

EVALUATION

CF

IRRI - PAKISTAN

INDUSTRIAL EXTENSION PROJECT

March 14-16, 1977

Program Division:ms
March 28, 1977

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I. INTRODUCTION

A. The Review Team

The review team was assembled and met on March 14, 15 and 16 to evaluate the progress of the IRRI Industrial Extension Project in Pakistan. (See Annex A for detailed agenda.) The team was composed of:

Dr. A. U. Khan
IRRI (Pakistan) Project Director

Mr. Aslam Ghayur
Deputy Director General
Agriculture Research Council (ARC)

Mr. Sarfaraz Beg
Lahore Engineering Foundry Organization (LEFO)

Mr. Niel A. Dimick,
Agriculture Engineering Advisor
USAID/Pakistan

Mr. Loring A. Waggoner
Assistant Program Officer
USAID/Pakistan

Mr. David Lundberg
Assistant Agriculture Development Officer
USAID/Pakistan

B. Evaluation Scope

General guidance for the evaluation was taken from AID Handbook 3 with specific guidance from STATE 000559 (Annex B) and the original logical framework for the project.

Issues reviewed from STATE 000559 included:

1. Infrastructure for testing prototype, introducing new machines, training rural area manufacturers and distributors.
2. Capability to assist with host government policy decisions on appropriate technology and socio-economic effort of mechanization.

3. Acceptability of machines by small farmer on the basis of performance and cost.
4. Collaboration between IRRI core budget activities and subject project on mechanization.
5. Recommendations for activities through life of project and continued activities and relationships following contract termination in September 1977.
6. Considering increasing current worldwide interest in small farm mechanization, how will expanded demand be serviced?
7. Desirability of international small farm machinery workshop at IRRI.
8. Issues unique to local environment.
9. Issues arising during evaluation process.

The original logical framework was reviewed during the evaluation and revised to more closely reflect the Pakistan element of the IRRI Machinery Industrial Extension Project (see Annex C).

C. Background and Progress Summary

The IRRI-PAK Agricultural Machinery Program is an off-shoot of the Agricultural Machinery Development Program at the International Rice Research Institute in the Philippines. The Institute's agricultural machinery program is directed towards providing appropriate farm machinery designs to meet the needs of small farmers in the developing countries. In the interest of a more effective distribution of the machinery designs originating from the Institute, an industrial extension network was established in 1976 under which two regional industrial extension programs were initiated in Thailand and in Pakistan. The Pakistan program is responsible for the introduction of the IRRI machines in Pakistan and neighboring countries which include Iran, Afghanistan, India, Nepal and Sri Lanka.

The Project is collaborating closely with the Agricultural Research Council in its efforts to transfer appropriate farm mechanization technology in Pakistan.

The Pakistan Project was initiated in 1976. In spite of unexpected delays encountered, considerable progress has been made during the start-up period towards setting up the Project facilities and in introducing the IRRI machines to manufacturers in Pakistan. The engineering design office has been equipped and is in operation and a small metal working shop has been erected at the IRRI-PAK Agricultural Machinery Program Office at Rawalpindi.

The present combined IRRI and ARC staff strength consists of five engineers, and three support staff. Selection for the posts of the Agricultural Engineer and Deputy Agricultural Engineer on the ARC staff has been made and these engineers will join the program in the next four months.

Manufacturers response on the IRRI axial flow thresher and power tillers has been most encouraging in Pakistan. Extensive interest has also been shown in the IRRI introduced rice transplanter.

Contacts have been established through personal visits with most established agricultural machinery manufacturers in Pakistan. Periodic newsletters, participation in exhibitions, seminars and demonstrations have been utilized to publicise the IRRI-PAK program to government officials, manufacturers and farmers in many parts of the country.

The review team feels the Program is off to an excellent start in Pakistan. Detailed information on Project progress can be found in semi-annual progress report No. 1 (Annex E).

