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FARMING SYSTEMS SOCIO - ECONOMIC RESEARCH IN PAKISTAN

- PROGRESS
- ISSUES
- RECOMMENDATIONS

A Consultancy Report

by

Marlin Van Der Veen

August 1991

PARC • USAID • MART • WINROCK

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A

The MART (Management of Agricultural Research and Technology) Project is funded by the United States Agency for International Development (USAID). The MART Project's chief link to the Government of Pakistan is through the Pakistan Agricultural Research Council (PARC). A MART Project Coordination Committee composed of federal, provincial, and university representatives coordinates and guides project activities. Its purpose is to assist the Pakistani agricultural research system to strengthen its research management capabilities, and to improve communications, training, farming systems research, arid zone research, and research in the rural social sciences. Winrock International, through a contract with USAID, has responsibilities to assist with the first four of these tasks. Two international agricultural research centers, the international maize and wheat improvement center (CIMMYT) and the International Center for Agricultural Research in Dry Areas (ICARDA), are responsible for the other two tasks.

The mission of Winrock International Institute for Agricultural Development is to help reduce poverty and hunger in the world through sustainable agricultural and rural development. Winrock International assists people of developing areas - in Asia, Africa and the Middle East, Latin America and the Caribbean, and the United States - to strengthen their agricultural institutions, develop their human resources, design sustainable agricultural systems and strategies, and improve policies for agricultural and rural development. As an autonomous, nonprofit organization, Winrock International provides services independently as well as in partnership with other public and private organizations. The institute is recognized as a private voluntary organization.

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Abbreviations

AARI	Ayub Agricultural Research Institute, (Faisalabad)
ARI	Agricultural Research Institute
CSO	Chief Scientific Officer
DG	Director General
FMI	Farm Machinery Institute
FSR	Farming Systems Research
MART	Management of Agricultural Research and Technology Project
NARC	National Agricultural Research Center
NARS	National Agricultural Research System
OFR	On-Farm Research
ORP	Operational Research Project
PARC	Pakistan Agricultural Research Council
PRI	Poultry Research Institute (Rawalpindi)
TDN/DM	Total Digestible Nutrient/Dry Matter
TOR	Terms of Reference
UAF	University of Agriculture Faisalabad
USAID	United States Agency for International Development
WINROCK	Winrock Institute for Agricultural Development.

1.0 Introduction

1.1 Background:

This is the second consultancy undertaken by this consultant, on farming systems research for MART. The first occurred from 10 February to 21 March 1990. The resulting consultancy report entitled "Assessing The Impact Of Farming Systems Research In Pakistan" noted the need for continued training on farming systems research in Pakistan to enhance the institutionalization of FSR in the NARS and universities and to improve the quality of the FSR being undertaken. This consultancy is part of the efforts being undertaken by MART to follow up on the recommendations made in that earlier report.

1.2 Purpose and TOR:

The general purpose of the consultancy was to advance the institutionalization of FSR by broadening understanding of the FSR approach and methods and by strengthening farm profitability analysis .

The specific terms of reference (See Appendix A) were to assist the FSR coordinators and associates to:

1. Increase scientist and key support personnel (including women) understanding of the FSR approach and methods throughout Pakistan.
2. Improve farm profitability analyses at each FSR site ensuring that team scientists complete all input/output data on revised FSR formats.
3. Conduct pertinent workshops in class, field and computer labs to improve FSR performance.
4. Define strategies that will strengthen linkages between FSR and development with particular focus on the private sector.
5. Prepare a concise list of issues, recommendations and a time frame to accomplish a significant impact from Agricultural Economists and other social scientists in FSR.

2.0 Progress

2.1 FSR Approach and Methods:

Visits, with Dr. Dawson and members of the NARC FSR Coordination Unit were made for each FSR target area (except in Faisalabad) to review achievements, plans and constraints. Please see Appendix B for itinerary, activities and persons met. Considerable progress has been made in each location in identifying and testing suitable agricultural technology addressed to important agricultural problems and in following FSR approaches and methods. All of the on-going and planned on-farm trials appeared to be addressed to important problems which were initially identified by a diagnostic survey. The new technology being tested in on-farm trials seems to have a good chance of being suitable and adopted by small farmers. In all cases attempts were made to compare the biological and economic performance of the technology being tested with the practices commonly followed by the farmers. It is important to note that the biological scientists presented the results of partial or enterprise budgeting in their reports of research results. This indicated that the agricultural economists were working with the biological scientists in helping them with the economic analysis. But more importantly the biological scientists have grown to appreciate the importance of looking at the viability of their technology and have learned enough about budgeting to be able to intelligently discuss how the economic analysis was conducted and what it means.

