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SUMMARY REPORT

REPORT NO. 1

DRYLAND AGRICULTURAL DEVELOPMENT - PAKISTAN BARANI PROJECT

Contract AID/NE-C-1217

CLARENCE J. MILLER
TEAM COORDINATOR

September 1, 1976 to May 3, 1979

June 1979

This report is one of seven summary reports prepared by Experience, Incorporated for Project AID/NE-C-1217, Pakistan Barani. The reports are listed as follows:

No. 1. Miller, Clarence J., Summary Report of Team Coordinator. September 1, 1976 to May 3, 1979

No. 2. Miller, Clarence J., Study of Socio-Economic Impact of Barani Project Demonstration in Punjab and Northwest Frontier Provinces, Pakistan

No. 3. Miller, Clarence J., Study of Economics of Wheat Production in Barani Areas of Punjab and Northwest Frontier Provinces, Pakistan

No. 4. McKay, Gerald R., Summary Report of Communications Consultant. September 1 to September 30, 1976 and October 2, 1978 to January 25, 1979

No. 5. Ulsaker, Lawrence G., Summary Report of Agronomist-Punjab Province. June 28, 1976 to April 3, 1979

No. 6. Burgess, William D., Jr., Summary Report of Agronomist-Northwest Frontier Province. February 23, 1976 to April 18, 1979

No. 7. Dilawar Ali Khan, et al, Study of Marketing of Farm Products and Farm Inputs in Barani Areas of Punjab and Northwest Frontier Provinces.

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I. INTRODUCTION

There are about 40 million acres of unirrigated (barani) land in Pakistan with soil and slope suited to tillage, but only 8 to 10 million acres of this area are tilled in an average year. Rainfall, varying from less than 10 inches to over 50 inches, is a limiting factor to increased cropping and crop yields in a large part of this area. Higher-rainfall areas are concentrated in the northern Punjab and Northwest Frontier provinces (NWFP), and are characterized by a fairly high population density, small and fragmented holdings, low yields, low cropping intensity, unsophisticated tillage methods, and low per capita income. Evidence from experience elsewhere, and limited research in Pakistan, suggest that much higher yields of field crops are possible by changing current farming technology. It can be assumed that higher yields would improve farm incomes as well as rural family living, on the small barani farms.

In 1973-74 Rabi1/ season, the USAID Mission established plots on 700 farms, where an improved seed variety and modest applica-

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1/ Rabi is the crop season that runs generally from October through March

tions of fertilizer resulted in a 100 percent increase in wheat yield, compared with local wheat grown under traditional practices. In the Kharif[2/] 1974, and Rabi 1974-75 seasons, similar trials were established. Results reinforced the previous conclusions conerning production potential in rainfed areas -- the possibility of a two to three-fold increase in yields.

On June 30, 1975, the Government of Pakistan (GOP) and USAID signed an agreement providing for the Barani Agricultural Development Project to operate for three years. USAID, on February 17, 1976, signed a contract with Experience, Incorporated of Minneapolis, Minnesota to provide technical assistance and support for the project. A Barani Project Director was provided by the GOP in each of the two provinces (at Rawalpindi and Peshawar), with supporting project personnel, offices, and logistic support.

II. PROJECT GOALS

The Barani Project was designed to establish the conditions considered necessary for widespread adoption of production and income-increasing practices by farmers in barani areas, through such measures as:

1. Identifying factors that motivate farmers to adopt improved agricultural practices that would result in a significant increase in crop yields.

2. Introducing, testing, and demonstrating production and income-increasing crops and practices acceptable to small barani farmers.

2/ Kharif is the crop season that runs generally from April through September.

3. Identifying improvements needed in marketing farm products and supplying production-increasing inputs; and planning and implementing these improvements.

4. Providing adequate flows of credit to farmers on acceptable terms.

5. Identifying and improving other conditions necessary to attain project goals.

While each of the above goals is laudable, they are very broad. Experience, Incorporated advisors found it necessary to focus the project on a few well-designed efforts that could be taken within the two to three year period allowed to accomplish the goals.

III. SCOPE OF PLANNED ACTIVITIES

To attain the above goals and conditions, the Experience, Incorporated team planned these steps:

1. Identify appropriate improved crops and practices, promote transfer of this improved technology through demonstrations and other techniques, and train local change agents (largely Agricultural Extension Service personnel).