II. DISCUSSION OF ISSUES

A. Infrastructure for testing prototypes, introducing new machines, training rural areas manufacturers and distributors

A good basis for continued successful implementation of the project is in place. The IRRI project headquarters for operations, design and fabrication has been established in Rawalpindi (page 3 Progress Report) and technical staff capable of implementing the present program have been hired and are on board. In addition the Agricultural Research Council (ARC) is supporting the project by posting competent staff in the ARC in order to strengthen and bolster project design and modification capabilities within the government's infrastructure. The testing, demonstration and development program in collaboration with the

ARC has been conducted primarily with the Rice Research Institute at Kala Shah Kaku. This facility has been utilized to test an axial flow thresher, diaphragm pump and liquid fertilizer applicator during the 1976 paddy season. The Rice Research Institute at Dokri, although not as conveniently located, will be utilized to test equipment developed by fabricators in the Sind. Both stations have assisted in the preliminary marketing and economic survey of rice producing areas in Pakistan conducted by the Georgia Institute of Technology, the sub-contractor in this project (see Annex E)

Thirty manufacturers have been contacted and six have produced prototypes for testing and development. Drawings of IRRI designed machinery were also supplied to nine companies who requested them for prototype development (Appendix C Progress Report).

Training of the Rice Research Institute's staff and two engineers in the utilization and testing of IRRI designed machines has been accomplished at the Project Headquarters in Rawalpindi and at the IRRI Core Project in Las Banos. Habib Industries Ltd. Karachi, Lahore Engineering and Foundry Organization, Lahore, Javed Engineering, Gujranwala and Masters Engineering Works Lyallpur have requested and received from the Project Headquarters short term training in design, use, testing and production of IRRI designed machines.

B. Capabilities to assist with host government policy decisions on appropriate technology and socio-economic effects of mechanization

The project staff have been actively involved with and accepted by the host country and have assisted ARC in the planning and establishment of their Engineering Cell. This Cell will be the National Agricultural Machinery Center which will serve agricultural mechanization research and development needs on a national level. The IRRI (Pakistan) Project Director, Dr. A. U. Khan is regularly requested by the Central Ministry of Food and Agriculture to advise on issues related to the mechanization of agriculture in Pakistan and has recently been appointed Chairman of the Advisory Committee on Agricultural Mechanization to the Government of Pakistan by the Secretary, Federal Ministry of Food and Agriculture. He is also on the Board of the Village Level Food Processing Project of the Appropriate Technology Development Organization of the Ministry of Planning in the Government of Pakistan.

The IRRI-PAK Project and its counterpart staff are also looked to by the Federal and Provincial Agricultural Departments as an important source of information and advice on matters related to agricultural mechanization in Pakistan.

A TAB/AID Washington funded social economic study to be conducted in the Punjab will assist and strengthen the study of small scale mechanization impact on rural agriculture. This study will be closely coordinated with the Georgia Institute of Technology, a sub-contractor to the project. The Project Director and his staff were requested by the Government to participate in the recent Pakistan Food and Agriculture Organization Seminar, "Agricultural Perspective Planning" where socio-economic impact of mechanization and its impact on the rural populace was discussed at length and the Project Director served as Chairman and discussion leader of the Agricultural Mechanization Session of the Seminar. Several papers related to the mechanization of agriculture have been prepared by the Project Director for presentation at seminars and for submission to the Federal Ministry of Food and Agriculture.

C. Acceptability of Machines by Small Farmers on Basis of Performance and Costs

The performance and evaluation of the use of some of the IRRI machines has been carried out by the test and evaluation team and interest by manufacturers and farmers is very high. The major thrust during the last few months has been on the multi-crop axial flow thresher and the prototype fabrication of the smaller **portable** thresher. The performance of the axial flow thresher has been compared with traditional threshing methods and with wheat threshers presently used in Pakistan.

The multi-crop capabilities of the axial-flow thresher make it suitable for many crops grown in Pakistan and regional countries. The smaller and cheaper unit will cater to the rural small land holdings of less than ten hectares. At least five prototypes will be tested for wheat threshing during this crop season beginning in April.

Five cooperating fabricators and provincial institutions are preparing prototype transplanters. The project staff has assisted during development of the transplanters and will continue to work with the interested parties throughout the current rice planting season in an attempt to develop the most suitable rice transplanter for use in Pakistan and surrounding regions.