Efforts were made to introduce an improved format for research proposals and workplans. The format is to be used in all target areas for the 1991/92 season. The format places greater emphasis on problem diagnosis and system relations as well as a clear statement of trial design the procedures. An example of how the new format should be completed is shown in Appendix C.

2.2 Farm Profitability Analysis:

A four day workshop on FSR Trial Designs, Data Collection and Economic Analysis was held in Faisalabad from 10 to 13 August 1991. The objectives of the workshop are stated below:

By the end of Workshop the participants were expected to:

1. have a general understanding of the research design and data requirements for the economic assessment of on farm trials which are planned and evaluated with a systems perspective;

2. be able to choose and effectively employ the most appropriate budgeting or other analytical tool for assessing the suitability of agricultural technology being proposed or being tested in trials;
3. explain and implement the data collection and evaluation strategies agreed upon to assess the suitability of new agricultural technology tested in on farm trials concerning; 1) livestock and poultry; 2) annual crops and 3) perennial crops and
4. realize the uses of farm case studies in improving the systems perspective in FSR and propose the way that farm case studies can be carried out in respective target areas.

The workshop schedule is shown in Appendix D and the table of contents of the training manual which was developed for the workshop is shown in Appendix E.

One agricultural economist, one livestock scientist and one plant or soil scientist from each FSR target area participated. The list of 23 participants is at Appendix F.

An outstanding feature of the workshop was the full and very positive involvement of the two professors (Agricultural Economists) from the Agricultural University of Faisalabad, Dr. Bashir Ahmad and Mr. M. Aslam Chaudhry. The two gentlemen have an excellent understanding of FSR and growing interests in working on it. The participants are looking forward for continued assistance and support from these two key individuals.

One important outcome of the workshop is the "Handbook for Data Collection and Budgeting for Assessing the Economic Viability of New Agricultural Technology Tested in On-Farm Trials". The handbook describes in simple terms the standard methodology agreed upon during the workshop, to be followed in all FSR target areas. The table of contents of the handbook is shown in Appendix G. The handbook will be published by PARC/MART.

2.3 FSR, Development and Private Sector Linkages:

The FSR program in Pakistan has identified, developed and tested in farmers' fields a large amount of improved agricultural technology thought to be highly suitable to small farmers. There is strong interest in bringing this improved technology to a large number of farmers (and women) as quickly as possible.

In the past the development efforts of the FSR program have been limited to the women's poultry production training program in Fatehjang, fruit tree production training/demonstrations in Mansehra and Quetta and the zero till wheat production/demonstration held in the Punjab during 1990/91. These activities generally involved training in the new technology and inputs were provided by the program. Although these activities did increase the level of interest of women and farmers in new technology, they were very limited in area and number of farmers involved and in duration. Little attempt was made to help insure that inputs were available to farmers by improving linkages between rural households and private enterprise and to fully involve extension. Further the efforts did not encompass project monitoring and evaluation activities.

The women's poultry program in Fatehjang is being used as a model to be followed in enhancing FSR, development and private sector linkages. The model to be followed involves the implementation of well planned and fully monitored and evaluated pilot to production programs. The objectives of the Women's Poultry Production Program in Fatehjang are to:

1. Increase the levels of net income of rural farm women in Fatehjang by improving poultry production.
2. Develop a practicable and sustainable model for improving the income of rural women that can be applied in other villages in Pakistan. Sustainability will be enhanced by establishing stronger linkages between the women and private enterprises for input and output marketing.
3. Develop and implement an appropriate monitoring and evaluation activity to provide ongoing information on program progress, impact effects, constraints and problems.

A five day planning workshop was held in Lahore to prepare a pilot production program based upon the zero till wheat seeder and which followed the model previously developed for Fatehjang. The workshop objectives were to:

1. Define achievements and problems associated with farmer use & adoption of zero tillage in wheat-rice system;
2. Develop inter-disciplinary team competence in monitoring and evaluating impact from farmer adoption of improved technology and
3. Articulate an action plan which could accelerate farmer adoption of

Improved technology in wheat-rice system based on zero tillage project experience.

An executive summary of the paper written during the workshop is at Appendix H.

Similar plans are being made for pilot production programs such as apple production in Mansehra and Quetta.

A paper entitled "Pilot to Production Programs: Planning, Monitoring and On-Going Evaluation" was written by the consultant to help the FSR project in its development efforts. The paper will be published by PARC/MART and be distributed for wide use. A table of contents of the paper is shown in Appendix I.

ISSUES AND RECOMMENDATIONS

Issue - 1

Farming systems researchers need much more of a systems orientation in planning and evaluating their trials. The systems orientation at NARC has been weakened with the loss of the FSR National Coordinator Dr. Abdul Majid and Fatehjang FSR Site Coordinator Mr. Mohammad Yousaf.