2. Plan and carry out studies of conditions related to barani the farmers' adoption of production-increasing practices.

3. Plan and carry out studies to identify improvements needed in marketing, in the distribution of inputs and of credit, in transportation and other services needed in project areas; implement plans and projects leading to the needed improvements.

4. Identify training needs and assist in training programs designed to prepare project and extension personnel to carry on project activities on an expanded basis after termination of this project.

5. Plan and produce printed and audio-visual materials to support training programs for extension personnel and to provide farmers with appropriate information that would help them increase their crop yields.

6. Support project participant training abroad. This part of the project was never implemented because the Government of Pakistan was unable to fund their portion of the costs.

The scope of these planned activities proved rather broad. Advisory staff members attempted to work on all the subjects in the program, but were not able to cover them as well as they would have liked.

IV. PROJECT STAFF AND ADMINISTRATION

The Experience, Incorporated team consisted of three long-term specialists and five short-term consultants. Long-term staff members were: Dr. Clarence J. Miller, agricultural economist; Lawrence G. Ulsaker, agronomist; and William D. Burgess, Jr., agronomist. Dr. Miller was team coordinator and gave leadership to studies on the economics of wheat production, marketing, and the impact of the project on barani farmers. He also provided logistic support to the two agronomists, helping coordinate seasonal activities, and provided liaison with national and international agencies, USAID officials, and Experience, Incorporated headquarters. Dr. William G. Bursch, Experience, Incorporated Vice President, was project administrator for this project. During the duration of the project, he made two trips to Pakistan.

Lawrence Ulsaker was agronomist in Punjab Province, where he gave leadership to all the crop-related work and coordinated various aspects of the project in this province. William Burgess filled a similar role in the NWFP.

In the NWFP, the local Barani Project Director was Lal Mohammad Khan, who worked very closely with Mr. Burgess. The Punjab Barani Project Director was changed three times during the life of the project. These changes presented some serious problems in planning and administration for the entire Punjab Barani Project staff. Both province offices were staffed with local professional and support people (see Report No. 6, Summary Report of William Burgess). Several professional positions were never filled in the Punjab Barani office (see Report No. 5, Summary Report of Lawrence Ulsaker).

Short-term project staff and dates they worked on the Barani Project are: Harold A. Kramer, Agricultural Engineer, December, 1976; Dr. Paul Carson, Soils Specialist, January, 1977; Dr. Peter H. van Schaik, Oilseeds Specialist, January, 1977; Howard W. Ream, Forage Crop Specialist, April, 1977; and Gerald R. McKay, Communications Specialist.

Mr. McKay made two trips which are reported in Report No. 4 of this final report. The first four specialists each spent a month or less as consultants in Pakistan. Mr. McKay was in Pakistan a month on the first trip and four months on the second.

V. STUDIES CONDUCTED

A. Benchmark Survey

A benchmark survey was conducted in both provinces to provide basic information to assist in making judgments in carrying out planned steps in the project and with which to compare progress in reaching the goals of increased production and improved family living. Dr. H. S. Plunkett, Sociologist with USAID, was given the

contract in 1975 to supervise these studies. However, his contract ended at the time the field work was completed. Dr. Miller supervised the data tabulation that was eventually done. Mr. Ateeque Ahmad, a local statistician, assisted with the tabulation, and from a selected sub-sample, 11 tables were made up for each province. In these tables, key information relating to barani farms and farmers was summarized (see unit No. 5, Appendix A, Benchmark Study in Punjab and Unit No. 6, Appendix A, Benchmark Study in NWFP).

B. Economics of Wheat Production

Data on yields of wheat plots comparing improved and traditional practices had been collected during the five years prior to the beginning of the Barani Project. Dr. Miller summarized this data and organized it in order to permit comparisons with the yield data later derived from plot trials in the project. Results of this study are in Report No. 3, "Economics of Wheat Production in Barani Areas".

C. Marketing of Farm Products and Inputs

Little attention has been paid to the commercial marketing of agricultural products from barani producing areas, in part because much of the buying and selling serves only local inhabitants. Also, most of the production of cereals, oilseeds, pulses, and animal products is consumed by the same farm families who produce them. One area in each province was selected for the study by Dr. Miller and personnel from the Economic Research Institute in Lahore, who were the contractors for this study.

The study showed that the existing marketing system is traditional and centralized. Present surpluses are small and localized; the potential production could provide respectable amounts for sale, especially if the present combinations of irrigated and barani areas combine their sales volumes.