D. Collaboration between IRRI Core Budget Activities and Subject Project on Mechanization

The IRRI Core Machinery Development Program is closely collaborating with the Pakistan Industrial Extension Project. Since most of the machinery designs are being originated by the Core Project at IRRI, regular contacts through mail and periodic visits of trainees and project staff to IRRI are being maintained. The Core Project has assisted in training new engineering staff hired on the Pakistan Project. The two engineers: Messrs. Mohammad Ilyas and Hamid Ayub have attended a short term Agricultural Machinery Training Course at the IRRI Agricultural Engineering Department. They have spent additional time with Project engineers in the Department at IRRI to learn more about projects of specific interest to Pakistan. Arrangements have also been finalized for sending Mr. Habibur Rehman, Assistant Agricultural Engineer of the Rice Research Institute at Kala Shah Kaku to IRRI for graduate studies in agricultural engineering. He has been accepted by the IRRI Agricultural Department where he will conduct his dissertation research on the development of paddy transplanters. He will complete his course work for a Master's degree at the Agricultural Engineering Department of the University of Philippines.

Latest design modifications and improvements developed are being received regularly from the IRRI Core Project and are being adopted to machines fabricated in Pakistan. Similarly some of the improvements made in Pakistan, particularly pivotly-mounted knives on the axial flow thresher and some improvements in the portable axial flow thresher, are being utilized in the Philippines to improve IRRI machinery designs. The design improvements from all sources are being exchanged and fed into the farm machinery network which consists of the Thailand and Pakistan projects and seven operating sub-contracts with cooperating organizations in other developing countries and the developments of the ongoing sister project in Thailand have been closely followed by the Project staff. Efforts are also being made to bring one small locally built four-wheel tractor from Thailand for test and evaluation in Pakistan. In addition two manual transplanters have been imported from the Philippines and are presently on loan to interested manufacturers in Pakistan for duplication.

E. Recommendations for activities through life of project and continued activities and relationship for contract expiring in September 1977

Work on a paddy farmer survey in Pakistan in order to evaluate the needs for appropriate farm mechanization will be continued. The data

gathered in the survey will be used for establishing project priorities so that locally assembled resources can be more effectively utilized, farmer preference will be better understood and marketing procedures will be identified and developed.

The Agricultural Research Council has only recently made the decision to establish an engineering cell. While the selection of some staff has been made and are on board, the engineering cell is still very much in its formative stage. This Project is playing an important role in the formation of the engineering cell and project staff will fulfill an advisory counterpart role to the cell. With this thought in mind, it is important that the project continues for the foreseeable future in order to help and develop the engineering cell to full maturity. At present it is doubtful that the cell will have sufficiently developed by September 1977 to stand on its own without assistance and guidance. The establishment and functioning of the engineering cell is a necessary criteria in order to provide the element of continuity for activities that have been initiated by this AID funded project. Maintaining the relationship between the present project activities and ARC Engineering Cell beyond the expiration date September 1977 of the current project is essential for its continued growth.

It has become apparent that while introducing some of the smaller farm machines developed by the Institute, linkages with the extension organizations in the various provincial governments will have to be developed and strengthened. The IRRI Rice Project recently negotiated with the Agricultural Research Council under a USAID grant, will be an excellent vehicle for developing such linkages and for introducing some of the IRRI developed machines to farmers.

F. Considering increasing current worldwide interest in small farm mechanization, how will expanded demand be serviced?

The original project in Pakistan was envisaged to have a satellite country program associated with it. The satellite country concept seems a rather expensive approach especially since the benefits will accrue mostly to one single country. Another possible approach would be to develop the sub-contracting concept with cooperating organizations in a greater number of countries in the region as done previously by the Institute in South Asia. This approach may provide benefits of new farm mechanization technology to a larger number of countries and will help to expand and serve worldwide interest in small farm mechanization. Under the sub-contract program approach, technical and financial assistance will be provided to organizations who are genuinely interested in introducing

new farm mechanization technology in their own countries and are willing to commit some of their own resources towards the objectives of the activity. On a regional basis the Pakistan Project will be able to provide better backup on design and testing. Perhaps the sub-contract concept may be utilized while conducting industrial extension activities in areas which could normally be served by the three existing programs, the Philippines, Thailand and Pakistan.

