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BA 63207

Food Security Management Project (391-0491)
Storage Technology Development and Transfer
Contract No. 391-0491-C-00-6080-00

Semiannual Report

Kansas State University
Food and Feed Grains Institute
Manhattan, Kansas 66506

January - June 1989

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SECTION I

PROJECT ACTIVITIES

The goal of the Storage Technology Development and Transfer (STDT) component of the Food Security Management (FSM) project is to improve the capacity of the Government of Pakistan (GOP) to manage the national food security system effectively and efficiently. The activities will ultimately enhance the capabilities of public-sector agencies and concerned private-sector firms to store food grains over extended periods of time.

The purposes of the program are to (1) strengthen the capabilities of the Pakistan Agricultural Research Council (PARC) and cooperating institutions for testing and developing improved grain storage technologies appropriate to local conditions, (2) organize and implement training programs for the rapid extension of improved technologies to all levels of managerial and operational personnel in the grain handling and storage sector, and (3) provide training to enhance the skills of researchers and those personnel responsible for training programs.

The following activities were planned for the 6-month period January 1 to June 30, 1989, to attain the objectives of the project.

Activities Planned for the 2nd Quarter

1. Revision of plan of work.
2. Initiate training for operations personnel at the provincial level.
3. Hold informal discussions on No Loss/Fair Average Quality (FAQ) policies with officials of the Ministry of Food, Agriculture and, Cooperatives (MINFA), Provincial Food Departments (PFDs), the Pakistan Agricultural Storage and Service Corporation (PASSCO), and the United States Agency for International Development/Islamabad (USAID/Islamabad).
4. Conduct wheat quality survey
5. Implement research in bag/bulk godowns, hex bins, and open bulkheads
6. Initiate bulk handling and storage research project.
7. Establish demonstration centers in PASSCO and the Punjab Department.

Progress During the Reporting Period

Revision of Plan of Work. A draft of a plan of work was prepared during the first part of the period and presented in May. However, due to required changes in the bulk handling and storage research project, revisions were required. The revisions have been completed and the revised plan of work will be presented to USAID/Islamabad, MINFA, and PARC early in July for approval.

The plan of work is attached as Appendix I, with the implementation plan for the bulk handling and storage research project attached as Appendix II.

Initiate training for operations personnel. Training programs for operations were conducted from January 4 to March 23 by personnel from the STDT Lahore Training Center (LTC). The initial 8-day course was revised to 6 days with new classes starting every Saturday in Lahore and Sukker. Three hundred thirty-seven persons were trained in 16 sessions, including 132 from the Punjab and Sind Food Departments and 205 from PASSCO. All eligible PASSCO personnel from southern Punjab were trained. A summary of the STDT training program is attached as Appendix III.

STDT training sessions were discontinued at the end of March due to wheat harvest. Training sessions will be resumed in July. The STDT LTC staff in Lahore began preparation of a training manual in lieu of presenting training courses. A first draft of the manual was nearly completed by the end of June. The manual is in English and Urdu. The manual will be tested in the Baluchistan training and published in quantity for distribution to all past and future trainees.

The Baluchistan Food Department is constructing a training center and laboratory in Quetta. The center is to be inaugurated on 22 July 1989 with STDT training for operations personnel. It is anticipated that all eligible personnel in Baluchistan will be trained in three sessions by the STDT LTC staff and four master trainers, two of whom are stationed in Quetta.

The wheat import program is utilizing storage facilities in the Northwest Frontier Province (NWFP). The NWFP Food Department staff is involved in receiving imported wheat, plus about 200,000 MT of local production, therefore the NWFP Food Department staff was not available for training. A meeting with the NWFP Food Department on June 12, 1989, produced an agreement to begin training in September 1989.

Hold information discussions on No Loss/FAQ policies with officials of MINFA, PFDS, PASSCO, and USAID. Copies of the STDT report "Impact of Fair Average Quality Procurement Procedures and No Loss Policy on Public Sector Storage of Wheat" were furnished to all relevant parties. Informal discussions and presentations have been held with the Economic Analysis Network (EAN), USAID, the Joint Secretary and Deputy Secretary of MINFA, the Punjab Food Department, NWFP Food Department, and the Pakistan Flour Millers Association. Visits to the Baluchistan and Sind Food Departments are scheduled for July.

The problems and controversies surrounding the wheat shortages and wheat import program during this time period have heightened the awareness and need for fundamental changes in government wheat policies. Preliminary arrangements have been made for a national conference on these topics during the Fall of 1989.

Conduct wheat quality survey. The field work for the wheat quality survey was conducted between May 10 and May 24 in the major wheat producing districts in Punjab. It was not possible to survey in Sind due to disturbances in the province. Sind and Punjab represent about 15 percent and 80 percent of the national production, respectively. By the end of June, all samples had been analyzed and data entered for computer analysis. The survey report is to be completed by August.

Implement research in bag/bulk godowns, hex bins, and open bulkheads. Implementing the research projects involving bag/bulk godowns, hex bins, and open bulk heads was delayed. The 1989 harvest was about 3 weeks late, and there was a general shortage of wheat transport for movement of wheat from procurement centers to the storage complexes due to competition with the imports.

The two grain pumps and a bulk hopper which were received by the STDT LTC in February were utilized by PASSCO in loading wheat into storage facilities at the designated research sites. The designated research sites are an open bulkhead at Depalpur, a bag/bulk godown at Manga Mandi, and the hex bins at Badami Bagh. The filling procedures are shown in Appendix III.

Pest Management Research Institute (PMRI) personnel placed monitoring tubes in the wheat during filling of the open bulk head at Depaplur. Fumigant gas concentrations will be measured when the bulkheads are sealed and fumigated.

Preliminary work on the bulk/bag godown at Manga Mandi was done in cooperation with Overseas Development and Natural Resources Institute (ODNRI), Great Britain in early April. At this time research devices were installed. This is preparatory to testing new fumigation methodology in bag/bulk storage in PASSCO. The goal is to develop fumigation recommendations for bag/bulk storage because present methods do not penetrate one-third to one-half of the grain mass.

Preliminary work on setting up hex bin research was begun in Badami Bagh. The Punjab Food Department has made available one block of 55 hex bins, each containing 36 to 38 tons of wheat. The research will use 12 bins for monitoring temperature and effectiveness of grain protection treatments.

Collaborative research with ODNRI and the Pest Management Research Institute (PMRI). An ODNRI economist was in Pakistan in February for preliminary work on the economics of bulk/bag storage. A work plan and schedule is being developed in which a major effort in examining bag storage costs will be conducted during August and September.

Initiate bulk handling research project. Specifications for the first lot of bulk handling equipment for research at the procurement centers were provided to USAID/Islamabad in January. STDT assisted in reviewing the bids for the first lot of equipment. Arrival of the equipment is expected in mid-1989.

There are several delays in the processing of the specifications for the fixed equipment component of bulk handling equipment for the Depalpur bulkhead. Questions arose over the type of grain cleaners to be used and methods of adjusting the conveyors to compensate for changes in the angle of repose of the wheat. Eventually, PASSCO had doubts about the usefulness of the fixed equipment and the fixed equipment items were deleted from the project. Specifications for the final lot bulk research equipment were provided to USAID/Islamabad for processing early in the 2nd quarter. The invitation for bids were published in the United States (U.S.) on June 20 with a closing date of July 20. This equipment should arrive in September and October.

The two grain pumps and a bulk hopper which were utilized in loading wheat into the designated research storage units described above, provided PASSCO with the initial experience in using portable bulk grain handling equipment.

The cost effectiveness of this equipment will be obtained from PASSCO preliminary to establishing a cost accounting system for all equipment in the bulk research project.

Establish demonstration centers in PASSCO and the Punjab Food Department. It was anticipated that eight demonstration centers could be established within the Punjab Food Department and PASSCO during the quarter. The late start of the procurement season and competition from the private sector for wheat forced PASSCO and the PFDs to increase their procurement efforts and some master trainers could not be released for demonstration center work. However, it was possible to start on development of one center in PASSCO. Also, methods of outdoor storage are being tested and demonstrated at Manga Mandi.

Other activities. Numerous other activities which relate to the STDT project were handled during this time period.

World Bank (WB) Team Visit

A team from the WB visited STDT in February. The team was reviewing the WB grain storage projects in Pakistan. Two items were of concern, the construction of open bulk heads being managed by PASSCO, and the grain storage training program conducted by PARC.

The relationship between the Bulk Handling and Storage Research Project and the open bulkheads were examined. The WB team was satisfied with the manner in which the two projects complemented each other. WB also required PARC to coordinate its training program with the STDT training activities. Follow-up meetings were held with PARC, which has funds for three additional training sessions.

Before leaving, the WB team asked for suggestions on additional follow-up activities for the training and bulk storage programs. A proposal was presented to them and a meeting held with a WB team member along with personnel from FMRI.

WB Transportation Mission

A WB team preparing a large project to improve Pakistan's transport capability was particularly interested in rail bulk transport of wheat and other agricultural commodities. Several discussions were held with the WB mission on the Bulk Handling and Storage Research Project, STDT report No. 2 "Bulk Wheat Handling and Storage Pilot Project in Pakistan", and various proposals for improvement of bulk handling capabilities at Port Qasim.

WB has incorporated several of the suggestions made by STDT for bulk grain transport into recommendations. The WB team also contacted the U.S. State Department and U.S. Department of Agriculture concerning improvements in wheat import handling facilities. The Pakistan railroad is preparing a business plan and commentary on the WB proposal and has contacted STDT for information and assistance on the bulk grains portion of its business plan. STDT will provide the Pakistan railroad with some data and a microcomputer program for optimization of wheat and fertilizer movements.

Flour Millers Seminars

Meetings were held with the U.S. Wheat Council and Pakistan Flour Milling Association on conduct of technical and wheat policy seminars for the flour milling industry. STDT will assist in scheduling these seminars for the Fall of 1989. The Wheat Council has agreed to provide a flour milling consultant for three technical milling seminars.

Integrated Pest Management Training

STDT personnel presented lectures and provided training materials for an International Integrated Pest Management Training Course sponsored by the Food and Agricultural Organization (FAO) at PARC headquarters in Islamabad. Participants from five Asian countries and Pakistan attended this training.

Project Reports

Mubarik, A., et al. March 1989. Development of Integrated Pest Management Protocols, Interim Report. PMRI Report No. 5.

Mahmood, T., et al. March 1989. Evaluation of Moisture Meters for Use in Food Handling Agencies in Pakistan. PMRI Report No. 6.

Alam, M., et al. March 1989. Development of Resistance in Beetle Pests of Stored Grains Against Phosphine and Contact Insecticides in Pakistan. PMRI Report No. 7.

Maxon, R. May 1989. "Insect Resistance, The Next Wheat Crisis", The Econogram.

Maxon, R. June 1989. "Role of Socioeconomics in Postharvest Losses", Presentation to Integrated Pest Management Training of Trainers Conference, PARC.

Acasio, U., et al. 1989. Training Manual: Grain Grading, Handling, and Marketing of Cereal Grains. Storage Technology and Transfer Project, Lahore Training Center Lahore, Pakistan.

FFGI Staff Utilization

No U.S. based Food and Feed Grains Institute (FFGI) staff or consultants were in-country during the quarter.

STDT Local Staff

Asim Raza replaced Nasir Ali as administrative officer in the Islamabad office.

The staff of the STDT LTC was increased by the hiring of the following personnel: Shansher Haider, senior program specialist (training); Jude Dias, electrical/mechanical instructor and maintenance specialist; Tina Khan, secretary; Khadin Hussain, driver; and Khalid Mahmood, driver.

Constraints

Clearance of GOP personnel for short-term training continues. Also, the system of allocating training positions to the provincial level through GOP ministries not directly connected with the FSM project often results in unsuitable candidates being nominated for training. Since the beginning of the year, the nominations to the FFGI Grain Storage and Marketing Short Course (GSMSC) have been referred to STDT for evaluation. STDT recommended rejection of two nominees, but has not been able to recommend viable candidates.