Recommendations:

1. Farm care studies should be carried out in all FSR target areas by multidisciplinary research teams, to insure that all concerned scientists have a good understanding of the complete farming systems of farmers.
2. All research proposals/plans should follow the revised format, which requires problem diagnosis and an understanding of systems interactions, for approval for funding.
3. The national FSR coordinator and the respective target area coordinators should take the responsibility to insure that all trials or interventions are planned with appropriate multidisciplinary-multicommodity integration.
4. An attempt should be made to choose the composition of the NARC Fatehjang FSR team to include plant scientists from a number of different disciplines but who are able to take a multicommodity approach. The present team seems to be dominated by agronomists with a strong commodity orientation.
5. The multidisciplinary, integrative and cooperative approach of the NARC agricultural economist should be encouraged.
6. Multidisciplinary FSR would be strengthened if each target area had a full time resident coordinator who is responsible for supervising the implementation and data collection for all the trials.

Issue - 2

Farming systems researchers should be working more in the area of development now that suitable technology has been developed.

Recommendations:

1. The likely success of the planned women's poultry production program in Fatehjang should be taken advantage of.
 - a) The model developed in Fatehjang to improve the incomes of farm women with a combination of improved linkages with private enterprise, training and suitable technology, could be followed in all target areas.
 - b) Other projects could be encouraged to implement this low cost but sustainable approach to uplift the income of rural women.
 - c) An audio-visual presentation of women's program should be developed.
2. Mr. Mohammad Aslam, Dr. Munir Ahmad and Dr. Khalid should be recognised for the work they carried out in planning the zero till wheat pilot production program and be encouraged to continue working with the D.G. of Extension, Punjab to better ensure the success of the program.
3. Opportunities for implementing other pilot production programs should be taken. Apple production in Mansehra and Quetta and disease and pest control in small ruminants in all target areas could form the basis of pilot production programs in the near future.

Issue - 3

In-service, in-country training in FSR concepts and methods needs to be strengthened. More scientists need to be trained. Because of staff turn over, and growth, training should be continuous.

Recommendations:

1. A training capability should be developed at NARC or the agricultural university of Faisalabad or other appropriate institute to provide short courses on a number of FSR topics as a routine matter.
 - a) A multidisciplinary team of consultants composed of an agricultural economist, plant scientist and animal scientist, experienced in FSR and training should be recruited to work with senior FSR scientists from Pakistan to develop appropriate FSR research methods and training manuals.

- b) The training manuals should be used to develop good training materials.
- c) A course for FSR trainers should be held to provide in service training in using the training materials developed.
- d) The training materials should be made widely available to be used by other projects and by agricultural universities.

Issue - 4

The scope of the work of the agricultural economists in FSR should be expanded. In the past the agricultural economists were mainly involved in the diagnostic surveys and in assessing the economic viability of technology tested in on-farm trials.

Recommendations:

1. Economists should attempt to document without delay the extent of autonomous adoption of FSR technology that has occurred in early target area. The procedure developed by Mr. Sharif Siddique from the agricultural university Tandojam, Sindh, should be studied for possible use in all locations.
2. The economists should become more active in identifying constraints for adoption of improved technology which appears to be economically viable and in suggesting ways that the technology can be modified to make it more suitable to small farmers. This work can be improved by
 - a. routinely interviewing farmers participating in the FSR trials and
 - b. interviewing farmers attending field days.
3. Agricultural economists should be fully involved in any pilot production program activity. Economists can help ensure that as much is learned as possible concerning constraints and requirements for rapid adoption of new agricultural technology. It should be a matter of urgency to appoint an agricultural economist to the implementation committee of the zero till wheat pilot production program and one to the women's poultry pilot production program in Fatehjang.

APPENDIX A

TERMS OF REFERENCE AGRICULTURAL ECONOMIST CONSULTANT

July - August 1991 (5 weeks)

SCOPE:

The Agricultural Economist will spend most of his consulting time in each of the provinces. To advance the institutionalization of FSR he will spend approximately equal time broadening understanding of the FSR approach and methods and strengthening farm profitability analysis.

He will specifically assist FSR Coordinator and Associates to:

1. Increase scientist and key support personnel (including women) understanding of the FSR approach and methods throughout Pakistan.
2. Improve farm profitability analysis at each FSR site ensuring that team scientists complete all input/output data on revised FSR formats.
3. Conduct pertinent workshops in class, field and computer labs to improve FSR performance .
4. Define strategies that will strengthen linkages between FSR and development with particular focus on the private sector.
5. Prepare a concise list of issues, recommendations and a time frame to accomplish a significant impact from Agricultural Economists and other social scientists in FSR.