G. Desirability of International Small Farm Machinery Workshop at IRRI

For a number of years IRRI has been conducting two-week training programs for junior engineers from the cooperating manufacturers and other cooperative organizations. While such courses helped to train the staff of a number of manufacturers in the production of machines, institutionalizing marketing analysis and research and development activities within cooperating manufacturers organizations has been largely underplayed. It is necessary that workshops be organized at the Institute which would be directed towards the entrepreneurs, managers and higher management level staff of some of the cooperating manufacturers and various government organizations concerned with agricultural mechanization in the region. It is also necessary that various government officials and policy makers who play a major role in establishing strategy for mechanization of agriculture in the developing countries are exposed to the philosophy and approach of the IRRI project. This type of workshop would be very beneficial to all parties who are associated with the efforts of introducing appropriate agricultural mechanization technology and would help to accelerate the introduction of this technology in the region. Such a workshop would also be helpful to the project staff in refining project strategy and making the project more responsive to the needs in the region. Regional projects are now planning to set up their own training program at the Thailand and Pakistan headquarters in order to make larger participation of manufacturers and government officials from this region possible.

H. Issues Unique to Local Environment

1. The program at IRRI is directed primarily to the wet land cultivation of paddy. The agro-climatic conditions in Pakistan and regional countries, however, are quite different than those found in the Philippines and other South East Asian regions. While rice is grown in substantial quantity in Pakistan, wheat is the major crop in this region. In this semi-arid region there are large areas of irrigated and dry land agriculture.

Much of the equipment developed at the IRRI Core Program is not directly relevant to the needs of the region and most of the machines brought to Pakistan from IRRI have had to undergo major revisions and modifications in design to serve even the need of rice cultivation in this area. It is important therefore that to attempt to serve the total agricultural mechanization needs of the country, the program not be restricted to the wet land paddy cropping conditions and instead tackle problems related to the agricultural mechanization of all crops of the region.

2. The use of gasoline engines is not economical in this region and diesel engines therefore are much more in demand. Most of the IRRI machines have to be modified so that diesel engines can be installed and utilized with them. Future machines designed for this region should utilize diesel rather than gasoline engines.
3. Most small manufactures in this region presently are not familiar with engineering drawings originating from the program. It is therefore, necessary in the interest of rapid technology transfer, to initially provide prototype machines to manufacturers so that the machines can be duplicated from the models rather than from the drawings. Because of this factor the project requires a larger number of prototype machines to be distributed to interested manufacturers.
4. Many farm machinery manufacturers do not sell machines directly to the farmer. Farm machines are often sold to the government and most manufacturers have very little understanding of marketing problems. They therefore, do not have well developed marketing channels which can reach the farmers directly. Thus the development of marketing capabilities along with after-sale service by the manufacturer should be an essential part of this program.
5. A large number of Pakistani technical personnel are finding employment in the Middle-East and this is creating difficulties in finding appropriately qualified and experienced staff.
6. There is a lack of agricultural machinery research and development activities in industry and in Government organizations. Commercial R&D activities are not well understood by the Government officials, research workers and machinery manufacturers. Much of the research being done at the public research institutions is of poor quality and does not reach the farmer.

7. Government policies seldom provide incentives to local farm machinery manufacturers and in some cases discourage local production.
8. Because of patenting system is not very effective in Pakistan, there is little incentive for manufacturers to improve their machinery designs.
9. Generally the Government policy favors the introduction of larger tractors and machines which benefits the farmer with large land holdings.
10. There is a lack of appropriate linkages between the different organizations concerned with agriculture mechanization in the country.
11. Most manufacturers sell their machines through the Government. This approach does not encourage competition and results in higher machinery prices. It also does not permit the development of appropriate marketing channels for farm machinery.
12. Most manufacturers produce one or two machines which have seasonal demand rather than a full range of farm machines. This results in intermitant production and creates production planning problems.