Even with the present small surpluses, marketing problems are already evident. These include poor storage, long distances for transportation and poor transport media, lack of quality control, lack of price incentive to produce better quality goods, and inability of the small farmer to influence the net price he receives. Present official thinking seems to be that first, barani production must be increased, then some priority can be given to marketing. However, this line of thinking can lead to disaster. There will, first of all, be no incentive for farmers to increase their production; and even if they do, there will be no marketing system to efficiently handle their produce. Efforts must be taken to improve marketing at the same time that efforts are going on to increase production (see Report No. 7, Marketing of Farm Products and Inputs).

D. Impact Evaluation for Barani Project

This study was initiated by Dr. Miller after two years of project operation. The purpose was to discover what changes had taken place in barani farmers' thinking and to determine the factors that influenced them to change their practices. One problem with the measurement of change was that there was a lack of comparable data available from the beginning of the project. Where demonstrations had been very successful, farmers were convinced of the need to change their inputs and improve their farming methods. In other cases, demonstrations had not shown the good results they were intended to show, so farmers were not convinced that it was worthwhile to change their methods, which would result in increased costs and labor inputs.

One consistent complaint from the farmers concerned the poor service given them by extension and other field agents. Extension personnel are restricted by lack of mobility and lack of resources. Influential farmers do favors for the agent and he, in turn, spends most of his time helping these few farmers. There are too many farmers officially assigned to each agent, and agents are called

on for many non-agricultural and time-consuming activities. Furthermore, the average field agent is ill-trained to assist farmers with problems of agricultural modernization (see Report No. 2, Socio-Economic Impact Evaluation for Barani Project Demonstrations).

E. Farmer Profile Study in NWFP

In order to better understand the kind of farmers with whom the Barani Project was concerned and to plan work with the farmers, a significant amount of profile data was collected at the time arrangements were made for the establishment of plots. Size of farm, major crops raised, and amount of fertilizer used were noted at the time farmers agreed to have plots on their farms.

Other characteristics such as age, number of workers per farm, and frequency of visits to the nearest city were also determined during the first interview with the farmer. This information was helpful in planning later activities related to the plots and in interpreting the results of various trials and demonstrations in particular situations. The information collected in this manner is summarized in Report No. 6, Appendix B, Farmer Profile Data From NWFP for Four Seasons.

VI. DEVELOPMENT OF PUNJAB FEEDER MARKET CENTERS

Establishment of these centers has proceeded under the direction of the Punjab Barani Marketing Economist, with advice from Dr. Miller, and with general cooperation from the Director of Marketing, Lahore. Similar centers had been built in areas where there is primarily irrigation agriculture, and the idea was to provide comparable services to farmers in areas that are primarily barani. With limited project funds available, the decision was made to select a few sites and build concrete platforms with project funds, later developing the shops and physical infrastructure with funds obtained from other sources. Sites were located at eight markets in four districts of the Punjab. are called Construction

of platforms is imminent or underway in Daultala, Chakwal, Shakargarh, and Pinanwal. Formalities have proceeded smoothly and should lead to construction in the present fiscal year in Dina and Karianwala. There are problems with site location or ownership, and construction will probably be delayed in Chak Beli Khan and in Mangowal.

The above feeder markets are designed primarily to handle barani crops in large enough lots to justify transporting from farms some distance away. If farmers have only a bag or two to sell, they may not be able to justify travel beyond the local village. A logical system that would make village crop marketing viable has not yet been devised. The markets for livestock are not rationalized, either.

VII. MATERIALS FOR INFORMATION SUPPORT

Gerald R. McKay, Communications Consultant, worked with the Barani Project staff one month in 1976, making general recommendations for carrying on an information program that would support various activities of the Barani Project. These recommendations are contained in his trip report of November, 1976. In October, 1978, he returned to Pakistan and over a period of four months developed the following teaching materials.

10 fact sheets on wheat production
5 fact sheets on groundnut production
5 fact sheets on maize production
4 fact sheets on rodent and bird control
23 radio scripts (one for each of the fact sheets)
2 x 2 inch slide sets to accompany the fact sheets
20 x 30 inch posters to match the fact sheets

Flip charts and tape cassettes were planned to further reinforce the materials but time was too limited to complete these items. All of the materials were intended to be used by field

assistants (FAs) in the Agricultural Extension Service as they work with farmers. The fact sheets were published in Urdu, and publication in English after the departure of the Experience, Incorporated team was expected (see Report No. 4, Summary Report of Gerald McKay, Communications Consultant).