The wheat shortage during March put pressure on PMRI to dismantle the research project prematurely. In Multan, an alleged inventory shortage at another site caused demands by flour millers for release of the research inventory. Research personnel were sent to dismantle the site at the end of the quarter. Two godowns were disassembled and research materials were recovered. In April, legal personnel from the Punjab Food Department padlocked the remaining godowns, and the research personnel were excluded.

Turnover among key officials in the PFDs has accelerated in recent months. This makes it difficult to arrive at a mutual understanding and maintain continuity in the conduct of research and training programs with the PFDs. It has been very difficult to communicate with the PFDs concerning grain grading and grain quality issues.

Multiple roles and interests in Pakistan wheat policies creates coordination conflicts. At present, USAID, the Asian Development Bank (ADB), WB, and other donors have major projects concerned with construction of wheat storage facilities, wheat transport, and various aspects of wheat storage and distribution policies. There are overlapping, conflicting, and competing elements in all of these activities. At the same time, it is very difficult to identify specific units or personnel in the GOP that are directly concerned with coordination of these donor activities, or the development of coherent, long-term national objectives. Much time and effort is being required of STDT to provide information and assistance to other donor projects in the absence clearly defined as GOP counterparts. There is a need for GOP to develop clear, concise policies related to storage and distribution and clearly define responsibility for implementation.

Projected Activities

The projected activities over the next 6 months are as follows:

1. Prepare for No Loss/FAQ conference, 1st week of October 1989.
2. Publish results of 1989 Survey of Wheat Quality.
3. Prepare audio/visual presentation on No Loss/FAQ as it affects consumers.
4. Initiate economic studies on bulk handling in cooperation with ONDRI.
5. Initiate quality assessment research on bulk storage facilities.
6. Complete training for operations personnel of the Baluchistan and NWFP.
7. Complete training for the second group of master trainers.
8. Set up, install, and train PASSCO personnel in the use of bulk handling equipment.

SECTION II
ADMINISTRATION

Expenditures

Expenditures for project activities to date are detailed in Table 1.

Foreign Country National Trainees

Four Pakistani participants attended the annual GSMSC presented at Kansas State University (KSU) by FFGI June 5 to July 21. Those who attended and the organizations they represent are as follows:

Iqbal Ahmed Baluch, private farmer
Nasrullah Khan Malik, MINFA
Abdul Hameed Chaudhry, Punjab Seed Corporation
Shahabuddin, MINFA

As reflected in the project activities described in Section I, training programs for PASSCO and PFD operational personnel were conducted by the staff of the STDT LTC. Three hundred thirty-seven persons were trained in 16 sessions, including 132 from the Punjab and Sind Food Departments and 205 from PASSCO.

Noor Ullah from the PMRI in Karachi continues his studies towards a Ph.D. in Grain Science at KSU, with FFGI staff member John Pedersen advising and assisting him in his graduate work.

Faqir Mohammad Anjum from the Ayub Research Institute in Faisalabad continues his studies towards a Ph.D. in Grain Science at KSU, with C.E. Walker advising and assisting him in his graduate work.

Abdul Hamid from Punjab Agricultural Department in Rawalpindi started his studies towards a M.S. in Agricultural Engineering at KSU in the fall of 1988, with Do Sup Chung advising and assisting him in his graduate work.

A summary of foreign country nationals trained to date is attached as Appendix IV.

Personnel Employed

Time utilization of FFGI staff and consultants is shown in Table 2. Specific personnel employed under the project during this time period are shown in Table 3.

TABLE 1

KANSAS STATE UNIVERSITY/FOOD AND FEED GRAINS INSTITUTE
 Food Security Management Project
 Storage Technology Development and Transfer
 Contract No. 391-0491-C-00-6080-00

Total Expenditures
 (\$)

	Budget Amount	This Period	To Date 6/30/89	Balance
Salaries and Wages	639,630.00	87,708.20	443,880.32	195,749.68
Fringe Benefits	140,718.00	16,117.51	75,119.63	65,598.37
Overhead	697,611.00	101,268.38	402,310.12	295,300.88
Consultant Fees	61,252.00	19,741.30	84,113.77	-22,861.77
Local Staff Salaries	144,200.00	23,583.66	63,929.99	80,270.01
Travel, Transportation, and Per Diem	381,686.00	8,292.80	180,622.21	201,063.79
Expendable Supplies	86,000.00	10,183.72	21,516.79	64,483.21
Non-Expendable				
Property	378,350.00	9,060.93	316,848.65	61,501.35
Training	270,200.00	70,063.59	90,418.92	179,781.08
Sub-Contracts	156,040.00	1,871.65	5,406.66	150,633.34
Other Direct Costs	<u>63,300.00</u>	<u>25,472.31</u>	<u>78,900.21</u>	<u>-15,600.21</u>
TOTAL	3,018,987.00	373,364.05	1,763,067.27	1,255,919.73

KANSAS STATE UNIVERSITY/FOOD AND FEED GRAINS INSTITUTE
 Food Security Management Project
 Storage Technology Development and Transfer
 Contract No. 391-0491-C-00-6080-00
 Time Summary Comparisons
 June 30, 1989
 (Person-days)

Year	TDY Technical Assist In-Country		Technical Assist On-Campus			Long-Term Advisors			Home Office Admin			Total Time			
	Budgeted	Actual	Budgeted	Actual	%	Budgeted	Actual	%	Budgeted	Actual	%	Budgeted	Actual	%	
July 86/ June 87	378.0	467.5	123.7%	188.0	155.0	82.4%	195.0	168.0	86.2%	345.0	295.0	85.5%	1,106.0	1,085.5	98.1%
July 87/ June 88	200.0	177.0	88.5%	96.0	296.0	308.3%	303.0	292.0	96.4%	345.0	323.0	93.6%	944.0	1,088.0	115.3%
July 88/ June 89	44.0	17.5	39.8%	47.0	96.0	204.3%	520.0	524.0	100.8%	345.0	365.0	105.8%	956.0	1,002.5	104.9%
July 89/ June 90	44.0			0.0			477.0			345.0			866.0		
July 90/ Nov 90	0.0			0.0			55.0			0.0			65.0		
TOTAL	666.0	662.0	99.4%	331.0	548.0	165.6%	1,560.0	984.0	63.1%	1,380.0	983.0	71.2%	3,937.0	3,177.0	80.7%
M/M	(34.75)			(17.25)			(72.00)			(72.00)			(196.0)		

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APPENDIX I
PLAN OF WORK



FOOD AND FEED GRAIN INSTITUTE



USAID
MISSION TO PAKISTAN

STORAGE TECHNOLOGY DEVELOPMENT AND TRANSFER

PLAN OF WORK

IN COOPERATION WITH

MINISTRY OF FOOD, AGRICULTURE
AND COOPERATIVES

AND

PAKISTAN AGRICULTURAL RESEARCH COUNCIL

FOOD AND FEED GRAIN INSTITUTE

MAY 1989 - NOVEMBER 1990

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SUMMARY OF PLAN OF WORK FOR SIDP 1989 - 1990

<u>ACTIVITY</u>	<u>TIME</u>	<u>IN CHARGE</u>
<u>I. Research</u>		
A. Setup / Field work		
1. Survey of Grain Quality	May 89	
2. Loss Assessment in Bulk Storage	Jun 89 -Apr 90	Mubarik Ahmed
3. Grain Quality Control in Bulk Storage	Jun 89 -Apr 90	Sajjad Ahmed
4. Insect Resistance Studies	May 89-June 90	Mubarik Ahmed
5. Pesticide Residues in Wheat	May 89-June 90	Zafar Masood
6. Bulk Storage and Handling	Aug 89-June 90	Ulysses Acasio
B. Laboratory and Data Analysis		
1. Survey of Grain Quality	Jun - Jul 89	Sajjad Ahmed/Shahid Shaukat
2. Loss Assessment in Bulk Storage	Jun 89-Mar 89	Mubarik Ahmed/Shahid Shaukat
3. Grain Quality Control in Bulk Storage	Jun 89-Apr 90	Mubarik Ahmed/Shahid Shaukat
4. Insect Resistance Studies	May 89-May 90	M. Sadar Alam/Shahid Shaukat
5. Pesticide Residues in Wheat	Jun 89-May 89	Zafir Masood
6. Bulk Storage and Handling	Sep 89-Jun 90	Ulysses Acasio/Asia Raza
C. Reports		
1. Survey of Grain Quality	Aug. 89	R. C. Maxon/Shahid Shaukat
2. Loss Assessment in Bulk Storage	May 89	Mubarik Ahmed/Shahid Shaukat
3. Grain Quality Control in Bulk Storage	Jun 89	Mubarik Ahmed/Shahid Shaukat
4. Insect Resistance Studies	Jun 89	M. Sadar Alam/Mubarik Ahmed
5. Pesticide Residues in Wheat	Jun 89	Zafir Masood
6. Bulk Storage and Handling	Aug 89	R. C. Maxon \ Ulysses Acasio
<u>II. In-Country Training</u>		
A. Operations Training		
1. Balochistan Food Department	Jul-Aug 89	Shamsher Haider
2. NWFP Food Department	Sep -Oct 89	Shamsher Haider
3. PASSCO - Punjab Food Department	Nov 89-Mar 90	Ulysses Acasio
4. Sind Food Department	Nov 89-Mar 90	Shamsher Haider
5. Bulk Equipment Operations & Maint.	Sep-Dec 89	Ulysses
Acasio		
B. Master Trainers	Aug - Sep 89	Ulysses Acasio
C. Post Harvest Information	Oct-Nov 89	Donna Shenk-Hawlin
<u>III. Seminars / Workshops</u>		
A. No Loss / Fair Average Quality	Oct 89	R. C. Maxon
B. Flour Milling	Nov.-Dec 89	Tim Oviatt/R.C. Maxon
C. Bulk Handling and Investment	Jan 90	R.C. Maxon/Ken Eubanks
D. Storage Technology & Pest Management	Mar 90	Mubarik Ahmed
E. Bulk Handling Economics and Technology	Sep 90	R. C. Maxon
<u>IV. External Training</u>	Nov-Dec. 89	Roe Borsdorf
<u>V. Phase Out</u>	Oct-Nov 90	Roe Borsdorf/R. C. Maxon

INTRODUCTION

Background

Contract 391-0491-C-00-6080-00, between USAID and the Food and Feed Grain Institute (FFGI) of Kansas State University established the Storage Technology Development and Transfer (STDT) component of the Food Security Management (FSM) project. The project agreement obligates the FFGI to conduct specific training and research activities as mutually agreed upon in a Plan of Work signed by the GOP, USAID, and the FFGI in October, 1986.

Objectives of the STDT

The goal of Storage Technology Development and Transfer (STDT) program is to improve the capacity of the Government of Pakistan (GOP) to manage the national food security system effectively and efficiently. The activities will ultimately enhance the capabilities of public-sector agencies and concerned private-sector firms to store food grains over extended periods of time.

The specific purposes of the program are (1) to strengthen the capabilities of the Pakistan Agricultural Research Council (PARC) institutions for testing and developing improved grain storage technologies appropriate to local conditions, (2) to organize and implement training programs for the rapid extension of improved technologies to all levels of managerial and operational personnel in the grain handling and storage sector, and (3) to provide training to enhance the skills of researchers and those personnel responsible for training programs, (4) examine and conduct studies on grain policies, grain handling technology, and marketing systems, that may improve or hinder Pakistan in achieving optimum efficiency in grain storage and distribution.

Revision of the STDT Subproject

The contract agreement and original plan of work anticipated that the GOP would contribute to the STDT programs by making available qualified research, training, and support personnel who were to be authorized in a PC-1 document. Due to a combination of circumstances, the personnel were not "sanctioned". As a result, the Contract between USAID and the FFGI was amended effective May 15, 1988 to permit the FFGI to fulfill the objectives of the contract by other means.