III. RECOMMENDATIONS

1. Considering the high degree of interest in mechanization and the long gestation period for machinery development and commercialization, this project should be considered as a long range program requiring support for at least five years. It is recommended that the project be extended for the next three years. At the end of this period it should be reviewed again for future actions.
2. The present rice mechanization focus of the project seems too narrow for the agro-climatic conditions prevalent in this region. There are large areas of dry land irrigated farming and semi-arid agriculture. The program is mainly serving the needs of the wet land paddy producers. In order to serve a larger number of farms, broadening and reorientation of the program focus will be necessary. This will necessitate a substantial increase in funding levels.
3. The project has made substantial progress in the initial stages in Pakistan and has generated considerable interest from the manufacturers and Government officials. The team feels that the project resources, especially the level of staffing, is not adequate to handle the increasing level of activities that are undertaken. Some augmentation in the quality and magnitude of the staff is essential if the project is not to lose the initial momentum generated at project offset.
4. The mechanization research and technical assistance from the Georgia Institute of Technology has been useful and should be continued. Market and information research has been especially important in giving general and specific support are required to strengthen data collection capabilities and to maintain information and working relationships with Government and other organizations active in agricultural mechanization within the region.
5. The single satellite country approach to extend mechanization technology in the region seems inadequate. This program should serve a large number of neighboring countries. One alternative would be to work through contractual arrangements with interested organizations in several neighboring countries. The experience gained with the sub-contract industrial extension program at IRRI could be used as a pattern. Additional resources will have to be provided to fund such arrangements at an effective level.

6. Appropriate training programs need to be developed for trainees from cooperating manufacturers and research organizations within the region. This will necessitate funds for staff, trainees travel and other costs.
7. The program needs to develop appropriate promotional materials and instruction manuals in English and local languages. Because of the limitations of staff and facilities for such work it could be handled better by professional services specializing in this field.
8. The project has developed linkages with various institutions and has started to play an active role in the development of agricultural machinery research capabilities in Pakistan. The project is making an effective contribution in the development of the Engineering Cell of the Agricultural Research Council which will serve as the center for agricultural machinery. This will provide a long range continuity to the Program activities. The development of agricultural machinery research capabilities should be considered as an important objective of the Program.
9. Most of the project ties are with larger manufacturers which is understandable given the short period the project has been operating. In the future special efforts should be made to include the rural area manufacturers and distributors.
10. The GOP is presently subsidizing the sale of machinery to farmers. Given the expected major expansion in machinery sales it is questionable whether the GCP can afford to continue this practice, if it is in fact beneficial. It is recommended that the subsidy issue be investigated further to determine its impact, positive or negative, on the project.

PROJECT REVIEW
IRRI-PAK AGRICULTURAL MACHINERY PROJECT

March 14, 1977

- 8.00 - 8.45 A.M. Visit the Director-General, ARC
- 9.00 - 1.00 P.M. Project Progress Report and Discussions
A. U. Khan; Phil Hess; Mohammad Ilyas; and
Hamid Ayub.
- 1.00 - 2.00 P.M. Lunch Rawalpindi
- 2.00 - 6.00 P.M. Discussion of issues and preparation of
draft report.

March 15, 1977

- 8.30 A.M. Departure for Lahore by PK-381
- 10.09 A.M. Visit to LEFC Factory
- 11.30 - 12.30 P.M. Visit Ittefaq Bros.
- 12.30 - 1.30 P.M. Lunch
- 2.00 - 3.00 P.M. Visit Ravi Engineering
- 3.00 - 4.30 P.M. Visit the Rice Research Institute,
Kala Shah Kaku
- 4.30 - 5.30 P.M. Visit LEFC Director
- 6.00 P.M. Return to Rawalpindi by PK-386

March 16, 1977

- 8.00 A.M. - 12.00 A.M. Discussions re: Report Finalization

UNCLAS STATE 000559

SUBJECT: REVIEW IRRI MACHINERY INDUSTRIAL EXTENSION PROJECT

REF: (1) STATE 300437; (B) BANGKOK 34509; (3) MANILA 19924

1. APPENDIX 9B, AID HANDBOOK 3 PROVIDES SCOPE OF WORK, FORMAT AND ISSUES FOLLOW LATE PROJECT START ACCEPTED. ACCOMPLISHMENTS FROM ACTUAL STARTUP CONSTITUTE REVIEW SCOPE. REVIEW TEAM SHOULD REPRESENT USAID AGRICULTURE AND PROGRAM OFFICES, HOST COUNTRY SPONSORING AGENCY, COOPERATING MANUFACTURER OR DISTRIBUTOR, FORD, ROCK-FELLER OR OTHER APPROPRIATE PRIVATE SECTOR DONOR. DUE DATE FINAL REPORT TO AID/W, MARCH 31, 1977.