APPENDIX B

ITINERARY, ACTIVITIES AND PERSONS MET

- 14 July Departed USA.
- 15 July In transit to Pakistan.
- 16 July Arrived in Islamabad. Met with Dr. Murray Dawson (FSR/MART), the FSR Coordination Unit from NARC including Dr. Mansab Ali, (Farming System Research Coordinator MART and Fateh Jang Site Coordinator), Mr. Azeem (AERV/FSR), Mrs Bushra Tariq (FSR Women's consultant, MART), Dr. Cheema (animal nutrition FSR/NARC/MART) with Dr. Daud Ahmed Khan (MART horticultural consultant) and Dr. Bill Wright (MART Project Chief of Party).
- 17 July Accompanied Dr. Dawson on a meeting with Dr. Prof. M. Hanif Qazi, Member of Social Science PARC and a meeting with Dr. Dennis Weller USAID. Had a meeting with Dr. Dawson, Dr. Mansab, Mr. Azeem, and Mrs. Tariq and proposed training in Fatehjang and the possibility of hiring another lady consultant to assist in the women's FSR activities.
- 18 July Worked with Mr. Azeem and Mrs. Tariq on the data requirements and interview schedules for the poultry impact study. Discussed the progress and plans for the present consultancy with Dr. Dawson. An agreement was made to try to extend the consultancy to 23 Aug. Invited to dinner by Dr. and Mrs. Bill Wright.
- 19 July Friday - the day off.
- 20 July Met with Mrs. Tariq to discuss pretesting the interview schedule for the impact study. Met with Dr. Dawson and the FSR coordination unit (Dr. Mansab, Mr. Azeem and Mrs. Tariq) to discuss ways in which the FSR work plans and proposals can be improved using the new format. Refined and developed the proposal for one intervention in Fatehjang, using the new format for use as an example for others to follow. Met with Dr. Dawson and the FSR coordination unit to review the example developed.
- 21 July Revised activities and plans with Dr. Dawson. Met with Dr. Mansab and Mr. Azeem and 8 NARC FSR scientists to discuss how their work

plans/proposals can be improved using the new format.

- 22 July Met with Dr. Dawson. Started planning the 4 day workshop in Faisalabad on 10-13 August, and prepared for the Mansehra field trip by reviewing reports and proposals etc.
- 23 July Wrote a draft of the training objectives, training schedule and training proposal for the Faisalabad workshop and developed a 150 pages training manual to be reproduced and used in the workshop.
- 24 July Accompanied Drs. Dawson, Mansab and Daud to Mansehra. Met with Mr. Gulfam FSR coordinator for Mansehra and 8 of his FSR staff concerning present FSR and past research results. Visited two apple orchards where research to improve the fruitfulness of apple trees was being conducted.
- 25 July Prepared a list of information the participants should collect and prepare for the Faisalabad workshop. Met with Dr. Mansab and Mr. Azeem to review the training proposal and make further plans for the workshop. Accompanied Dr. Dawson to USAID and met with Dr. Saeed, Dr. Dennis Weller and Dr. Ron Senykoff.
- 26 July Friday - the day off.
- 27 July Met with three NARC FSR scientists concerning improving their research proposals/plans using the improved format. The scientists included Mr. M. Shafiq Zahid (fodder), Mr. Qasam Khan (Animal Scientist) and Habib Iqbal Javed (Maize)
- 28 July Met with Dr. Dawson to discuss progress and plans for the consultancy. Met with Mr. A. Razzaq (Wheat) and Mr. Habibur Rehman (Pulses) NARC FSR scientists in regards to improvements that can be made to their research proposals/plans using the improved format. Met with Mr. Ghulam Nabl NARC FSR soil scientist on the ways the soil scientist can better contribute to FSR. Met with Dr. Mansab to discuss the meeting to be held at the PRI on the 31st. Worked with Mrs. Tariq on the analysis of data from the poultry impact study survey.
- 29 July Continued working on the poultry impact study survey with Mrs. Tariq and helped plan the presentation concerning the study findings to be given during the PRI meeting to be held on the 31st.
- 30 July Met with Dr. Mansab to further plan the Faisalabad workshop. Met with Dr. Dawson, Dr. Mansab and Mrs. Tariq to discuss the PRI meeting to be held

on the following day.