Following the contract revisions, these actions were taken:

1. A long term advisor for training was added to the STDT staff in July, 1988.
2. A Bulk Storage and Handling Research component was added to the STDT project in November, 1988.
3. A STDT training center and laboratory was established Lahore in August, 1988.
4. Twelve master trainers were selected and trained.
5. Sixteen training sessions for operations personnel were conducted.
6. Responsibility for the research program was assumed by the Pest Management Research Institute, (PMRI), Karachi.
7. Large scale integrated pest management research tests were established in Multan and Manga.
8. A survey of grain quality at the farmgate and procurement centers was completed in June, 1988.

MANAGEMENT STRATEGY AND PROJECT SUPERVISION

Management Strategy

Management STDT will concentrate on institutionalizing training and research capabilities within cooperating institutions during the remainder of the project. The FFGI will support and advise the individuals and organizations in the performance of the research and training, but the actual conduct of these activities will be the responsibility of the individuals concerned.

The STDT is also developing wider constituencies for support of change in public policies related to wheat storage. This is being done through contacts and coordination with World Bank and Asian Development Bank storage projects, flour millers, other donor organizations, and consumer groups.

GOP Supervision

The administrative structure developed in the March 1988 plan of work will remain essentially unchanged. The salient features of the present structure as detailed. To facilitate communication between the STDT and MINFA, the STDT provides a contract employee to the Storage Cell whose major function is to handle communications between the STDT, Storage Cell, and Joint Secretary, MINFA.

GOP administrative supervision of the STDT project will be with Joint Secretary (Food), Ministry of Food, Agriculture, and Cooperatives (MINFA). The contact point in MINFA will be the Deputy Secretary (Food) of the Storage Cell Wing. PASSCO and the Provincial Food Departments each have named a senior administrator as a liaison between their organizations all STDT research and training matters.

The basic activities of the STDT project will be divided into three functional areas; FFGI Support Activities, Technical Research and Training, and Field Activities. The project structure is presented in the diagram at the end of this section.

FFGI Support Activities

Support Activities will be under the direction of the Long Term Advisor who will schedule TDY personnel as required, plan and participate in economic analysis, plan and supervise non-field training and seminars for officials MINFA, the PFD's, PASSCO, USAID, and Pakistan institutions as required. The Support Activity will serve as primary contact for the Private Sector, but refer the private sector activities as necessary to the Field Staff as will be noted below.

The Support Activities will also maintain contacts with the Harvest Information and Documentation Service (PHIDS).

Technical Research

The administrator of the Pest Management Research Institute (PMRI) in Karachi will serve as the Research Coordinator. The Coordinator will allocate resources provided by STDT to support research planning, laboratory work, data analysis, and publications in PARC affiliated laboratories. The Integrated Pest Management (IPM) Project Leader will act as the director for technical research. The field work personnel who set up the research experiments and collect samples and data for laboratory analysis are under the IPM project leaders direction.

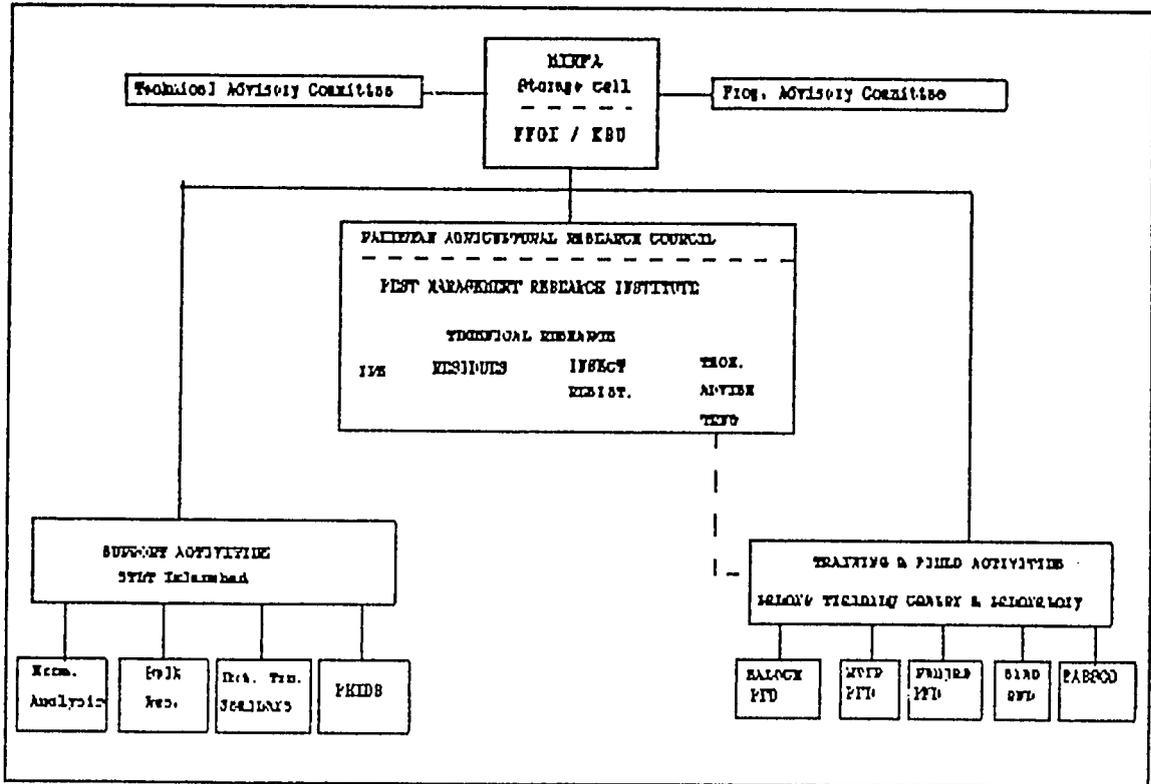
Field Activities

The Field Activities combine the training and godown research work conducted for and in cooperation with the Provincial Food Departments and PASSCO. The Long Term Advisor for Storage will direct the field activities from the Lahore Training Center. He will be assisted by a Program Specialist (Training) The Training Center also houses a laboratory staff assigned by PMRI. The PMRI is logistically supported by the Lahore Training Center, but are under direction of the IPM Project Leader.

Training programs for PASSCO, the Punjab Food Department, and Master Trainers will be conducted at the Lahore Training Center and other locations as mutually agreed upon. Balochistan Food Department has constructed a training facility which will be used to institutionalize the training program. NWFP trainees will use a training center operated by Peshawar University. Sind trainees will use Sind FD facilities in Karachi and at PMRI. In some locations, trainees from PASSCO and one or more Food Departments may attend the same training activity.

Figure 1.

ADMINISTRATIVE STRUCTURE OF STDT



DETAIL WORK PLANS

RESEARCH

A detailed research work plan has been prepared by PMRI covering activities 1 through 5. The research plan has been approved by PARC. Activity 6 is under the direction of STDT. A separate work plan has been prepared for the Bulk Storage and Handling Research Project.

1. Survey of Grain Quality
 - a. Survey May, 1989
 - b. Survey Report, August, 1989
2. Storage Loss Assessment in Bulk Storage, June, 1989
 - a. Setup research in June, 1989
 - b. Monitoring, June, 1989 to grain dispatch (est. Feb., 1990)
3. Sampling grain quality in open bulkheads, bulk-cum-bag storage, and hexagonal bins.
 - a. Setup July, 1989, Badami Bagh, Lahore, July, 1989
 - b. Monitoring until dispatch (est. Jan., 1990)
4. Insect Resistance Studies - continuous
 - a. Collection of insect species from public godowns, May, 1989.
 - b. Propagation and testing of species collected, June, 1989 - February, 1990.
5. Pesticide Residues in Grain Storage - continuous
 - a. Develop testing procedures and baseline data, May - June, 1989
 - b. Testing samples from storage protocols. July, 1989 - April, 1990.
6. Bulk Storage Research
 - a) Detailed implementation plan by STDT attached.
 - b) Grain quality aspects by PMRI included in above research activities.

In-country Training

1. Objectives of training

Organize and conduct training for PASSCO and at the provincial level for management and operating personnel on grain protection, quality control, and management systems to improve technical capabilities of operational personnel. Assist the Provincial Food Departments to institutionalize in-service training

programs.

2. Operation of training programs

The training for operating personnel will be conducted on a 6 day cycle, with new group of trainees reporting every Saturday. The training includes about 40 hours of classroom, laboratory, and on site instruction and exercises. The training is coordinated with other other FSM and USAID-sponsored projects such as Vertebrate Pest Control, and MART.

A limited number of trainees from private sector in can be accomodated in the training activities. If sufficient persons are available, a separate training program for the private sector will be developed.

3. Training Staff

The fulltime staff of the training center consists of the STDT Long Term Advisor for Grain Storage, a Senior Program Specialist for Training, plus a Scientific Officer and Asst. Scientific Officer on deputation from PMRI.

About 20 lecturers are used in the conduct of courses for the master trainers, including officials of the Food Departments and PASSCO, USAID, and USAID sponsored projects such as the Vertebrate Pest Control and Management of Agricultural Research and Technology (MART).

Master Trainers are organized into multi-institutional teams from surplus and deficit wheat areas under the direction of the Senior Program Specialist for Training. While the master trainers' will have the primary responsibility for conduct of the training within their organizations, The Senior Grain Storage Specialist, FFGI local staff, and other qualified personnel from the Vertebrate Pest Control program, the GSRL, PARC, and academic institutions are available to supplement their efforts.

In addition to training operating personnel, the teams facilitiate communications between their respective organizations. Grain dispatched from surplus to deficit areas is now accompanied by documents stating storage conditions and treatment. Technical problems or questions can be resolved by the master trainers communicating with each other.

4. Training Materials

Training manuals

Training manuals will be developed based upon experience gained in training of master trainers and the training programs conducted in 1st and 2nd quarters, 1989. The manuals will be tested in with training to be conducted in the third quarter. Revisions will be made and manuals published for distribution during the 4th quarter. The manuals will be published in urdu and English.

The master trainers prepare teaching materials for operations personnel in accordance with their organization's needs and capability of the trainees.

PMRI has developed and continuously modifies manuals for teaching more technical and scientific subjects. The PMRI materials are in urdu.

Audio-visual materials

Training materials have been developed in photo slides, video tapes, models, and computer generated graphics.

Laboratory and grain protection equipment

Complete sets of grain testing and protection equipment are available at all training sites in sufficient quantities for hands-on training.

5. Training evaluation

The trainees are tested for their level of knowledge at the beginning of each session. The effectiveness of the training is evaluated by the trainees and training Center staff during each session.

The trainees also rate each of their instructors, the training materials used, and the effectiveness of training methods at the close of each training cycle.

6. Location of Training Program

Training activities for PASSCO and the Punjab Food Departments will be based primarily in the STDT Training Center, Lahore. Some training may be shifted to Multan, Okara, and other areas with large concentrations of PASSCO and Food Department personnel.

Training in Sind will be centered in Karachi, with additional training in Sukkor, Hyderabad, and other locations as conditions permit.

The Balochistan Food Department has created permanent training facility within its Headquarters building for use by the STDT.

The NWFP Food Department will use a training center of the Peshawar University for its activities.

Master Trainers will be instructed at the STDT Training Center in Lahore.

All training activities will use godowns of the respective institutions for field exercises and demonstrations.

7. Schedules and Quantifiable Outputs

Training for grain storage personnel

Balochistan Food Department July - August, 1989
100 operations personnel (90% of all eligible)
Management seminar on utilizing training
Assistance in developing permanent training
facility.

Northwest Frontier Food Department Sept.-Oct. 1989
120 operations personnel (80% percent of eligible)
Management seminar on utilizing training.