2. ISSUES: (A) INFRASTRUCTURE FOR TESTING PROTOTYPE, INTRODUCING NEW MACHINES, TRAINING RURAL AREA MANUFACTURERS AND DISTRIBUTORS. (B) CAPABILITY TO ASSIST WITH HOST GOVERNMENT POLICY DECISIONS ON APPROPRIATE TECHNOLOGY AND SOCIAL-ECONOMIC EFFORT OF MECHANIZATION. (C) ACCEPTABILITY OF MACHINES BY SMALL FARMER ON THE BASIS OF PERFORMANCE AND COST. (D) COLLABORATION BETWEEN IRRI CORE BUDGET ACTIVITIES AND SUBJECT PROJECT ON MECHANIZATION, (E) RECOMMENDATIONS FOR ACTIVITIES THROUGH LIFE OF PROJECT AND CONTINUED ACTIVITIES AND RELATIONSHIPS FOLLOWING CONTRACT TERMINATION IN SEPTEMBER 1977. (F) CONSIDERING INCREASING CURRENT WORLDWIDE INTEREST IN SMALL FARM MECHANIZATION, HOW WILL EXPANDED DEMAND BE SERVICED? (G) DESIRABILITY OF INTERNATIONAL SMALL FARM MACHINERY WORKSHOP AT IRRI, (H) ISSUES UNIQUE TO LOCAL ENVIRONMENT. (I) ISSUES ARISING DURING EVALUATION PROCESS. (J)

3. APPROPRIATE PROJECT DOCUMENTS BEING POUCHED EACH MISSION. COMMENTS AND SUGGESTIONS ON REVIEW ISSUES WELCOMED FROM IRRI AND MISSIONS.

KISSINGER

LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date September 1980
Date of this Summary March 1977

Project Title: IRRI Machinery Industrial Extension - Pakistan (Region)

