherty, Davy, Hutchcroft, Garces, Mannan, Amjad Hossain (RDA, Bogra), and Keith Gorey (RDA, Bogra) prepared a preliminary proposal for an IWM training materials production and testing unit to be developed at Bogra with assistance from BARC. The preliminary proposal has stirred some discussion. RDA has responded with a formal proposal for audio-visual activities at RDA. It may be possible in the next six months to move towards a formal proposal.
- * Prepared for a consultancy by Dr. Sam Johnson, III, in economics of DTW irrigation. Dr. Johnson will set up a study on DTW irrigation during his two-month consultancy in February-March 1984.

- * Prepared for consultancies by Drs. Weaver, Roumasset, Rosegrant, and Keller as a team to assist in the design of research proposals in IWM. The consultants will arrive in January 1984.
- * Discussions on the training component of the IWM budget continued throughout the period. Dr. Byrnes from IADS Washington assisted in the discussions. Together with Drs. Davy and Garces, developed a proposal for more foreign degree training in IWM to meet national needs. Another option is for non-degree US training. A third is for an IWM training materials production and testing unit at Bogra (see above) to assist in-country training in IWM. All these program options will move towards decision in 1984.
- * At the request of Drs. Mannan and Shawkat Ali, Joint Secretary, Ministry of Agriculture, worked with Dr. Z. Karim to prepare a scheme to link research on IWM issues with extension. The work resulted in a report on BARC IWM research and a schedule for annual research reporting to feed into the extension network.
- * Have been developing preliminary plans for a workshop on experimental distribution systems for water from DTWs, LLPs, and STWs. In this regard, a trip to visit Indian minor irrigation projects has been scheduled and discussions have been held with MacDonald's, BADC, WB, ODA, and ADB personnel about experimental distribution systems to be built as part of the current ADB and WB-funded tubewell programs.
- * Prepared for and assisted consultancy by Dr. Radosevich in water law. Dr. Radosevich's consultancy (September 11- October 2) involved review of developing law on spacing of tubewells.
- * Prepared for and assisted Cornell-CSU consultant team to study the possibility of developing a program to aid the IWM program at BAU. A four-person consultant team visited Bangladesh from 13 September to 7 October, intensively studied resources at BAU, and reported suggestions on some modest aid programs that may be appropriate at this time.

- * Worked on preliminary plans for a drainage and irrigation research project at Boro Biler Par near Mymensingh. This work was in cooperation with Dr. Garces, Dr. Kaul, and several staff members from INA. Unfortunately, INA seems unable at this time to undertake the activity. The innovative drainage and irrigation scheme proposed for Boro Biler Par is suitable for testing at a number of other sites; will continue to look for someone to carry out a similar project.
- * Dr. Levine visited Bangladesh for a short consultancy in IWM. Following suggestions from his consultancy report moved towards preparation of the 2-3 November workshop mentioned above.
- * In conjunction with the 2-3 November workshop, an internal review of BARC's program of work in IWM was carried out by consultants Dr. Hamid and Dr. S.D. Chaudhuri. Their evaluation was given as a report in the opening session of the workshop of 2 November.

B. Constraints and Action Required

- * A major constraint identified was the lack of manpower at BARC (in the IWM program area) to help follow up on the activities planned. At the end of the reporting period only one PSO each in the fields of water management and agricultural engineering was available. This constraint has been brought to BARC's attention. The possibility of hiring two persons on a short-term basis from the "local support" item of ARP funds until BARC can find suitable personnel is under consideration.
- * An interdisciplinary approach is especially important for research in IWM. Significant efforts have been made in this direction, particularly through the contract research project Integrated Irrigation Command Area Development. However, a better integration between the IWM and other program areas (i.e. Farming Systems, Economics & Social Sciences etc.) is needed.

- * Regular monitoring by IADS of IWM contract research is lacking. It has been proposed that each IADS specialist be associated with specific contract research projects, in order to monitor, assist, and advise. This step will assure the principal investigator more efficient technical support from IADS.

4.7.2 Agricultural Engineering

A. Major Activities and Progress

The Agricultural Engineer arrived at post on 13th September 1983.

- * Visits to BARI, BRRI, BAU, INA and BUET to contact IWM personnel and learn of their current activities.
- * Trip to Chittagong to visit the Hathazari cropping systems project area. The Integrated Irrigation Command Area Development Project - an Irrigation and Water Management Program Area activity - has chosen a site within the Hathazari area in order to give a Farming Systems approach to the solution of IWM problems. The IICAD project will be underway in early January 1984.
- * Trip to Bogra to meet IWM-related personnel, and to see an underground pipe system to consider further studies on this type of water distribution system. A site where such a system could have an application has been identified in the vicinity of Mymensingh.
- * A trip to Mymensingh (Boro Biler Par site) was made to study the possibilities of conducting drainage/irrigation contract research in collaboration with the INA. The site looks promising and initial steps towards this purpose have been taken: a request to INA to gather all available climatological, soils, etc. data concerning the site, and the creation of a committee to draft a contract research proposal in collaboration with the IADS IWM Specialists. A final decision on whether to go ahead with this project has not yet been made by INA.