PASSCO and Punjab Food Department
300 operations personnel, Nov. 1989 - Feb. 1990
50 engineers/operators on bulk equipment
20 accounting/clerkical on bulk grain accounting
2 management seminars on training and bulk
handling

Sind Food Department
200 operations personnel, Nov. 1989 - Feb. 1990
(some Sind personnel may be trained jointly with
PASSCO and Punjab Food Departments)

Storage Management - 8 persons have been nominated for training under FSM for FY89. Four to six master trainers and PMRI research officers will be nominated to attend the same course. November 1989 or February - March, 1990.

Academic training (external)

Objectives

Increase the availability of academically-trained personnel in postharvest systems for universities, research units, government agencies, and private-sector entities in Pakistan.

Description

Under FSM

One MS candidate at Kansas State University in Storage Engineering will complete his studies by May, 1990. STDT will provide data and information on Pakistan for thesis research in aeration of bulk storage.

One candidate for a Phd in Agricultural Economics has applied at Kansas State University.

Other

One Phd candidate in grain storage entomology will be supported by KSU/FFGI from non-project funds to complete research on tribolium castaneum, Aug. 1989 - May, 1990.

Postharvest Information

Objective

Provide support in postharvest information on all aspects of postharvest grain systems for use by researchers, extension personnel, private sector, and other educational institutions.

Description

Provide a centralized information source, known as the postharvest Information Service (PHIS) through the selected

system on all aspects of postharvest grain systems for the use of researchers, technicians, extension personnel, and administrators within the various universities institutes, research units, government agencies, and private-sector entities in Pakistan. This will include

Transfer all relevant information in the FFGI Postharvest Information and Documentation Center to PMRI and NARC libraries.

Training the selected system library personnel in use of documentation services, database searches, and other advanced information storage and retrieval technology.

Receiving, classifying, and distribution of Pakistan postharvest research information on a world-wide network to enhance status of Pakistan research and obtain additional research literature on an exchange basis.

Schedule

Duplicate and transfer PHIDS information at NARC library to PMRI library fourth quarter, 1989.

Train PMRI personnel in-country on post-harvest information retrieval and data base management, fourth quarter, 1989.

Transfer postharvest information documents to and from Pakistan on a continuous bases for life of project.

Marketing and Distribution

Objective

Develop policy alternatives that which will create an environment in which grain quality can be improved and the results of training and research can be utilized.

Methods

The STDT will conduct studies and disseminate information on the physical and economic aspects of grain storage and distribution as requested by GOP and USAID. Studies include

Impact of Fair Average Quality Procurement Procedures and No Loss Policy on Public Sector Storage of Wheat

Physical Quality Characteristics of Wheat at Farm Gate and Procurement Centers in Sind and Punjab 1989.

Technical Recommendations for Pakistan Wheat Grading and Testing Procedures

Bulk Wheat Handling and Storage Research
(See Implementation Plan for Bulk Storage and Handling Research)

Schedule:

Publish Impact of Fair Average Quality Procurement Procedures and No Loss Policy on Public Sector Storage of Wheat, May, 1989.

Informal discussions with USAID, provincial food departments, and flour milling industry May - August, 1989. Revise above report, September, 1989, National conference/workshop October, 1989.

Survey of Wheat Quality, 1989. Report to be completed by August, 1989 and incorporated into the above final report and recommendations by September, 1989.

Bulk Research Reports, May, 1990. See Bulk Implementation Schedule.

THIRD PLAN OF WORK
 SCHEDULE FOR STORAGE TECHNOLOGY DEVELOPMENT AND TRANSFER
 PLAN OF WORK, MAY 1, 1989 - NOVEMBER 30, 1990.

	May '89	Jun '89	Jul '89	Aug '89	Sep '89	Oct '89
Applied Research						
1. Wheat Quality Survey	Wheat Sample Report					
2. Bulk Storage Losses	Open Bulk Quality Deterioration					
3. Sampling Grain Quality	Resistance Studies Setup QO Monitor Research Pr					
4. Insect Resistance	Resistance Studies Residue testing					
5. Pesticides Residues Testing	Bulk Storage Research					
6. Bulk Storage & Handling Res.						
In-country training						
1. Training Manuals	Training Manuals					
2. Balochistan Training	Balochistan T					
3. NUFP Training						
4. PASSCO - Punjab Food Dept.						
5. Sind Training						
6. Bulk Operations and Maint.						
7. Master Trainers						
8. Postharvest Information						
External Training						
Grain Storage Management						
Seminars / Workshops						
1. No Loss / FAQ						
2. Flour Milling						
3. Bulk Handling and Investment						
4. IPM and Storage Management						
5. Bulk Technology & Economics						
Phase Out						

THIRD PLAN OF WORK
 SCHEDULE FOR STORAGE TECHNOLOGY DEVELOPMENT AND TRANSFER
 PLAN OF WORK, MAY 1, 1989 - NOVEMBER 30, 1990.

	Oct '89	Nov '89	Dec '89	Jan '90	Feb '90	Mar '90	Apr '90
Applied Research							
1. Wheat Quality Survey	on						
2. Bulk Storage Losses	Research Protocols						
3. Sampling Grain Quality							
4. Insect Resistance							
5. Pesticides Residues Testing							
6. Bulk Storage & Handling Res.							
In-country training							
1. Training Manuals							
2. Balochistan Training							
3. NUFP Training	NUFP Tral						
4. PASSCO - Punjab Food Dept.	PASSCO-Punjab Training						
5. Sind Training	Sind Training						
6. Bulk Operations and Maint.	Operations & Maintenance						
7. Master Trainers							
8. Postharvest Information							
External Training							
Grain Storage Management	PHIDS						
Seminars / Workshops							
1. No Loss / FAQ	Ext. Tr						
2. Flour Milling	Ext. Tr						
3. Bulk Handling and Investment	Ext. Tr						
4. IPM and Storage Management	Ext. Tr						
5. Bulk Technology & Economics	Ext. Tr						
Phase Out							

THIRD PLAN OF WORK
 SCHEDULE FOR STORAGE TECHNOLOGY DEVELOPMENT AND TRANSFER
 PLAN OF WORK, MAY 1, 1989 - NOVEMBER 30, 1990.

	May '90	Jun '90	Jul '90	Aug '90	Sep '90	Oct '90	Nov '90
Applied Research							
1. Wheat Quality Survey	H Report						
2. Bulk Storage Losses	QO Reports						
3. Sampling Grain Quality	Resistance						
4. Insect Resistance							
5. Pesticides Residues Testing	Residue						
6. Bulk Storage & Handling Res.	Bulk Repo						
In-country training							
1. Training Manuals							
2. Balochistan Training							
3. NUFP Training							
4. PASSCO - Punjab Food Dept.							
5. Sind Training							
6. Bulk Operations and Maint.							
7. Master Trainers							
8. Postharvest Information							
External Training							
Grain Storage Management							
Seminars / Workshops							
1. No Loss / FAQ							
2. Flour Milling							
3. Bulk Handling and Investment							
4. IPM and Storage Management							
5. Bulk Technology & Economics							
Phase Out	Bulk						
	Phase out						

THIRD PLAN OF WORK

SCHEDULE FOR STORAGE TECHNOLOGY DEVELOPMENT AND TRANSFER
PLAN OF WORK, MAY 1, 1989 - NOVEMBER 30, 1990.

Wheat Survey 5/8/89 to 5/22/89 [14 days]

Obtain 150 samples of wheat from
farms and procurement centers in
Punjab.

Sample analysis 5/22/89 to 6/19/89 [28 days]

Analyze samples from wheat
survey

Report 6/19/89 to 7/10/89 [21 days]

Publish wheat quality survey
report.

Open Bulk Quality Deterioration 6/19/89 to 3/5/90 [259 days]

Periodic measurement of grain
quality in open bulk heads by use
of temperature sensing devices
and grain probes.

OBH Report 4/23/90 to 6/4/90 [42 days]

Report on results of open bulk
head grain quality analysis.

Setup GQ 7/17/89 to 8/21/89 [35 days]

Setup research protocols in hex
bins and bag cum bulk storage.

Monitor Research Protocols 8/21/89 to 4/2/90 [224 days]

Manage research grain stocks
according to design.

GQ Reports 6/4/90 to 7/16/90 [42 days]

Evaluate and report on research
results.

Resistance Studies 5/8/89 to 6/4/90 [30 days]

Collect and evaluate insect resistance to chemical control measures. This is a continuous and ongoing process.

Resistance Reports 6/4/90 to 7/9/90 [35 days]

Publish reports of resistance research for previous trial periods.

Residue testing 6/12/89 to 7/30/90 [413 days]

Continuous activity in support of other grain storage work.

Residue reports 7/30/90 to 8/27/90 [28 days]

Report on results of residue testing.

Bulk Storage Research 6/5/89 to 8/6/90 [427 days]

Physical and Economic aspects of bulk storage systems as per Bulk Handling and Research Plan of Work.

Bulk Reporting 8/13/90 to 9/17/90 [35 days]

Complete physical and economic analysis of bulk research project.

Training Manuals 5/1/89 to 7/10/89 [70 days]

Develop training manuals based upon materials and experience in master trainers and operations personnel training.

Balochistan Training 6/19/89 to 8/7/89 [49 days]

Train all eligible Balochistan Food Department personnel in three sessions in Quetta, from July 20 to August 7, 1989. Maximum of 120 persons to be trained. Conduct seminar on training program for senior officials.

NWFP Training 9/25/89 to 10/23/89 [28 days]

Establish training program in NWFP for operating personnel. Minimum of 110 persons to be trained. Conduct seminar on training for senior officials.

PASSCO-Punjab Training 9/18/89 to 3/26/90 [189 days]

Resume training for operating personnel of PASSCO at Punjab Food Department. Minimum of 350 persons to be trained. Conduct seminar for senior officials.

Sind Training 10/30/89 to 3/26/90 [147 days]

Train operations personnel of Sind. Minimum of 200 persons to be trained. Conduct seminar for senior personnel.

Bulk Operations & Maintenance 9/11/89 to 1/22/90 [133 days]

Setup bulk handling equipment and train engineers and operators in maintenance and operating procedures. Minimum of 75 persons to be trained. Train private sector operators in flour mills. Conduct advanced training on bulk equipment design for engineers.

Master Trainers 8/21/89 to 9/18/89 [28 days]

Train 8 additional master trainers.

PHIDS 10/20/89 to 11/20/89 [22 days]

Post harvest information and documentation training at FMRI for workers in applied and basic research. Minimum of 25 persons.

Ext. Training 11/13/89 to 12/11/89 [28 days]

Advanced training for selected master trainers at FFGI/KSU in conjunction with training through FSM/HRD.

NL/FAQ 10/2/89 to 10/9/89 [7 days]

Conduct No Loss/FAQ national seminars 1st week Oct.

FM 11/20/89 to 12/4/89 [14 days]

Conduct series of 3 technical seminars with US Wheat Council and Pakistan Flour Millers Association.

BI 1/22/90 to 2/5/90 [14 days]

Bulk handling and investment seminar in conjunction with PASSCO and RONCO

IFM & Storage Technology 3/5/90 to 3/19/90 [14 days]

Reporting sessions for FMPI on bagged and bulk losses, storage protocols, and Insect Resistance

Bulk Conference 9/10/90 to 10/1/90 [21 days]

Reporting session for GDF and USAID on bulk handling and storage research.

Phase out 9/3/90 to 11/30/90 184 days

Close down and transfer equipment to GOP. Prepare final reports. Long Term Advisor for Training to leave by October 1, 1990. Chief of Party by November 1, 1990.