- 31 July** Met with Dr. B.M. Bhatti, D.G. PRI. Dr.(Mrs) Naseem Fawad, Dr. Mansab and Mrs. Tariq to discuss the women's poultry training program in Fatehjang. Met with Mr. Ghulam Ahmed Bhatti, Lecturer, Department of Livestock Management, University of Agriculture, Faisalabad to discuss proposed training program for women poultry breeders. Met with Dr. Dawson to discuss the outcome of the meetings.
- 1 August** Met with Dr. Mansab and 6 NARC FSR scientists to discuss progress in improving the FSR workplan/proposal following new guidelines. With Dr. Dawson and Dr. Mansab met the member of social science Dr. Prof. M. Hanif Qazi, the deputy director of agribusiness, Mr. Sultan Mahmood Khan, Dr. Mohammad Khalid of MART, Dr. Izuno of MART, and Dr. Chattha to discuss ways the agribusiness cell could help in establishing linkages between farmers and agribusiness.
- 2 August** Departed for Karachi with Dr. Dawson and Dr. Mansab.
- 3 August** Meeting with Dr. Dawson, Dr. Jim Barnett/MART, and Dr. Ray Carpenter Winrock International. Met with Dr. Mansab and Dr. Qasam Khan.(a.m.) Sind FSR Project review with Dr. Memon and nine FSR scientists from Sindh(p.m).
- 4 August** Continued the Sindh FSR review with 10 Sindh FSR scientists, Dr. Dawson, Dr. Barnett and Dr. Mansab and Dr. Qasam Khan NARC FSR coordinating unit.
- 5 August** Flight to Quetta with Dr. Dawson, Dr. Mansab and Dr. Qasam Khan, Reviewed the diagnostic survey and other FSR activities being carried out by ARI.
- 6 August** Meeting in Quetta ARI to review the progress, constraints and future plans for FSR with the Quetta FSR staff. Met with Dr. Dennis Weller, Dr. Bajoi and Dr. Dawson.
- 7 August** Meeting with the Secretary of Agriculture Balochistan, Dr. Dennis Weller, Dr. Dawson, and Dr. Mansab. Meeting with Dr. B.R. Khan Director of AZRI. Flight to Lahore.
- 8 August** Attended the conference for accelerated development in the rice-wheat system. Met with Drs. Dawson, Izuno, Hashmi, Chattha, Hanjra and others to plan the follow up from the conference. Accompanied Dr. Hanjra and Dr. Khan to Faisalabad.

- 9 August** Met with Dr. Roger Peterson to discuss his input into the Faisalabad workshop. Prepared for the workshop.
- 10 August** Participated in the first day of the 4 day workshop on "FSR Trial Designs, Data Collection and Economic Analysis" .
- 11 August** Attended to the 2nd day of the workshop.
- 12 August** Attended to the 3rd day of the workshop.
- 13 August** Attended to the 4th and final day of the workshop. Accompanied Dr. Dawson on the night flight back to Islamabad.
- 14 August** Report writing
- 15 August** Met with Mr. Museen Khan, head of the Social Science Institute at NARC. Met with Dr. Dawson, Dr. Hashmi, Dr. Munir, Mr. Aslam and Dr. Wright concerning activities related to the zero till wheat drill.
- 16 August** Friday - day off. Brunch at the house of Dr. and Mrs. Swanson, USAID.
- 17 August** Meeting with Drs. Dawson, Hashmi, Munir, Chattha and Mr. Aslam in regard to the zero tillage drill demonstration activities to be planned.
- 18 August** Field Trip to Mansehra with Drs. Dawson, Peterson and Daud for a review of FSR being carried out in NWFP. Helped plan the horticulture training course to be held in Mansehra.
- 19 August** With Drs. Dawson and Peterson met with the NARC FSR scientists to review 1991/92 workshop and proposals
- 20 August** Report writing.
- 21 August** Meeting with Drs. Dawson, Hashmi, Munir, Chattha and Mr. Aslam to plan the Lahore workshop on the zero till wheat pilot to production program. Met with Dr. Mohammad Khalid and Mr. Sultan Mahmood Khan agribusiness cell of PARC to discuss their participation in the workshop.
- 22 August** With Dr. Dawson and Roger Peterson and Mr. Azeem met with Dr. Prof. M. Hanif Qazi member of Social Science, PARC to discuss progress/outcomes in regards to the consultancies. Had dinner with Dr. Abdul Hameed Memon, a friend.
- 23 August** Proof reading - the day off