- * Helped, organized and participated in a one-day workshop on "Issues in irrigation and water management". A recommendation to undertake a study or survey on the present performance of different types of tubewell equipment in Bangladesh was the highlight of the meeting.
- * Helped, organized and participated in a two-day workshop on "Research and research priorities in irrigation and water management". More than a hundred participants identified over 50 researchable items that should be given attention.
- * A complete work plan for the survey on "Performance of different types of tubewells and LLP equipment" to be undertaken during the 1983/1984 rabi season was prepared. It included a detailed budget and personnel terms of reference. However, due to time and manpower constraints, it has been postponed until October 1984.
- * A trip to the Rangpur-Dinajpur area was taken to become familiar with treadle-pump technology. This water lifting device was found to be very promising. A verbal agreement has been reached with the Rangpur-Dinajpur Rehabilitation Service - the institution promoting this pump - whereby they will train personnel involved with the pump for research purposes.
- * Initial contacts to develop contract research in Agricultural Engineering-related activities were made at BAU, BIRRI and BARI. Dr. L.R. Khan from BAU has shown interest in groundwater-related problems; Dr. Azharul Hoque from BIRRI will look into economic viability of DTWs, and M.H. Rashid from BARI would like to explore the subject of percolation losses in mini-reservoirs.
- * Preparations are being made to bring out a foreign consultant on saline soils. Terms of reference have been developed. Identification of the consultant is under progress.

- * Contacts were made with the Irrigation and Water Development and Flood Control Division of MOA to discuss their needs for training in the area of IWM. A recommendation plan which includes overseas short-term training, in-country short-term training for micro-computers, and a regional workshop was submitted. The plan is presently under consideration by the Ministry.

- * A trip to Jessore to evaluate the status of the on-going contract research project entitled "Efficiency of bamboo tubewells for small scale irrigation in Cropping System areas of Jessore" was made. A trip report was prepared with suggestions and recommendations on how to upgrade the IWM component of that project.

- * A contract research proposal entitled "A study on the effect of intensive Deep/Shallow tubewell installations on ground water recharge and safe yield in the Comilla Kotwali thana and Thakurgaon tubewell projects" was received in early December. Recommendations concerning some technical concepts of the proposal were submitted to the S&I Member-Director. Funding was recommended.

- * Preparation of a "Commodities List" is underway. Each of nine institutes (BAU, BUET, DU, BARI, BRRI, SRTI, BJRI, BTRI, INA) has been asked to submit their research equipment needs. In addition a general list to complement the above is being prepared.

- * Proposal for a year-long training course on "Pump Irrigation in Bangladesh" to be held on five days each month was submitted to BARC for approval. A target of 240 participants is sought. The proposal is now being considered by BARC.

- * Proposal to send six persons to five different non-degree short-term training IWM-related courses in USA was submitted to BARC's S&I Member-Director.

B. Constraints and Action Required

- * The constraints which have been identified in the Agricultural Engineering program area are common to the IWM program as a whole. They are already outlined in the Water Management Extension report, page 64.

4.8 Pest Management

4.8.1 Plant Pathology

A. Major Activities and Progress

- * A work plan for the plant pathologist for the period October 1983 to July 1984 was prepared and submitted to the IADS Project Supervisor.
- * A professional and friendly working relationship has been established with Dr. Hamiz Uddin Ahmed, Head of the Division of Plant Pathology at BARI, and with his senior staff, as well as with Dr. Md. Ameerul Islam, Head Entomology Division, BARI. An informal review was made of ongoing field research projects in plant pathology at BARI, Joydebpur and at BARI Regional Research Stations.
- * The plant pathologist participated as a member of the pest management working group in the Bangladesh Agricultural Research Planning Workshop in November 1983. Suggestions and recommendations were made to assign top priority to a survey of plant diseases and pests in Bangladesh and to research on crop loss assessment methodology. This is essential to provide a basis for coherent and objective pest management research in the future.
- * An intensive short course in the techniques of crop loss assessment, to be held at the University of Minnesota in July 1984, has been identified as a desirable training course for selected Bangladeshi scientists involved in pest management. The paperwork necessary for approval is being processed. It is anticipated that one plant pathologist and one entomologist will attend this course.
- * Familiarization visits were made to the Regional Research Stations at Jessore and Ishurdi. At each station, ongoing research in pest management was reviewed with the PSO and with the pest management staff. Laboratory facilities and equipment were reviewed and a list of additional equipment required was made at each location. The additional equipment will be necessary to provide the pest management laboratories with the capability for diagnosis of plant disease and pest damage, as well as for more up-to-date research. It is planned to purchase the

bulk of this equipment with Phase II pest management commodity funds. The ultimate goal is to equip four RARS's to function as diagnostic, as well as research, laboratories.

- * Familiarization visits were made to Bangladesh Agricultural University, SRTI at Ishurdi and BARD at Comilla. At BAU, an informal meeting and exchange of ideas was held with the faculty of the Department of Plant Pathology. A similar meeting was held at INA, located on the BAU campus.
- * A listing of pest management related publications held by the major agricultural libraries is underway and has been completed for MALDOC, BAU, EARI and BARD. It is planned to put this information on computer tapes and distribute printouts to interested institutes.