**PROPOSED TERMS OF REFERENCE
BULK RESEARCH IMPLEMENTATION**

<u>Proposed Consultant</u>	<u>Time of Assignment</u>
John (Zack) Lea	September 10 - October 5, 1989

Terms of Reference

1. Specifications of data requirements to determine
 - a. comparative economic and physical efficiency of bag and bulk handling systems by distribution stages:
 - 1) procurement
 - 2) transport to reservoir
 - 3) storage
 - 4) transport to flour mills
 - 5) handling costs within flour mills
 - b. Specification of data requirements and procedures to determine the physical and economic efficiency of the mechanical components of the bulk system:
 - 1) Physical productivity in tons/hour, tons/manhour, or other relevant terms
 - 2) Operating costs per operating hour, per ton, or relevant terms.
2. Examine data available from PASSCO, transport contractors, flour mills, and others for completeness and compatibility with data specifications from 1a. and 1b.
 - a. Work with PASSCO and others as necessary, including flour mills in devising data collection plans.
 - b. Where required, develop proformas and outline training programs for personnel assigned to collect data.
3. Develop and recommend strategies for use of cleaning equipment in bulk handling systems including:
 - a. Methods of accounting for changes in volume.
 - b. Analysis of costs/benefits to flour mills in using grains cleaned to various specifications.
 - c. Pricing strategies for cleaned grains.
4. Collaborate with Overseas National Development of Natural Resources (ODNRI) personnel in development of analysis of economics of bagged storage systems.
5. Train STDT, PASSCO, and other personnel in use of transportation planning software.

Deliverables

1. Report containing complete discussion of items 1 -3 above.
2. Seminar/reporting sessions with PASSCO, USAID, and concerned Provincial Food Departments not later than 3 days before scheduled departure date. Preparation of final reports before departure.

**PROPOSED TERMS OF REFERENCE
EXECUTIVE VISIT AND PROGRAM ASSISTANCE**

<u>Proposed Consultant</u>	<u>Time of Assignment</u>
Roe Borsdorf	Sep. 25 - Oct 12, 1989

Terms of Reference

1. Executive visit of FFGI logistical support personnel as permitted under terms of Contract 391-0491-C-00-6080-00.
 - a. Review of training and research programs, with planning for FFGI/KSU support.
 - b. Prepare budgets in dollars and rupees for remainder of project.
 - c. Prepare plans for phase out of project with STDT and USAID.

2. Assist in conduct of No Loss / Fair Average Quality seminar and workshop:
 - a. Review all printed materials, audio/visual presentations, and other items.
 - b. Assist invited speakers in preparation of presentations as required.
 - c. Evaluate conference and assist in developing followup activities.

Deliverables

Report containing items 1 a.-c., and 2c.

Concurrence

Plans of Work, May 1, 1989 to November 30, 1990 for Storage Technology Development and Transfer, Food Security Management Project approved this date:

Joint Secretary (Food)
Ministry of Food, Agriculture and
Cooperatives

Date

Project Officer
USAID/Islamabad

Date

Long-Term Advisor
Food and Feed Grain Institute

Date

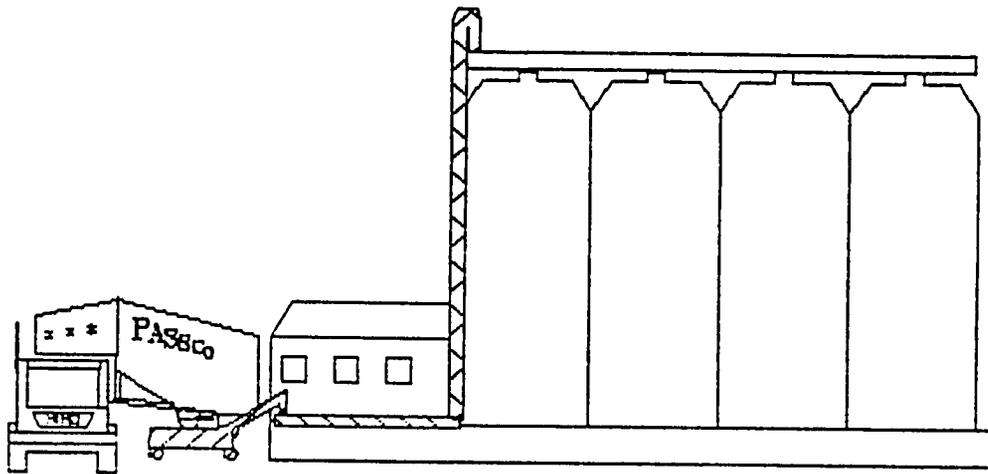
Prepared by:

R. C. Maxon
Chief of Party

APPENDIX II

IMPLEMENTATION PLAN: BULK HANDLING AND STORAGE RESEARCH PROJECT

**IMPLEMENTATION PLAN
BULK HANDLING AND STORAGE
RESEARCH PROJECT**



PASSCO

STDT

PMRI

MINFA

USAID

PROVINCIAL FOOD DEPARTMENTS

FLOUR MILLS

June 1989 - October 1990

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IMPLEMENTATION PLAN BULK RESEARCH PROJECT

Summary

The Bulk Handling and Storage Research Project includes three major areas:

1. Location of equipment and assignment of responsibility for supervision, staffing, and maintenance of equipment at each site.
2. Development of sub-systems and system for procurement, storage, and distribution.
3. Physical and economic evaluation.

The project will develop a complete bulk handling system from the procurement center to flour mills, including collection, transport, storage, retrieval, and distribution without bags. Because of the timing in arrival of equipment, individual pieces of equipment and subsystems for retrieval and delivery of wheat will be put in place before the next procurement season.

Nearly all equipment to be tested is portable or mobile. Only minimal civil works will be required for two weighbridges and bin unloading system for the Chichawatni silo. Most portable equipment can be moved and used in a variety of ways. This will enable grain handling personnel to become familiar with bulk handling methods and principals.

Additional elements to be tested are the use of grain cleaners, and some improved mechanization of existing bulk handling facilities. The physical and economic performance of bulk handling will be evaluated. A final report of the bulk handling experience will be provided, along with recommendations for future expansion of the bulk handling system.

The bulk handling research project will cooperate with and benefit from research conducted in Pakistan by the Overseas Development of Natural Resources Institute (ODNRI), a unit of the British Overseas Development Administration.

SECTION I. RESEARCH PROGRAM

Grain Quality Research

The PMRI has developed a comprehensive research plan for bulk grain storage in a separate document. The research will be conducted at Depalpur for open bulkhead storage, Manga Mandi for bulk-cum-bag storage, and Badami Bagh, Lahore, for hex bin research. The research will involve recording applications of various chemical treatments, monitoring the effectiveness of fumigants, and periodic examination of grain quality. A detailed PMRI plan of work has been approved by PARC.

Economic analysis.

Three man months of TDY consultants will be required to complete a report and recommendations by the end of project. Part of the economic analysis will be conducted in cooperation with the Overseas Development of Natural Resources Institute, (ONDRI) a unit of the Overseas Development (ODA) of Great Britain. The ODNRI will provide 6 person months of a senior economist in 1989-90 to assist in this effort. Two of the man-months will be spend in-country on data collection and cooperative analysis with the STDT.

The following data will be required for the comparative economic and physical efficiency of bag and bulk handling systems by distribution stages:

1. Procurement
2. Transport to reservoir
3. Storage
4. Transport to flour mills
5. Handling costs within flour mills

Data and analysis to be included in the above stages will include:

1. Handling losses
2. Effect on quality
3. Comparative costs in terms of costs per ton, costs per T/KM, manhours per ton, and similar measures.

A TDY economist provided by the STDT will examine data available from PASSCO, transport and labor contractors, flour mills, and others for completeness and compatibility with data specifications. This person will work with PASSCO and others including flour mills in devising data collection plans. When needed, the TDY will develop proformas and outline training programs for personnel assigned to collect data.

Research expenses

1. Equipment operating expenses.

PASSCO and the Food Department will provide the personnel for the routine operation and maintenance of the bulk handling equipment. The respective organizations will pay the normal operating costs for fuel, expendable

supplies, and minor repairs.

2. Repairs.

The STDT will supervise repairs and to maximum extent possible use spare parts provided with the equipment. Allocation of costs for major repairs will be considered on case by case basis, with concurrence of USAID when STDT expenditures in excess of Rs. 5,000 contemplated.

3. Grain Storage Research

The STDT will provide the chemicals and supplies required for research being directed by PMRI.

4. Economic Analysis

PASSCO will provide the accounting data available from its current records. The STDT and PASSCO will consider cost sharing arrangement in collecting data from field tests of equipment where volume of data and/or skills required in collection of data may not be feasible for PASSCO personnel to provide. Expenses for data analysis will be the responsibility of the STDT.

5 Installation and Maintenance Expenses

PASSCO will pay the installation costs as maintenance or costs of establishing procurement centers. The STDT has acquired a recommended set of tools for the setup, maintenance, and field repair of bulk handling equipment. A vehicle will be obtained and equipped as mobile repair facility, and to provide over-the-road transport of the bulk handling equipment when feasible.

The tools and repair vehicle will remain under the supervision of the STDT Center in Lahore. A site or sites for maintenance of bulk handling equipment will be selected by PASSCO.

SECTION II. LOCATION OF EQUIPMENT

Placement of equipment

The initial placement of grain handling and research equipment will be as indicated in Table 1. As the portable equipment can be used in a variety of ways, it is anticipated that the equipment will be transferred among godowns, hexagonal bin sites, flour mills, and other locations as the need and opportunity arises.

PASSCO will assume primary responsibility for the location of the grain handling equipment. The bulk grain receiving and storage activities will be concentrated in the Depalpur - Okara. Two bulk procurement centers will be established near Depalpur at Auli Moti and Mazarabad. The third center will be established within the Depalpur storage complex.

PASSCO will provide bulk-cum-bag godowns and open bulkheads for research purposes at Depalpur, Okara, and Manga Mandi. The Punjab Food Department will allocate hexagonal bins at Bagdani Bagh for research. The research godowns and hexbins will be given priority in allocation of available portable handling equipment for loading and unloading. One set of portable equipment for flour mill unloading will be tested for unloading the hexagonal bins.

PASSCO will control and initially use the highway bulk carriers with its existing trucks and tractors. After an initial experience of 2 to 4 months, PASSCO may consider leasing the bulk carriers to qualified private contractors at prevailing commercial rates. PASSCO will retain control and use of the 8 bulk trolleys to be used between the procurement centers, open bulkheads, and godowns on as needed basis.

Private firms will be encouraged to visit bulk storage sites and observe the bulk handling equipment in operation. In special cases, the firms may be loaned equipment for examination for short periods of time, subject to the approval of MINFA and USAID. Such loans should not exceed one week.

The STDT Training Center Lahore, will receive the grain testing and inspection equipment. Packages of grading equipment will be assembled and delivered to active research, procurement, and bulk release sites as needed. The STDT will also receive an assortment of tools and maintenance equipment.

Table 1. Allocation of Research Equipment

Table 1.

Table 1. EQUIPMENT ALLOCATION FOR BULK RESEARCH AND STORAGE PROJECT

IFB No.	Equipment	Total	Primary Location					Secondary Location					Flour Mills	STDT Lhr.	PASSCO	Comments
			Procurement Center	Storage Complex	Storage Complex	Storage Complex	Storage Complex	Storage Complex								
			Al	M	Mzb	Dep	Dep.	Okara	Manga	LhrBB	Chwtn	Other				
	Portable Truck Scale	2	1	1												Should be considered as a fixed installation
A2A.	Mobile Incline Conveyor, 65'	1				1										
A2B.	Mobile Incline Conveyor, 35'	9	2	2	2	1	1	1		1	1					
A3.	Mobile Trk. Unload Hoppers	3	1	1	1											
A4.	Portable Bulk Scales	6	2	2	2											
A5.	Portable Generators	5	1	1	1	1	1									
A6.	Grain Sampling -Grading Equip	5 Sets	1	1	1	1	1									
A6.	Grain Testing & Lab. Equip.	Set													1	
	Maintenance & Repair Tools (Provided by STDT)	Set													1	
G1.1	Self propelled grain slinger	1				1										
G11.1	Power shovel (not available at this time, request for waiver pending)															
G11.2	Rotary Grain Cleaner	4	1	1	1			1								
G11.3	Gravity Flow Grain Cleaner	2				1										
G11.4	Insecticide Sprayer Pump	4				2	1	1								
G111.1	Bulk Gravity Wagons	8	2	2	2	2									4	
G1V.1	Port. Incline Conveyor 80 Ft.	1				1										
G1V.2	Conveyor accessories	Set				1										To be distributed as needed
G1V.3	Flat Storage Unloader-50 Ft.	2				2										
G1V.4	Bin Unloading System	1								1						
G1V.1	Truck unloading hoppers	6				6				1				5		Initial receipt at Okara for distribution
G1V.2	Inlet hoppers	8				8				1				7		Initial receipt at Okara for distribution
G1V.3	Augur head sections	8				8				1				7		Initial receipt at Okara for distribution
G1V.3	Augur extensions	48				48				1				35		Initial receipt at Okara for distribution
G1V.1	Single axle semi-trailer	2														
G1V.2	Four wheel hopper trailer	2														2 To be controlled by PASSCO headquarters

SECTION III. OPERATING PROCEDURES

Operations engineering and training.