- 24 August Accompanied Dr. Munir Ahmad, Senior Engineer FMI, Mr. Liaquat Hussain, Engineer ORP and Mr. Mohammad Aslam, agronomist wheat program NARC on a round trip to Lahore. Visited the ORP office and repair shop in Gujrat. Interviewed Mr. Ch. Nazir, a farmer who had experience in using the zero till wheat drill.
- 25 August Attended to the Lahore Zero till Wheat Pilot Production Program workshop with Dr. Ahmad, Dr. Khalid and Mr. Aslam.
- 26 August Continuation of the workshop in Lahore. Preparation of a draft of a 31 page paper entitled "The Zero Tillage Wheat Pilot Production Program for the Punjab Rice/Wheat System 1991/92."
- 27 August Met with Drs. Zafar Altaf, Dawson, Izuno, Khalid, Chattha, Hashmi, Ahmad and Mr. Aslam and others at the Sudhuka Biosaline Experimental Research Station to discuss the Zero Till Wheat Pilot Production Program. Continued the meeting in Lahore.
- 28 August Met Mr. Ghulam Abbas Jalvi, DG Agricultural Extension Punjab with Drs. Dawson, Izuno, Khalid, Ahmad and Mr. Aslam to discuss extension leadership roles in the zero till pilot production program. Returned to Islamabad.
- 29 August Report writing. Gave a final verbal report of the consultancy to Dr. Ronald S. Senykoff and Dr. Dennis Weller USAID.
- 30 August Report writing.
- 31 August Met with Mr. Sultan Mahmood, Dr. Khalid, Dr. Ahmad and Mr. Aslam in regard to the zero till wheat pilot production program. Final meeting with Mr. Azeem . Report writing. Final meeting with Dr. Dawson.
- 1 Sep. Depart Pakistan to London.
- 2 Sep. London to the USA and Minneapolis

APPENDIX C

Example of Research Proposal Following The Revised Format (Fatehjang)

1. Problem Statement

At least 55 % of the cultivated land in the target area is devoted to a mono crop of wheat. This low intensity of cropping leads to low farm income and low land productivity per year.

2. Problem Diagnosis and System Relations

Low cropping intensity in Fatehjang is caused by a number of interrelated factors which must be taken into account when planning and analyzing potentially suitable interventions. These factors relate to: 1) The farming systems followed by farmers with their limited resources to best meet their objectives; 2) the objectives, goals and knowledge of the farmers and household members and 3) the socio-economic and natural environments facing the farmers.

More particularly the constraints to higher cropping intensity include the following:

A. Natural environment topography-water run off.

1. Low and erratic rainfall.

a) farmers allow their fields to lay fallow in order to build up available plant moisture for the wheat crop.

b) could lead to low or variable yields of the introduced crop.

2. A standing crop in an area where much of the land is fallow can attract pests.

B. Socio-economic environment

1. Village farmers may have collectively decided to use the fallow fields for grazing their livestock.

2. The required inputs; seed, pesticide, fertilizer etc may not be available to farmers when needed.

3. Credit for the purchase of inputs may not be available or is at high cost.
4. The market price for a new crop may be low or uncertain.

C. Farming system interactions:

1. An additional crop requires more power and labor . Farmers may be engaged in other farm or non-farm activities and may have inadequate power and labor to insure timely land preparation and planting during the short turn around time between crops.
2. Land to graze their livestock.
3. Farmers may lack the resources to purchase the inputs required or may prefer to use their capital or cash in other more remunerative activities.

D. Farmers' goals and perceptions:

1. Low Income farmers may wish to avoid the risk of growing the additional crop.
2. Tenants may have to bear much of the additional costs of an extra crop but reap only 50% of the returns.
3. Farmers may be unaware of the benefits of growing a new crop such as mungbeans.

3. Achievements to date

Good - but has there been any farmer feedback that can be included? Also other interventions have been tested to address the same problem.

4. Proposed Interventions

A diagram showing the 12 month crop calendar for the improved and farmers cropping pattern as well as 10 year monthly average rainfall data should be included in this section.

5. Research Design and Treatment

Design = RCB
 Sites = 4-6 farmers

Cropping Patterns:

s1 - wheat-fallow-wheat

s2 - wheat-rnung-wheat

Also explain site selection, and treatment lay out procedures, approximate plot size, and crop management.

6. Level of material inputs used

State the experimental and non-experimental input levels for the improved cropping patterns on old farmer as well as on the control.

7. Inputs to be provided

8. Expected Results

- a) Show estimated returns above variable costs calculated with ex-ante economic analysis.
- b) Approximately one ton of plant residue per hectare would be available by November/January which is a period of time when fodder for livestock is scarce.
- c) The short duration of the mung crop allows adequate turn-around time between crops.
- d) Mung is a leguminous crop which could help maintain soil productivity.
- e) Mung does not require large amount of soil moisture and may not lead to large reductions in the yield of the succeeding wheat crop. No carry over disease or pests onto the next crop is expected.
- f) Mung is an improvement in the nutrition of household members.
- g) Additional income derived from growing mung could be used to purchase additional fertilizer or other inputs to increase the income from other farm or non-farm enterprises.
- h) The mung harvested from the trials could be used by the farmers as a seed source.
- i) Farmers would learn how to successfully grow a relatively new crop to the area and can become convinced of its value.

9. Data To Be Collected

- a) That required to carry out enterprise budgeting for the farmers and improved cropping patterns (example of a summary table is attached).
- b) Farmer interviews to receive their assessments and recommendations concerning the improved cropping pattern.