A listing of desired publications in pest management has been prepared but not yet finalized. Decisions remain to be made concerning priority of purchase and in which libraries selected publications should be held. This listing includes journals, text books and reference books. It is anticipated that Phase II pest management commodity funds will be used to provide these publications.

- * The plant pathologist was appointed to the BARC Banana Task Force formed in October 1983. Aside from active participation in Task Force meetings and one field trip to Narsingdi on December 12, 1983, the plant pathologist has helped to prepare a national survey questionnaire on banana culture in general and two leaflets on banana diseases for nationwide distribution.
- * Visits were made to cropping systems research sites at Jessore, Ishurdi (RARS and SRTI) and Daudkandi to determine how pest management principles can be inserted into this program. Due to the somewhat unstructured elements of this program it is felt best just to respond to particular problems pending the arrival of the entomology specialist and a subsequent evaluation of the possibilities for integrated pest management practices in CSRS.

- * Discussions were held on several occasions with Dr. G.A. Fakir of BAU concerning the establishment of a seed technology center in Bangladesh. The plant pathologist's initial feeling is that Bangladesh would be better served by a seed technology center, incorporating several disciplines, than by a center of seed pathology, focusing primarily on seedborne plant diseases and post-harvest diseases. However, Dr. Fakir has a formal proposal already partially approved for a seed pathology center and it may be best at this time not to interfere or compete with this proposal. Planning and information gathering will continue in order properly to assess the country's needs in this area before any formal proposals will be tendered.

B. Constraints and Action Required

- * Several external evaluation teams have recommended that a survey of plant diseases and pests be conducted. Such a survey is being done through the Division of Plant Pathology and the RARS's of BARI. However, initial indications are that symptomatology alone, and not rigorous pathogen identification, is being used to catalogue most diseases. Such a survey could serve as a preliminary effort but will have to be authenticated.

Two major constraints are: scarcity of trained, experienced personnel and lack of adequate laboratory equipment for proper pathogen identification. Training programs in diagnostic procedures and techniques are being planned and needed laboratory equipment will be ordered from Phase II funds. Initial training will stress diagnostic techniques using available, unsophisticated equipment.

GLOSSARY

ADB	-	Asian Development Bank
AESS	-	Agricultural Economics and Social Science
ARP II	-	Agricultural Research Project Phase II
ASI	-	Agro Services International
BADC	-	Bangladesh Agricultural Development Corporation
BARC	-	Bangladesh Agricultural Research Council
BARD	-	Bangladesh Academy of Rural Development
BARI	-	Bangladesh Agricultural Research Institute
BAU	-	Bangladesh Agricultural University
BIDS	-	Bangladesh Institute of Development Studies
BJRI	-	Bangladesh Jute Research Institute
BNF	-	Biological Nitrogen Fixation
BRDB	-	Bangladesh Rural Development Board
RRRI	-	Bangladesh Rice Research Institute
BTRI	-	Bangladesh Tea Research Institute
BUET	-	Bangladesh University of Engineering and Technology
BWDB	-	Bangladesh Water Development Board
CARE	-	Cooperative for American Relief Everywhere
CDST	-	Customs Duty and Sales Tax
C&F	-	Crops and Forestry
CIDA	-	Canadian International Development Agency
CMLA	-	Chief Martial Law Administrator
CSP	-	Cropping Systems Program
CSR	-	Cropping Systems Research
CSRS	-	Cropping Systems Research Site
CSU	-	Colorado State University

DAE	-	Directorate of Agricultural Extension
DTW	-	Deep Tubewell
DU	-	Dhaka University
E&RP	-	Extension and Research Project
EVC	-	Executive Vice-Chairman
FAO	-	Food and Agriculture Organization
HYV	-	High-Yielding Variety
IADS	-	International Agricultural Development Service
ICP	-	International Potato Centre
IFDC	-	International Fertilizer Development Center
IICAD	-	Integrated Irrigation Command Area Development
INA	-	Institute of Nuclear Agriculture
IPSU	-	International Project Service Unit
IWM	-	Irrigation and Water Management
IRWIT	-	International Rice-Wheat Integrated Trial
LLP	-	Low Lift Pump
MOA	-	Ministry of Agriculture
MP	-	Muriate of Potash
NALDOC	-	National Agricultural Library and Documentation Center
NIFTAL	-	Nitrogen Fixation by Tropical Agricultural Legumes
NPK	-	Nitrogen, Phosphorus, Potassium

PL-480 - Public Law - 480
PPI - Potash and Phosphate Institute
PSO - Principle Scientific Officer

RARS - Regional Agricultural Research Station
RDA - Rural Development Academy

S&I - Soils and Irrigation
SMO - Subject Matter Officer
SO - Scientific Officer
SRTI - Sugarcane Research and Training Institute
STW - Shallow Tubewell

TSP - Triple Superphosphate

USAID - United States Agency for International Development

WB - World Bank