MANAGEABLE INTEREST

If Inputs, Then Outputs

If Outputs, Then Purpose

If Purpose, Then Goal

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS										
<p>Program Goal: The broader objective to which this project contributes:</p> <p>Increased use of locally produced intermediate scale IRRI farm machinery by small and medium sized farmers in Pakistan and neighboring countries.</p>	<p>Measures of Goal Achievement:</p> <p>a) 20% increase in sales of each prototype tested and adopted.</p> <p>b) Research expenditure v/s sales generated.</p> <p>c) 20% increase in farmer demand for purchases.</p> <p>d) Increase in employment of industrial worker by cooperating manufacturers.</p> <p>e) % research expenditure on generated sales. (next page)</p>	<p>a) Manufacturers sales records.</p> <p>b) Manufacturers forward order receipts.</p> <p>c) Manufacturers records.</p>	<p>Concerning long term value of program/project:</p> <p>a) Local manufacturers are capable of adopting and manufacturing requirement in sufficient quantity to satisfy farmers demands.</p> <p>b) Government policies are changed to encourage the manufacture, instead of importation, of farm machinery.</p> <p>c) That labor saving devices may (next page)</p>										
<p>Project Purpose:</p> <p>To adopt, manufacture, market and service small scale food production related agricultural equipment in Pakistan region based on designs and production related know-how of IRRI, business and management assistance by Georgia Tech. and the capabilities of indigenous manufacture to expand and diversify their operations.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>20 manufacturers producing adopted and improved small scale farm machinery for commercial sales.</p> <p>15 manufacturers working directly with IRRI technicians to develop; prototype of farm machinery, R&D Cells, marketing analysis capabilities and retail commercial outlets.</p>	<p>a) IRRI project records.</p> <p>b) Locally based manufacturers records and reports.</p>	<p>Affecting purpose-to-goal link:</p> <p>a) Manufacturers will be willing to cooperate with IRRI.</p> <p>b) Raw materials and labor will be available.</p> <p>c) Contract staff will be available to assist manufacturers as requested.</p> <p>d) Funds will be available for private operators to manufacture machines.</p> <p>e) Government policy will encourage the development of private retail outlets.</p>										
<p>Outputs:</p> <p>a) An economic and market study of the agro-industrial sector of Pakistan.</p> <p>b) A comprehensive survey of agriculture mechanization needs of small and medium sized Pakistani farms.</p> <p>c) An analysis of the social-economic affects of farm mechanization in Pakistan. (next page)</p>	<p>Magnitude of Outputs necessary and sufficient to achieve purpose.</p> <p>a) Completed study of agro-industrial sector.</p> <p>b) Completed survey of equipment needs of small farmers.</p> <p>c) Completed analysis of socio-economic effects of farm mechanization in rural areas of Pakistan.</p> <p>d) At least 8 different prototype machines designed, tested and assembled with published results. (next page)</p>	<p>a) Completed report received by TAB/W and USAID.</p> <p>b) Completed report reviewed by TAB/W and USAID.</p> <p>c) Completed analysis received by TAB/W and USAID.</p> <p>d) IRRI and manufacturers records and reports.</p> <p>e) IRRI mailing list.</p> <p>f) Manufacturers and IRRI records and reports.</p>	<p>Affecting output-to-purpose link:</p> <p>a) Manufacturers will have access to completed studies.</p> <p>b) IRRI personnel will work closely with manufacturers and government officials.</p> <p>c) Government will encourage manufacturers to test and demonstrate new mechanized technology</p>										
<p>Inputs: Activities and Types of Resources</p> <p><u>IRRI</u></p> <p>Technical expertise, local and international to assist in design of prototypes equipment and imported prototypes, materials and supplies.</p> <p><u>Government and local manufacturers</u></p> <p>Agriculture Research Council counterparts to IRRI technicians, manufacturers construction of prototypes.</p>	<p>Level of Effort/Expenditure for each activity.</p> <p><u>Senior Project Staff (included in Philippines Budget</u></p> <table border="0"> <tr> <td>Transportation & travel (senior staff)</td> <td style="text-align: right;">\$ 38,800</td> </tr> <tr> <td>Overhead and Benefits</td> <td style="text-align: right;">26,712</td> </tr> <tr> <td>Local Staff</td> <td style="text-align: right;">60,480</td> </tr> <tr> <td>Equipment, prototype and supplies</td> <td style="text-align: right;">37,000</td> </tr> <tr> <td>Total:</td> <td style="text-align: right;">\$ 162,992*</td> </tr> </table> <p>GOP/ARC staff/supplies (yet unknown)</p> <p>* 2 year estimates.</p>	Transportation & travel (senior staff)	\$ 38,800	Overhead and Benefits	26,712	Local Staff	60,480	Equipment, prototype and supplies	37,000	Total:	\$ 162,992*	<p>IRRI budget records and staffing pattern.</p> <p>GOP staffing records.</p>	<p>Affecting input-to-output link:</p> <p>Staff are available locally to be hired by IRRI.</p> <p>Funds are available to support both local and expatriate staff.</p> <p>ARC continues to support small scale agriculture mechanization in Pakistan.</p> <p>GOP staff are assigned to Engineering Cell.</p>
Transportation & travel (senior staff)	\$ 38,800												
Overhead and Benefits	26,712												
Local Staff	60,480												
Equipment, prototype and supplies	37,000												
Total:	\$ 162,992*												

**LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN**

Est. Project Completion Date September 1980
Date of this Summary March 1977

Project Title: IRRI Machinery Industrial Extension - Pakistan (Region)

DEVELOPMENT HYPOTHESES
 If Purpose, Then Goal
 If Outputs, Then Purpose
 If Outputs, Then Outputs
 If Inputs, Then Outputs
 MANAGEABLE INTEREST