The STDT Training Center, Lahore, will conduct training sessions on bulk handling engineering principles and application to PASSCO and Food Department Facilities. The training will begin as the bulk handling equipment arrives and installations and applications of the bulk handling are made.

Procurement receiving and dispatch procedures.

As soon as practical after arrival of the procurement center equipment, model procurement center(s) will be set up at Manga and/or Depalpur. PASSCO and STDT personnel will test alternative equipment arrangements and buying procedures, including sampling and testing of bags and bulk quantities, cleaning, and loading of bulk carriers. Purchase documents will be modified as needed. PASSCO Engineering Department will determine the location of the weighbridges and provide for their installation.

Bulk wheat transport

The transport of wheat in bulk is the common element of all phases of the bulk handling and storage research project. Three types of bulk handling equipment are being imported. PASSCO has or is acquiring trucks capable of moving wheat in bulk. The following transport stages are to be studied:

1. Procurement centers to storage reservoirs.

Wheat will be loaded directly into trucks and wagons upon procurement. The trucks and wagons will be dispatched to the nearest reservoir, where it will be unloaded by mechanical means. The available bulk handling transport equipment should be concentrated in the procurement areas so as to test a continuous of loading, transport, and unloading chain. The initial procurement centers will be set up near Depalpur.

2. Storage reservoirs to flour mills.

Where mills are close to bulk supply, the bulk wagons could be used after the close of the procurement season. The wagons can be dropped off, and empty wagons picked up in a continuous fashion. For longer distances, the PASSCO dump trucks and/or over the road trailers will be used. Loading and unloading arrangements will be arranged according to the available equipment at each location. The first flour mills to receive bulk wheat should be in the Depalpur - Lahore corridor.

3. Rural reservoirs to urban distribution centers.

Where bulk distribution facilities are available in urban centers,

(Lahore hexbins for example) the bulk carriers can be used to refill the centers. Bulk can loaders and portable conveyors can be used for loading and unloading at the urban centers.

4. Additional Bulk Transport

The power shovel can be used experimentally to unload conventional trucks and wagons. Some bulk trolleys already exist in the rural areas. Cargo trucks can be modified by use of plastic sheets to main the grain tight for short distances.

Where distances between the procurement centers and long storage sites are short, wheat may be loaded into bulk trolleys and pulled by tractor directly to the reservoir. Under good road conditions, a tractor can pull two wagons.

SECTION IV. FLOUR MILL PARTICIPATION

Basic criteria

Flour mills to participate in bulk handling will be selected according to the following criteria:

1. Road and site access that can accommodate bulk delivery equipment in a safe manner.
2. Location in proximity to available bulk supply of wheat.
3. Quantity of equipment needed and effort required to set up bulk handling in the flour mill.
4. Type of milling equipment and flour produced. The research aspect requires that both atta mills and roller mills be represented.
5. Need for geographic dispersal for demonstration purposes. Flour mills in Depalpur, Okara, Faisalabad, Lahore, and Multan, other locations may participate regardless of whether the wheat delivered was originally procured and stored in bulk.

Conditions for flour mill participation:

The flour mills chosen to participate in the research project will observe the following conditions:

1. Receive the bulk handling equipment will be on loan for maximum of 90 days.
2. Pay the official release price for unbagged wheat of equivalent quality delivered to competing mills, plus delivery costs for equal quantity bagged wheat. If cleaned wheat is delivered, the delivery price maybe adjusted to recover cleaning costs and equalize cost on basis of milling yield between cleaned and uncleaned wheat.
3. Provide electrical connections, and operating personnel.
4. Pay portable equipment operating costs and routine maintenance.
5. Providing data on operating costs and flour yields.
6. Permit other flour millers to observe bulk handling operations

Selection of Flour Millers

Selection of flour mills to participate will be made in consultation with the PASSCO, the Provincial Food Department if deliveries are made from PFD godowns, and the STDT. PASSCO and the STDT shall make the final selections based upon the criteria above. The portable equipment available is sufficient to equip 4 to 6 mills for bulk delivery, depending upon requirements of each selected mill. A minimum of four flour mills should be served at all times.

Assistance to Flour Mills.

The STDT will locate and if necessary train engineers and other private sector firms in the design and installation of bulk handling equipment for flour mills. The STDT will cooperate with existing public finance and special import programs to develop simple proformas for feasibility analysis and financing requirements. This will continue through life of project and be terminated by September, 1990.

Arrangements with MINFA, Provincial Food Departments

Where necessary, PASSCO will make arrangements or obtain permission of the Provincial Food Departments to deliver wheat in bulk. Payments or transfer of offsetting wheat stocks will be made as mutually agreed upon. Recommendations will be made by the STDT and PASSCO to MINFA for permission to adjust prices on an experimental basis, when research on cleaning determines amount of adjustment necessary to equalize prices between mills receiving bulk and bagged wheat.

SECTION V. PROJECT MANAGEMENT

Management of bulk handling research and storage project

A bulk research coordinating committee will be established consisting of representatives of:

PASSCO Engineering
Finance
Operations
STDT Chief of Party
Long Term Advisor for Storage
PMRI Scientific Officer
MINFA Storage Cell
Punjab Food Department
USAID FSM Coordinator

The committee will meet at least once per month to plan and coordinate activities for following month, review research progress, and resolve pending issues. Representatives of the Flour Millers Association, transport contractors, or others having interest in the bulk handling may be invited to attend coordinating committee meetings. The coordinating committee will function with the assistance of a bulk secretariat located in the Lahore Training Center.

Bulk Secretariat

The STDT will be responsible for the overall coordination of the bulk handling and research project. To facilitate this activity, a bulk secretariat will be established in the Lahore Training Center. Purpose of the secretariat would be to coordinate and maintain communications with all parties concerned with bulk handling:

PASSCO

- location and scheduling of equipment use
- collection of performance and economic data
- provision of training in operation and maintenance

Food Departments

- coordination of bulk deliveries for flour mills
- schedule use of handling equipment
- setup data collection as needed

Flour Millers

- assist in selection and scheduling of mill participation.
- setup and monitor data collection
- select equipment and supervise installation
- training for flour mill personnel

Other duties;

- Initiate correspondence, set up meetings, and distribute information
- Schedule research activities in coordination with bulk loading and

transfer activities.

- Answer inquiries regarding bulk research project and arrange demonstrations for public and private sector as appropriate.
- Maintain central files and record systems:
 - Equipment inventory: location, source, cost, use records, physical output, costs in use.
 - Physical and economic research
 - Reference materials
 - Repair manuals, parts lists, etc.
 - Schedules of equipment use and transfer between locations.

Provide support for short term consultants and others working on bulk projects.

Phase out of Bulk Handling Research

PMRI research

The PMRI is installing bulk research experiments in open bulkheads, bulk cum bag storage, and hexagonal bins during the 1989 procurement season. These will be phased out when the wheat is withdrawn from storage in the normal course of dispatch by the Food Departments and PASSCO.

The PMRI will assist with the bulk cleaning evaluation, to be conducted from November onward with deliveries to flour mills, and at the procurement season. This effort will be terminated at the end of the procurement season in June, 1990. In all probability, flour mills will buy from open markets from May onward, and cleaning operations will be transferred to the procurement centers.

Economic analysis

The economic analysis will be phased out in accordance with the schedule of reports and publications in the following section.

Disposition of bulk equipment.

At end of procurement season, July, 1990. MINFA, PASSCO, PARC, and USAID will confer on final disposition of all equipment used. STDT will provide lists of equipment, location, use value in bulk handling and research, and recommendations for disposition.

Disposition of data and records.

STDT will indicate what data and records are available with disposition according to USAID regulations, and recommendations for disposal where options are available.

SECTION VI. REPORTS AND CONFERENCES

Reports and Conferences on Bulk Handling

Reports and Conferences

Preliminary report. Bagged Storage and Handling Costs,
November, 1989. STDT/ODNRI

Interim report. Use of Bulk Handling Equipment in Storage
and Distribution, December, 1989, STDT

Bulk Grain Handling and Investment Potentials
Seminar/workshop in Lahore with RONCO/ACSCA, last week
January, 1990.

Preliminary report. Bulk Handling in Wheat Procurement,
July, 1990. STDT/ODNRI

Bulk and Bagged Grain Handling Economics and Social
Implications. August, 1990. ODNRI.

Final Report. Bulk Grain Handling in Pakistan.
September, 1990. STDT

Bulk Grain Seminar for USAID/GOP, Sept., 1990.

SECTION VII. IMPLEMENTATION SCHEDULE

BULK STORAGE AND HANDLING RESEARCH IMPLEMENTATION SCHEDULE

	Jun '89	Jul '89	Aug '89	Sep '89	Oct '89
Bulk Handling & Storage Research					
Storage research					
Establish Secretariat					
Equipment arrival					
Equipment setup					
Equipment training					
Flour mills					
Economic analysis					
Economic reports					
Bulk handling seminar					
Phase out					

BULK STORAGE AND HANDLING RESEARCH IMPLEMENTATION SCHEDULE

	Nov '89	Dec '89	Jan '90	Feb '90	Mar '90	Apr '90
Bulk Handling & Storage Research						
Storage research						
Establish Secretariat						
Equipment arrival						
Equipment setup						
Equipment training						
Flour mills						
Economic analysis						
Economic reports						
Bulk handling seminar						
Phase out						

BULK STORAGE AND HANDLING RESEARCH IMPLEMENTATION SCHEDULE

	May '90	Jun '90	Jul '90	Aug '90	Sep '90	Oct '90
Bulk Handling & Storage Research						
Storage research						
Establish Secretariat						
Equipment arrival						
Equipment setup						
Equipment training						
Flour mills						
Economic analysis						
Economic reports						
Bulk handling seminar						
Phase out						

BULK STORAGE AND HANDLING RESEARCH
IMPLEMENTATION SCHEDULE

Research setup 6/15/89 to 7/27/89 [45 days]

Setup bulk grain quality research
in Depalpur and Manga Mandi

Bulk research 7/27/89 to 5/24/90 [301 days]

Data collection and monitoring of
grain storage research as long as
wheat remains in bulk storage.

Research Report 8/2/90 to 9/6/90 [35 days]

Final report on bulk storage
protection and grain losses.

Secretariat 8/24/89 to 10/5/89 [42 days]

Set up secretariat to coordinate
project activity and data
collection.

Equip. Arrival 8/3/89 to 10/19/89 [77 days]

First set of bulk handling and
research equipment received.

Equip. Arrival 10/26/89 to 12/21/89 [56 days]

Second set bulk handling
equipment received.

Equip. Setup 8/17/89 to 1/4/90 [140 days]

Distribute and setup bulk
handling equipment as it arrives.

Equip. Training 9/14/89 to 1/18/90 [126 days]

Train engineers and operators in
placement, maintenance, and use
of bulkhandling equipment.