Summary of Cropping Pattern Performance

.....

Site: _____ Land type: _____ Year: _____

OPERATIONS	Pattern 1*	Pattern 2*	Pattern 4	Pattern 5	Pattern 6
Fields tested (no.)					
Failures (no.)					
Gross returns					
Labor costs					
Power costs					
Material costs					
Costs					
Costs					
Total variable costs					
Returns over variable costs					
Returns to labor costs					
Returns to material costs					
Returns to costs					
Returns to costs					
MBCR 1					
MBCR 2					

*First or first 2 patterns should be prevalent farmer's patterns. Labor cost should include the value of all labor used, whether supplied by researchers, family, exchange labor, or hired sources. Costs and returns to other factors considered important, e.g. total cash requirements, costs of hired labor, harvest labor, insecticides, etc. MBCR 1 is the ratio in relation to pattern 1 and MBCR 2 is the relation to pattern 2.

APPENDIX D

WORKSHOP ON FSR TRIAL DESIGNS, DATA COLLECTION AND ECONOMIC ANALYSIS

Schedule

10 August

09:00 - 11:00	Open Session (to be organized by the Member of Social Science with assistance from the FSR Coordinator.)	
11:00 - 11:30	Break	
11:30 - 13:00	Workshop objectives, procedures and reports on assignments prepared for the workshop by the participants	Dr. Van Der Veen and Mr. Azeem
	(Questions and Answers)	
13:00 - 14:00	Lunch	
14:00 - 15:00	Research Design and Data Collection for On Farm Animal Nutrition Trials with a systems perspective (Discussion)	Dr. Peterson
15:00 - 15:15	Break	
15:15 - 16:30	Research Design and Data Collection for On Farm Trials with a Systems Perspective concerning Animal Health (Discussions)	Dr. Peterson

11 August

09:00 - 09:45	Budget Analysis in FSR: An Introduction	Dr. Van Der Veen
09:45 - 11:00	Review of Data Requirements and Analysis in Partial Budgeting for Component Technology Trials (Discussions)	Mr. Aslam Ch.
11:00 - 11:30	Break	
11:30 - 12:15	Data Requirements for Assessing the Economic Viability of Cropping Pattern Trials (Discussions)	Dr. Van Der Veen
12:15 - 13:00	Common Measurement Biases in the Economic Evaluation of Cropping Pattern Trials (Discussions)	Dr. Van Der Veen
13:00 - 14:00	Lunch	
14:00 - 15:00	Data Collection for Cropping Pattern Trials	Dr. Van Der Veen
15:00 - 16:30	Present Data Collection Practices being used for economic analysis in MART Target Areas (Preparation for Target Area Reports)	Participants

12 August

09:00 - 10:00	Using Enterprise Budgeting for Assessing the Economic Viability of New Cropping Patterns (Discussions)	Dr. Van Der Veen
10:00 - 11:00	Using Farm Case Studies for Developing and Understanding of Farming Systems, Assessing Intervention Suitability and Impact Monitoring	Dr. Van Der Veen
11:00 - 11:30	Break	
11:30 - 12:30	Target Area Reports on Present Methods of Data Collection. Fatehjang Mansehra Sind Shahkot Faisalabad	
12:30 - 13:30	Lunch	
13:31 - 16:30	Preparation of Group Reports on Standard Procedures for Data Collection and Analysis for the Economic Assessment of FSR Trials. 1) Annual Crops 2) Livestock	Mr. Aslam Ch. Dr. Bashir Dr. Van Der Veen Mr. Azam (Resource Persons)

13 August

Group Reports on Standard Procedures for Data Collection and Analysis for the Economic Analysis of FSR Trials.

10:00 - 11:00	Livestock	Dr. Ghulam Hussain Soomro
	Animal Nutrition Animal Health	
11:00 - 12:00	Annual Crops	Dr. Mansab Ali
	Component Technology Cropping Pattern Trials	
	Future Directions and Issues for Social Scientists working in FSR	Dr. Van Der Veen
	Remarks	Dr. Dawson
	Giving of Certificates	Dr. Hanjra & Dr. Dawson
	Closing Remarks	Dr. Hanjra