A logo was developed for each province with illustrations characteristic of agriculture in these provinces. The logos were used to identify equipment items and in also in publicity (see examples on fact sheets, posters, and slide sets in Report No. 4, Appendix C).

VIII. EXTENSION AGRONOMY ACTIVITIES

During the three-year period of the Barani Project, 8,543 demonstration trials were conducted in the NWFP, as well as 703 verification and adaptive research trials. This large number of trials was impossible to monitor by the Barani Project staff. For yields under improved technology, compared with traditional methods, reliable and accurate plot yield data were sometimes difficult to collect, process, and analyze. Yields under the improved conditions were often, but not always, higher, and it is suspected that in many cases there was no statistically significant difference in the means. Cost-gain ratios were also quite variable, with some cases resulting in a ratio of less than one, but other cases resulting in a higher ratio, especially in high-rainfall barani areas.

Two important techniques were formulated in the NWFP in connection with demonstration plot establishment: (1) soil sampling and (2) using rain gauges and thermometers. The technique used for soil sampling was to take the samples at the time the farmer agreed to a site for a demonstration plot for the coming season; send the sample to the laboratory, and get back the recommendations from the soils technician, then communicate this information to the farmer in time so that he and the extension agent could select the

right fertilizer rate at the time the plot was sown to the crop. More training and attention to the timing must be given if this technology is to become entirely satisfactory for future use, however.

In NWFP, rain gauges and thermometers were installed in different climatic zones, because of the importance of rainfall and temperature patterns in planning inputs and other cultural practices. Methods of daily measurement and reporting were set up, but since the system was in operation for only a few months, the collection and analysis of the data is incomplete at this date (see unit No. 6, Summary of Agronomy Activities in NWFP).

In the Punjab Province, approximately 500 field staff from the Punjab Agricultural Extension Service, the Soil Conservation Service, the Murree-Kahuta Development Authority, the Integrated Rural Development Program (IRDP), and the Rapid Soil Fertility and Soil Survey Wing assisted in conducting various types of station and on-farm trials, using a variety of plots. By the end of 1977, a total of 20,525 plots had been established in the Punjab. After the joint project evaluation in 1977, the number of plots was reduced to a more manageable number and they were located in areas closer to the center of Barani Project activites. In the last two years of the project, 6,050 more plots were established. The task of in-service training of the field staff for establishing these plots required a significant amount of effort at the tehsil, district, division, and provincial levels. The territory (geographic and content) to be covered was large. Continual transfers of responsible agronomists and, for most of the period, a lack of personnel for authorized positions in the Punjab Province, stretched the resources of the Project.

Efforts, especially in the Punjab, were made to introduce improved tools and farm implements and develop their design to best suit the needs of barani farmers. Better bullock-drawn equipment appears to be needed. There is also need for tractors for land

preparation, for harvesting and threshing equipment, and for better groundnut harvesters. All would be in demand if their proper design and use could be properly demonstrated. Some local manufacturers have been persuaded to make and sell implements of improved design. The demonstration, improvement, and commercial manufacture of improved machinery would have been possible to a greater extent if a practical engineer had been assigned to the project with these goals in mind. An illustrated summary of the improved tools and machinery introduced is in Report 5, Summary of Agronomy Activities in the Punjab Province.

IX. RECOMMENDATIONS FOR FUTURE DEVELOPMENT OF BARANI AREAS

1. Several new subject areas should be considered. These include feeding draft and milk animals, soil and water conservation, range management, firewood production, and the economics of all barani farm management practices. Specific objectives should be worked out before the project is launched and adequate staffing included in the plan.

2. A new program should put emphasis on supplementary irrigation and harvesting of rainfall since more barani farmers will be initiating these activities if and when the price comes within range.

3. Some form of land consolidation, perhaps with multiple ownership but with single management, is necessary if the improved farming practices being recommended are to have a significant impact. Present small land pieces being farmed individually are a waste of the farmer's effort.

4. More effort should be put on cooperative work with the Agricultural Research Council (ARC) and/or other similar organizations. If a project in the barani areas is large enough, one staff member could be assigned to a liaison position with ARC. The new Barani Agricultural Research Institute might be a logical place to focus this effort and a good location for a liaison research person. Arrangements should be made so staff members could visit related research institutes and attend conferences in this part of the world.

5. Farmer education should take place wherever and however it can. Radio and other audio-oriented media, such as cassettes, should be utilized for the large proportion of illiterate barani farmers. A planned program of printed and audio-visual materials to support extension activities in a project of this kind is essential, also.