Select 9/21/89 to 10/19/89 [91 days]

Select 4 flour mills for receiving bulk deliveries

Flour mills 10/19/89 to 1/18/90 [91 days]

Set up bulk receiving in first set of flour mills

Flour mills - 2 1/25/90 to 4/26/90 [91 days]

Move bulk handling equipment to second set of flour mills, make deliveries.

Economic Analysis 8/24/89 to 6/28/90 [308 days]

Begin data collection and continue analysis through life of project.

Bag Econ. 11/2/89 to 11/23/89 [21 days]

Preliminary Report on Bagged Handling by ODNRI

Equipment 12/14/89 to 12/28/89 [14 days]

Report on use of bulk handling equipment in storage and distribution.

Bulk Procurement 7/12/90 to 8/2/90 [21 days]

Preliminary report on procurement in bulk.

ODNRI Bulk 8/9/90 to 9/6/90 [28 days]

ODNRI report on economics and sociology of bulk and bag wheat handling and storage.

Final Bulk Report 11/13/90 to 10/4/90 [21 days]

Final report on bulk handling and
research project.

Seminar 1/18/90 to 1/25/90 [7 days]

• Conduct bulk handling seminar in
cooperation with Agribusiness
Investment Constraints Project
last week of January, 1990.

Bulk Seminar 9/20/90 to 10/4/90 [14 days]

Seminar - report on bulk handling
for GOP and USAID

Phase out 7/5/90 to 10/4/90 [91 days]

Assign and transfer to GOP
agencies all equipment and
records used and developed by
bulk handling research project.

APPENDIX III

SUMMARY OF THE STDT TRAINING PROGRAM
NOVEMBER 27, 1988 TO MARCH 30, 1989

65-

SUMMARY OF THE STDT
TRAINING PROGRAM

November 27, 1988 - March 30, 1989

STDT Training Center
64 Ahmad Block
Lahore

Dr. Ulysses A. Acasio
Training Director

Food and Feed Grain Institute
Manhattan, Kansas 66506
(Contract 391-0491-C-00-6080-00)

SUMMARY OF THE STDT TRAINING PROGRAM
November 27 - March 30, 1989

A. Training of Master Trainers

The Master Trainers course was initiated on November 27, 1988 and completed January 16, 1989 with twelve participants (PASSCO-4, Punjab-4, Sind-2, and Baluchistan-2). The instructional component of the course was four weeks, including a week of training with the Pest Management Research Institute of the PARC at the Karachi University campus. Additional two weeks was devoted to the preparation of training materials and a week of practice teaching with 20 operations personnel of the Punjab Food Department and PASSCO.

Their training was further enhanced by their participation in a two-day in-house Seminar-Workshop held at the training center in Lahore where issues such as wheat procurement standard, impact of the "no-loss" policy of the GOP, and need of personnel training in the PFD and PASSCO were presented and discussed.

B. Training of Operations Personnel

After the master trainers completed their training, they were formed into two groups. One group was assigned to conduct training in Lahore and the other in Sukkur, Sind. Training was conducted in Lahore from January 4 to March 22, 1989, while in Sukkur training was from January 28 to March 22, 1989. There were 9 courses conducted in Lahore with 202 participants and 7 courses in Sukkur with 135 participants from PFD and PASSCO. The duration of each course was 6 days. The training program has to be temporarily suspended in preparation for the 1989 wheat procurement season.

The course content of the operations personnel training included the following subject matter:

1. Pre-storage preparation of the godowns and procurement equipment and materials.
2. Use and completion of procurement forms and documents.
3. Grain postharvest losses in Pakistan.
4. Factors affecting stored grains.
5. Inspection, housekeeping, and sanitation of storage facilities.
6. Grain quality and its determination.
7. Stored grain pests and methods of control.

C. Conduct of the Training

Initially, each master trainer was assigned to teach a specific subject matter and prepared all needed teaching

materials such as lecture handouts, overhead transparencies, slides, and laboratory equipment. All the lecture handouts were first written in English and most were later translated into Urdu as time allowed.

After the third week of teaching experience, each master trainer was assigned to teach another topic to expand his informational skills. He was allowed to use and improve the teaching materials previously prepared by other master trainers, or develop his own. A few more innovative master trainers improved on the work of other master trainers while others were content on using previously prepared materials.

To give varied teaching experience, the master trainers were assigned to teach both in Lahore and in Sukkur. At least two master trainers were rotated every training session between the two sites. Also, the participants from PASSCO and PFD were trained together by the joint master trainers. This method of training demonstrated a spirit of cooperation between the two agencies.

The participants were given a benchmark evaluation right after registration and a final evaluation in the last day of the course. They were also given a chance to evaluate the course through a questionnaire.

D. Comments and Recommendations:

1. The training was generally recognized by the participants as necessary to improve their skills.
2. The trainees felt that the training period be extended from a week to at least 2 weeks.
3. Most had little or no knowledge of the insects pests and the kinds or names of chemicals used in their control.
4. Majority expressed satisfaction with the training and that the objectives of the course were achieved.
5. Equipment used in grain quality determination be provided to be used in procurement.

E. Opportunities and Constraints

The initial agreements with PASSCO and the Provincial Food Departments called for the STDT to provide training, lodging and per diems for personnel assigned as Master Trainers. PASSCO and the Provincial Food Departments were to provide transportation, lodging, and per diems to the trainees. PASSCO provided the allowances to its personnel., The Provincial Food Departments provided some transportation allowances, but did not provide any living allowances for its trainees. Hence many remarks on this subject are found in the "Comments" section. The course was

shortened to 6 days, with a new class inducted each Saturday and completed on the following Thursday, in part to avoid holding the trainees in Lahore and Sukkor on Fridays.

The matter was brought to the attention of the Food Department several times. The response was that the trainees would be paid, but the system worked great hardship on several participants. It is a measure of the trainees' interest and devotion to the subject and organization that virtually all remained throughout the course. Some trainees commuted daily from as far as Fasallabad to attend the course.

The trainees themselves recognized that they were caught in situations in which they had the knowledge to do what is required, but were powerless to act because of the system in which they operate. For instance, when insect counts indicate that fumigation undertaken in a Food Department godown, the godown in-charge must make a written request through channels to fumigate. By the time paperwork is completed, the insect numbers may have exploded or temperatures changed so fumigation is not effective. PASSCO's system is more responsive and timely.

The trainees are not adequately supported with equipment and supplies needed to do their jobs effectively. The World Bank provided a large quantity of grain grading and testing equipment to the Food Departments in 1985-86. PASSCO was in charge of procuring the equipment for the WB, but did not obtain any equipment for itself. Most of the equipment is still locked in storage at the district level. The moisture meters provided by the WB were equipped with batteries when stored. All moisture meters borrowed from the PFD's for training purposes were corroded and non-functional. The locally manufactured screen sets do not have uniform perforations and thus are unsuitable for commercial grading purposes.

The course did reveal that much hidden and under-utilized talent exists among both the master trainers and trainees. The challenge is to install management systems and policies that will permit personnel of the Food Departments and PASSCO to use their abilities to the fullest extent.

F. Evaluation of Training

The training was evaluated in three ways:

1. Trainees were tested as to their knowledge of the subject matter to be presented shortly after their arrival at the training course.
2. The trainees were tested at the conclusion of the course, and their scores compared against the entry level scores.

3. The trainees were asked to rate the overall course, course content, teaching methods, and their instructors.

The following are summaries of the training programs, training schedules, and evaluations, plus verbatim comments made by individual trainees. The comments are presented at in their entirety

Table 1. Calendar of Training and Number of Trainees

Table 2. Training Course Summary

Table 3. Consolidated Summary of The Training Course Evaluation

Table 4. Summary of Trainee Evaluation

Table 5. Evaluation of Master Trainers by Course Participants

Table 6. Course Evaluation Comments

Table 7. Seminar-Workshop Program on Training

Table 1.

CALENDAR OF STDT TRAINING & NUMBER OF TRAINEES
LAHORE (1989)

BATCH	DATE	FOOD DEPTT	PASSCO	TOTAL
1.	Jan 4-12, 1989	13	12	25
2.	Jan 22-30, 1989	10	10	20
3.	Feb 4-9, 1989	9	12	21
4.	Feb 11-16, 1989	8	14	16
5.	Feb 18-23, 1989	7	14	21
6.	Feb 25-Mar 2, 1989	11	13	24
7.	Mar 4-9, 1989	9	10	19
8.	Mar 11-16, 1989	11	19	30
9.	Mar 18-22, 1989	11	15	26
	SUB-TOTAL	83	119	202

SUKKUR (1989)

1.	Jan 28-Feb 5, 1989	15	3	18
2.	Feb 11-16, 1989	18	9	27
3.	Feb 18-23, 1989	9	10	19
4.	Feb 25-Mar 2, 1989	6	17	23
5.	Mar 4-9, 1989	1	7	8
6.	Mar 11-16, 1989	0	29	29
7.	Mar 18-22, 1989	0	11	11
	SUB-TOTAL	49	86	135
	TOTAL	132	205	337

NOTE: Training will resume both in Punjab and Sind after this year's harvest season, including Baluchistan and NWFP.

GRAIN HANDLING, STORAGE, & PROTECTION
 TRAINING COURSE SUMMARY
 JANUARY 4 - MARCH 22, 1989

SUBJECT MATTER	DURATION, HRS.
1. PRE-PROCUREMENT PREPARATION	
Documents, forms, contracts, etc.	1.00
2. GRAIN QUALITY:	
Importance & quality factors	1.00
Sampling procedure, equipment, sample preparation, etc.	1.00
Cereal grain structure, moisture and its measurement, EMC	2.00
Quality determination practical	2.00
3. GRAIN HANDLING:	
Grain receiving, despatching, and inventory control	1.00
4. GRAIN STORAGE:	
Postharvest losses	1.00
Grain storage systems in Pakistan	1.00
Factors affecting safe storage of cereal grains	2.00
Bag & bag/bulk storage in godown	1.00
Bag storage in plinths	1.00
5. GRAIN PROTECTION:	
Stored grain insects & biology	1.00
Insect identification (Practical)	1.00
Methods of pest control	1.00
6. FUMIGATION OF GRAIN:	
Indoor stack & godown fumigation	1.00
Outdoor stack fumigation	1.00
Fumigation practical & safety	2.00
7. INSPECTION, HOUSEKEEPING, & SANITATION	
Checklist & reporting	1.00
Video presentation	1.00
8. OTHER ACTIVITIES:	
Field trip to a godown complex	3.00
Open discussions	1.00
Benchmark & final examination	2.00
Training course evaluation	1.00

TOTAL HOURS (6 days)	30.00

Table 3.

GRAIN HANDLING, STORAGE, AND PROTECTION
SHORT COURSE

COURSE EVALUATION

CONSOLIDATED SUMMARY OF ALL COURSES (LHR%)

A. Based on the classroom, laboratory, and field activities, were the performance objectives achieved under each subject matter areas discussed?