APPENDIX E

WORKSHOP ON FSR TRIAL DESIGNS DATA COLLECTION AND ECONOMIC ANALYSIS

Training Materials

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APPENDIX F

FSR TRIAL DESIGN, DATA COLLECTION AND ECONOMIC ANALYSIS WORKSHOP

List of Participants

1. Mr. Ghulam Hussain Soomro Associate Professor, Agri University Tandojam
2. Mr. Khair-ud-Din Tunio Associate Professor, Agri University Tandojam
3. Mr. Sharif-ud-Din Siddiqui Associate Professor, Agri University Tandojam
4. Mr. Shahid Riaz A.S.O. NARC
5. Mr. Muhammad Azim S.O. NARC
6. Mr. M. Shafiq Zahid S.O.NARC
7. Dr. Muhammad Qasim Khan NARC
8. Dr. Mansab Ali NARC
9. Mr. Aman Ullah Cheema S.O. NARC
10. Mr. Gulralz Ahmad Lecturer, Animal Nutrition, U. Agri, Faisalabad
11. Mr. Shahid Rasool Lecturer, Animal Nutrition, U. Agri, Faisalabad
12. Mr. Muhammad Javald Lecturer, Farm Machinery & Power, U. Agri, Faisalabad.
13. Dr. Muhammad Saeed Asstt. Prof., Deptt. of Agronomy U. Agri, Faisalabad.

14. Mr. Hakim Khan R.O. Dhodial NWFP
15. Mr. Sultan Muhammad R.O. Dhodial NWFP
16. Prince Nizam Sabir Assistant Agri. Economist, AERU Quetta.
17. Dr. Mohammad Ayaz Khan Veterinary Officer-Dhodial NWFP
18. Dr. Abdul Qadir Veterinary Officer Mastung Quetta
19. Mr. Asif Azim Assistant Agronomist, Quetta
20. Mr. Jalees Ahmad Bhatti Lecturer, Deptt. of Livestock Management.
21. Mr. Muhammad Yunus Agronomist, AARI, Faisalabad.
22. Mr. Muhammad Arshad Assistant Agronomist, AARI, Faisalabad.
23. Mr. Manzur Ahmad Lecturer, Animal Nutrition, U. Agri, Faisalabad.

APPENDIX G

HANDBOOK FOR DATA COLLECTION AND BUDGETING FOR ASSESSING THE ECONOMIC VIABILITY OF NEW AGRICULTURAL TECHNOLOGY TESTED IN ON-FARM TRIALS

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APPENDIX H

ZERO TILLAGE WHEAT PILOT PRODUCTION PROGRAM FOR THE RICE-WHEAT SYSTEM IN THE PUNJAB (1991-92)

Executive Summary.

1. Zero till wheat sowing technology have been developed and tested which allows the timely sowing of wheat and a reduction in costs of production due to the avoidance of land preparation activities.
2. The zero till technology for heavy high clay content soils was developed by AARI and involves broadcasting the wheat seed into the rice stubble with an irrigation.
3. The zero till technology for medium and light textured soils involves the use of multi seed cum fertilizer drills originally produced in New Zealand but later manufactured in Pakistan.
4. Four years' on-farm trials with the drill and one year's experience in a production/demonstration program with farmers has shown that using the drill can allow earlier sowing, higher yields and reductions in costs of production.
5. Interviews with farmers, using the drill have consistently shown that the farmers are interested in applying the zero till technology on all of their wheat land, provided a suitable drill is available.
6. Experience has also shown that neither the New Zealand drill or the locally manufactured drill are suited for farmers or for commercialization by private industry. This is because of the excessive purchase costs, repair costs and weights of the drills.
7. A prototype of a more suitable multi seed cum fertilizer drill is being developed by FMI and will be available for testing in the 1991 wheat planting season.
8. On the basis of past experience with the zero till technology, a pilot production program is planned for 1991/92. The main objectives of the program are to accelerate the adoption of zero till technology i.e.
 - a) design, develop, test and demonstrate a prototype unit of a low cost no till seed cum fertilizer drill;

- b) Involve private manufacturing firms in the commercial production of the no till drill and agricultural chemical firms in testing appropriate weed and stem borer control technology.
 - c) convince farmers, extension workers, government officials and policy makers of the benefits of the zero till sowing technologies and to gain full support of all.
9. Five locally manufactured drills will be sent to the Gujrat area and will be managed by ORP and the NARC wheat program. Another five drills will be sent to the Slalkot area and will be managed by the Punjab Agricultural Extension Service.
 10. Targets totaling 750 acres devoted to zero till wheat and involving 100 farmers have been set for the Gujranwala and the Slalkot areas.
 11. The technology to be followed in the program has been fully outlined. Funds will be provided for tractor hire and the provision and repair of drills. The farmers will be expected to cover all other costs of wheat production.
 12. A tentative schedule of activities to be carried out, to meet the objectives of the program and the targets, has been outlined and deadline dates for undertaking the tasks have been set.
 13. A procedure for monitoring and evaluating the pilot production program has been developed and the required data recording and reporting forms are listed.

APPENDIX I

PILOT TO PRODUCTION PROGRAMS: PLANNING, MONITORING AND ON-GOING EVALUATION

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