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes:	Measures of Goal Achievement: f) Imported or local purchases of engines.		Concerning long term value of program/project: provide advantages, cost/benefit wise over the growing scarcity of farm labor. d) Farmers will have financial resources/alternatives available to them to purchase improved equipment.
Project Purpose:	Conditions that will indicate purpose has been achieved: End of project status.		Affecting purpose-to-goal link:
Outputs: d) Prototype machines designed, assembled, tested and results published. e) Blueprints and operating manuals published. f) Demonstration and training program for design and production personnel.	Magnitude of Outputs necessary and sufficient to achieve purpose. e) A general distribution system for blueprints and operating manuals. f) 16 demonstration and training sessions.		Affecting output-to-purpose link:
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:

Summary of Georgia Tech Assistance to the IRRI
Agricultural Machinery Program - Pakistan

In the initial stages of the IRRI Agricultural Machinery Program, Georgia Tech assistance has concentrated on the development of in-country working relationships, the identification of suitable manufacturers, and the data collection, informational, and marketing analysis requirements of the IRRI program.

During 1976, a Georgia Tech engineer spent approximately three and one-half months in Pakistan. During this time, assistance was given in administering the office, hiring personnel, overseeing construction of a machine shop and additional office space, ordering equipment, and other start-up activities. Trips were made in Punjab and Sind Provinces to promote and discuss the program with government officials, manufacturers, agricultural specialists, and other local and international agencies. From interviews and secondary data sources, market analyses of IRRI machines were made. A description of Pakistan agriculture, rice farming, and mechanization status was included.

A Pakistani engineer was hired to continue the program when the Georgia Tech specialist was not in-country. The local engineer collected general and specific information necessary for the program. Promotional alternatives of the program were investigated. Manufacturers were contacted concerning their management and technical problems.

A major survey of 200 farmers in the major rice producing areas was made to assess the status of mechanization and develop the mechanization requirements and desires of the farmer.

Development of Linkages in Pakistan's
Agricultural Mechanization Program

In Pakistan, the Punjab and the Sind provinces presently have organizations which conduct research concerning agricultural machinery and mechanization. Similar research in agricultural machinery is also conducted at some of the universities in the country. The ARC has recently established the Agricultural Engineering Cell which is being developed as a national agricultural machinery research center to tackle agricultural mechanization problems which cannot be effectively handled at the provincial level. The national center will be responsible for testing and evaluating promising machines that are imported into the country and some of the locally manufactured agricultural machines. This will help to ensure that the introduction of appropriate farm machines in the country is well documented and results well publicized. The national center will also coordinate research activities in the country in order to minimize duplication of efforts and to make more effective use of available resources. The provincial centers will concentrate on problems which are more specific to their own areas and will assist the national center in testing, evaluating and extending the technology being developed at the center or being imported into the country.

A high degree of coordination will be necessary between the national and the provincial agricultural machinery centers in order to develop a well coordinated national agricultural mechanization research program. This project can play an effective role not only to develop the Engineering Cell of the ARC at the national level but to assist in the development of close linkages between the concerned organizations and in assisting the provincial center in upgrading their research capabilities. The IRRI program, with its worldwide contacts in agricultural mechanization, can help to bring new machines and technology from abroad and transfer it to this region.

There are a number of projects related to agricultural mechanization that have been organized by the various International Organizations in this region. It is important that the project develop close contacts with such programs in order to benefit from their activities. The project can in turn contribute to regional programs by providing the machinery designs developed by the Institute. Similar linkages could be developed with various agricultural machinery research organizations in the neighboring countries through sub-contract arrangements with cooperating organizations. The project has an excellent potential to serve as a nucleus for an agricultural machinery network for exchanging and disseminating information on mechanization in this region.

There is a distinct lack of working relationship between the various research organizations in the Pakistan Section and machinery manufacturers. The project has made substantial progress in developing a working relationship with a number of manufacturers in Pakistan. It can play an active role in fostering similar relationships between other research organizations and the local manufacturing community. Because of the more flexible aspects of the project, it is in a unique position to work with a wider variety of organizations and bring them together in the interest of mechanizing agriculture.

The project has been successful in bringing together leading manufacturers and leading distributors of agricultural machinery in Pakistan. Development of similar linkages between manufacturing and sales organizations can help to establish a more rational machinery marketing structure in the region.