6. In order for a two-way flow of information -- from farmers to researchers and return -- to be a reality, a communications specialist should assist with the training program. This should be a full-time position beginning the day a project in the barani areas gets underway.

7. Other formal staff training of various types should also be included in future barani areas development projects. Three types could be planned for a long-term project. These should include a two to four year program in an academy for basic education leading to a degree, in-service or short course-type of training to update staff members' skills, and seasonal training to prepare the field assistants and others for the current season's activities.

8. It would be well worth trying on a pilot basis to form two or three farm cooperatives in different locations which would handle the sale of farm products and the purchase of inputs. A farm cooperative assisted by the government is probably more likely to succeed than a government-run cooperative. If such an effort is attempted, a person who has had experience in cooperative organization should be on the staff. This person might also be assigned the responsibility for studying and implementing plans for some kind of credit for farmers. Work on the credit component of the current Barani Project was discontinued at the recommendation of the joint evaluation committee in 1977.

9. Crop demonstrations would have more meaning for, and greater impact on, farmers if the demonstrations were limited to one Kharif and one Rabi crop each year. After a few seasons of success, a shift could be made to other crops. Local patterns of intercropping and the relation of labor and finance to the crops being demonstrated should also be included in the planning.

10. In any new barani areas project, the Government of Pakistan should provide more logistic support in terms of functional offices, filling all staff positions, leaving people in positions for longer terms, and providing an adequate number of vehicles. During the current project, a shortage of vehicles and staff frequently resulted in seed and fertilizer being delivered to farmers too late for effective use in their demonstration plots.

X. EXPERIENCE, INCORPORATED REPORTS PUBLISHED DURING THE PERIOD OF THE PROJECT

Numerous reports, which are listed below, were published over the period. They report activities, recommendations for planning and implementation of new or revised activities, and the evaluation and review of actions, as well as suggestions for changes in the scope of work. These are on file in the Contracting Office and Technical Office of USAID/Asia in Washington, D. C., and at the USAID Mission in Islamabad.

1. First Quarterly Report, July, 1976.

2. Second Quarterly Report, October, 1976.

3. Third Quarterly Report, January, 1977.

4. William G. Bursch Home Office Project Review, February, 1977.

5. Fourth Quarterly Report, May, 1977.

6. Fifth Quarterly Report, August, 1977.

7. Sixth Quarterly Report, November, 1977.

8. Seventh Quarterly Report, March, 1978.

9. William G. Bursch Home Office Project Review, April, 1978.

10. Eighth Quarterly Report, May, 1978.

11. Ninth Quarterly Report, September, 1978.

12. Tenth Quarterly Report, November, 1978.

13. Eleventh Quarterly Report, March, 1979.

14. Five short-term consultants' reports.

    a. Report of Harold Kramer, Agricultural Engineering Consultant, December, 1976.

    b. Report of Paul Carson, Barani Soil Fertility -- Soil Testing by January, 1977.

    c. Report of Peter H. van Schaik, Oilseeds and Pulses Consultant, January, 1977.

    d. Report of Howard Ream, Forage Crops Consultant, April, 1977.

    e. Report of Gerald R. McKay, Communications Consultant, September, 1976.

15. 3/ Benchmark Survey data obtained at the beginning of the project and summarized in Report No. 5, Lawrence Ulsaker Summary Report, Appendix A; and in Report No. 6, William Burgess Summary Report, Appendix A. NWFP Farmer Profile Data is also summarized in Mr. Burgess' Report No. 6, in Appendix B.

3/ Reports from No. 14 through 22 are a part of this final report of the Barani Project and are referred to throughout preceding pages.

16. Report on Socio-Economic Impact Evaluation for Barani Project Demonstrations, based on data obtained after two years of project operations.

17. Reports based on statistical summaries by tehsil and district with yield information obtained from research plots (Report No. 6, William Burgess, Appendixes C, D, and E).

18. Summary Report No. 4, Gerald R. McKay, Communications Consultant, November, 1976 and January, 1979.

19. Economics of Wheat Production Practices, Clarence J. Miller, April, 1979, Report No. 3.

20. Marketing of Farm Products and Farm Inputs, Dilawar Ali Khan et al, April, 1979, Report No. 7.

21. Extension Agronomy Activities: Punjab, Lawrence G. Ulsaker, April, 1979, Report No. 5.

22. Extension Agronomy Activities: NWFP, William D. Burgess, Jr., April, 1979, Report No. 6.