Subject Matter	LEVEL OF ACHIEVEMENT (Number and Percent)			
	Completely	Almost	Barely	Never
1. Pre-procurement preparation	<u>127(65%)</u>	<u>64(33%)</u>	<u>4(2%)</u>	<u>1(0.5%)</u>
2. Determination of grain quality	<u>115(60%)</u>	<u>71(37%)</u>	<u>6(3%)</u>	-----
3. Receiving a grain shipment	<u>93(48%)</u>	<u>81(41%)</u>	<u>19(10%)</u>	<u>2(1%)</u>
4. Dispatching grain	<u>141(72%)</u>	<u>45(23%)</u>	<u>8(4%)</u>	<u>1(0.5%)</u>
5. Stacking of bags in a godown	<u>118(72%)</u>	<u>45(27%)</u>	<u>1(0.6%)</u>	-----
6. Stacking of bags on plinths	<u>125(63%)</u>	<u>60(30%)</u>	<u>12(7%)</u>	<u>2(1%)</u>
7. Inspection & sanitation	<u>108(55%)</u>	<u>82(42%)</u>	<u>4(2%)</u>	-----
8. Grain fumigation	<u>108(56%)</u>	<u>80(41%)</u>	<u>5(2%)</u>	-----

B. How helpful were the following activities?

	LEVEL OF EFFECTIVENESS			
	Excellent	Good	Fair	Poor
1. Lectures	<u>98 (51%)</u>	<u>86(45%)</u>	<u>8(4%)</u>	-----
2. Practical exercises	<u>50(25%)</u>	<u>118(59%)</u>	<u>21(10%)</u>	<u>10(5%)</u>
3. Field exercises (Manga%)	<u>58(30%)</u>	<u>109(57%)</u>	<u>21(11%)</u>	<u>3(1.5%)</u>

C. How effective were the following communication aids?

LEVEL OF EFFECTIVENESS

	Excellent	Good	Fair	Poor
1. Lecture handouts	<u>96(54%)</u>	<u>80(45%)</u>	<u>2(1%)</u>	<u>1(0.5%)</u>
2. Overhead transparencies	<u>56(32%)</u>	<u>95(54%)</u>	<u>22(13%)</u>	<u>1(0.5%)</u>
3. Video presentations	<u>74(46%)</u>	<u>74(46%)</u>	<u>9(6%)</u>	<u>3(2%)</u>
4. Board	<u>81(49%)</u>	<u>73(44%)</u>	<u>12(7%)</u>	-----
5. Slide projection	<u>60(32%)</u>	<u>104(56%)</u>	<u>20(11%)</u>	<u>1(0.5%)</u>

D. Was the amount of time devoted to the following topics, sufficient?

	too much?	about right?	too little?
1. Pre-procurement	<u>66(34%)</u>	<u>120(61%)</u>	<u>10(5%)</u>
2. Grain quality determination	<u>51(26%)</u>	<u>123(64%)</u>	<u>19(10%)</u>
3. Receiving a grain shipment	<u>37(19%)</u>	<u>138(71%)</u>	<u>18(9%)</u>
4. Dispatching grain	<u>53(27%)</u>	<u>126(64%)</u>	<u>19(9%)</u>
5. Stacking of bag in godowns & plinths	<u>57(30%)</u>	<u>118(62%)</u>	<u>16(8%)</u>
6. Inspection, house-keeping & sanitation	<u>65(33%)</u>	<u>112(51%)</u>	<u>18(9%)</u>
7. Grain fumigation	<u>44(23%)</u>	<u>125(66%)</u>	<u>21(11%)</u>
8. Postharvest losses	<u>43(22%)</u>	<u>128(66%)</u>	<u>22(11%)</u>

E. How relevant to your work were the topics discussed?

	Very Relevant	Somewhat Relevant	Not Relevant
1. Pre-procurement	<u>173(89%)</u>	<u>19(9%)</u>	<u>2(1%)</u>
2. Grain quality determination	<u>170(87%)</u>	<u>26(13%)</u>	-----
3. Receiving a grain shipment	<u>155(81%)</u>	<u>30(15%)</u>	<u>7(4%)</u>
4. Despatching grain	<u>165(85%)</u>	<u>32(16%)</u>	<u>1(0.5%)</u>
5. Stacking of bags in godowns & plinths	<u>169(87%)</u>	<u>26(13%)</u>	-----
6. Inspection, house-keeping & sanitation	<u>165(85%)</u>	<u>29(15%)</u>	-----
7. Grain fumigation	<u>164(85%)</u>	<u>28(14%)</u>	<u>2(1.4%)</u>
8. Postharvest losses	<u>143(74%)</u>	<u>42(22%)</u>	<u>7(4%)</u>

G. Overall satisfaction with the course:

Excellent 76(40%) . Good 103(54%) Fair 10(5%) Poor_____

H. Would you recommend this course to other operations personnel of your organization?

Yes 181(95%) Maybe 10(5%) Not at all _____

I. Please indicate how much knowledge did you have in the following subject matters presented prior to the course:

	Adequate	Little	Nil
1. Moisture measurement	<u>25(19%)</u>	<u>92(69%)</u>	<u>16(12%)</u>
2. Grain quality determination	<u>56(42%)</u>	<u>75(57%)</u>	<u>1(0.75%)</u>
3. Grain sampling technique	<u>52(39%)</u>	<u>73(55%)</u>	<u>7(5.3%)</u>

4. Stored grain insects	<u>43(31%)</u>	<u>92(66%)</u>	<u>4(3.0%)</u>
5. Factors affecting stored grains	<u>36(26%)</u>	<u>95(70%)</u>	<u>5(3.6%)</u>
6. Inspection, house-keeping & sanitation	<u>52(38%)</u>	<u>85(62%)</u>	<u>1(0.72%)</u>
7. Grain fumigation	<u>37(31%)</u>	<u>82(68%)</u>	<u>2(2%)</u>
8. Postharvest losses	<u>28(21%)</u>	<u>91(67%)</u>	<u>16(12%)</u>
9. Insecticides and their use	<u>32(24%)</u>	<u>98(72%)</u>	<u>6(4%)</u>
10. Methods of storage	<u>56(41%)</u>	<u>79(58%)</u>	<u>1(0.73%)</u>

J. Any comment you may have about the course and instructor that may improve the next short course:

**INDUCTION AND COMPLETION OF COURSE EVALUATIONS
OF TRAINERS - FIRST QUARTER, 1989**

STDT TRAINING EVALUATION SUMMARY LAHORE

BATCH NO.	NO. OF PARTICIPANT	BENCH MARK EVALUATION			FINAL EVALUATION		MEAN PERCENTAGE
		HIGH	LOW	MEAN	HIGH	LOW	
1ST	25	83	33	58	96	34	65
2ND	20	79	48	63	88	43	65
3RD	21	73	39	56	86	39	63
4TH	16	82	30	56	99	61	80
5TH	21	100	54	77	98	46	72
6TH	24				95	38	66
7TH	19	79	52	65	93	39	67
8TH	30	77	53	65	100	51	71
9TH	26	89	51	70	86	33	60

STDT TRAINING EVALUATION SUMMARY LAHORE

BATCH NO.	NO. OF PARTICIPANT	BENCH MARK EVALUATION			FINAL EVALUATION		MEAN PERCENTAGE
		HIGH	LOW	MEAN	HIGH	LOW	
1ST		75	46	60.5	90	34	62
2ND							
3RD		76	52	64	93	37	65
4TH		68	31	49.5			
5TH					47	32	39.5
6TH							

Table 5.

MASTER TRAINERS EVALUATION BY TRAINEES

Instructors: Please rate the lecturers in the following areas by encircling the numbers 1 to 5: (5 for excellent mark)

1ST BATCH, LAHORE (January 4-12, 1989)

	Knowledge of Subject	Clarity of Presentation	Overall performance
1. Dr. Khushi Muhammad	1 2 3 4 5 95	1 2 3 4 5 95	1 2 3 4 5 110 = 300
2. Mr. Shamsheer Haider	1 2 3 4 5 90	1 2 3 4 5 89	1 2 3 4 5 100 = 279
3. Mr. Paryal Channa	1 2 3 4 5 84	1 2 3 4 5 78	1 2 3 4 5 95 = 257
4. Mr. Abdul Khaliq	1 2 3 4 5 81	1 2 3 4 5 83	1 2 3 4 5 100 = 264
5. Mr. Zia A. Malik	1 2 3 4 5 90	1 2 3 4 5 89	1 2 3 4 5 104 = 283
6. Mr. Riaz-ul-Haq	1 2 3 4 5 89	1 2 3 4 5 89	1 2 3 4 5 105 = 283
7. Mr. Ibrahim Dasti	1 2 3 4 5 90	1 2 3 4 5 86	1 2 3 4 5 105 = 281
8. Mr. Rana Abbas	1 2 3 4 5 84	1 2 3 4 5 83	1 2 3 4 5 99 = 266
9. Mr. Abdul Latif	1 2 3 4 5 86	1 2 3 4 5 85	1 2 3 4 5 96 = 267
10. Mr. Haibat Khan	1 2 3 4 5 62	1 2 3 4 5 52	1 2 3 4 5 76 = 190
11. Mr. Akhtar Muhammad	1 2 3 4 5 89	1 2 3 4 5 89	1 2 3 4 5 104 = 282
12. Mr. Nazar M. Khan	1 2 3 4 5 85	1 2 3 4 5 83	1 2 3 4 5 96 = 264

2ND BATCH, LAHORE (January 22-30, 1989)

	Knowledge of Subject	Clarity of Presentation	Overall performance
1. Dr. Khushi Muhammad	1 2 3 4 5 102	1 2 3 4 5 87	1 2 3 4 5 87 = 276
2. Mr. Shamsheer Haider	1 2 3 4 5 97	1 2 3 4 5 90	1 2 3 4 5 89 = 276
3. Mr. Abdul Khaliq	1 2 3 4 5 97	1 2 3 4 5 86	1 2 3 4 5 87 = 270
4. Dr. Zia Malik	1 2 3 4 5 83	1 2 3 4 5 72	1 2 3 4 5 77 = 231
5. Mr. Riaz-ul-Haq	1 2 3 4 5 89	1 2 3 4 5 81	1 2 3 4 5 84 = 254
6. Mr. Ibrahim Dasti	1 2 3 4 5 84	1 2 3 4 5 72	1 2 3 4 5 76 = 308

3RD BATCH, LAHORE (February 4-9, 1989)

Instructors: Please rate the lecturers in the following areas by encircling the numbers 1 to 5: (5 for excellent mark)

	Knowledge of Subject					Clarity of Presentation					Overall performance				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1. Mr. Riaz-ul-Haq															
	(61)					(72)					(70) = 203				
2. Mr. Ibrahim Dasti	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	(82)					(72)					(71) = 225				
3. Mr. Zia Malik	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	(71)					(71)					(72) = 214				
4. Dr. Khushi Muhammad	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	(83)					(75)					(74) = 232				
5. Mr. Shamsher Haider	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	(83)					(68)					(74) = 225				
6. Mr. Abdul Khaliq	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	(83)					(75)					(74) = 232				

4TH BATCH, LAHORE (February 11-16, 1989)

1. Dr. Khushi Muhammad	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	78					74					73 = 225				
2. Mr. Zia A. Malik	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	76					68					72 = 216				
3. Mr. Ibrahim Dasti	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	77					68					70 = 215				
4. Mr. Rana Abbas	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	57					52					55 = 164				

5TH BATCH, LAHORE (February 18-23, 1989)

1. Mr. Rana Abbas	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	83					78					80 = 241				
2. Mr. Riaz-ul-Haq	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	91					87					92 = 270				
3. Mr. Zia Malik	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	84					75					86 = 245				
4. Dr. Khushi Mohammad	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	103					94					103 = 300				
5. Mr. Abdul Khaliq	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	97					93					97 = 287				

GRAIN HANDLING, STORAGE, & PROTECTION
 TRAINING COURSE SUMMARY
 JANUARY 4 - MARCH 22, 1989

SUBJECT MATTER	DURATION, HRS.
1. PRE-PROCUREMENT PREPARATION	
Documents, forms, contracts, etc.	1.00
2. GRAIN QUALITY:	
Importance & quality factors	1.00
Sampling procedure, equipment, sample preparation, etc.	1.00
Cereal grain structure, moisture and its measurement, EMC	2.00
Quality determination practical	2.00
3. GRAIN HANDLING:	
Grain receiving, despatching, and inventory control	1.00
4. GRAIN STORAGE:	
Postharvest losses	1.00
Grain storage systems in Pakistan	1.00
Factors affecting safe storage of cereal grains	2.00
Bag & bag/bulk storage in godown	1.00
Bag storage in plinths	1.00
5. GRAIN PROTECTION:	
Stored grain insects & biology	1.00
Insect identification (Practical)	1.00
Methods of pest control	1.00
6. FUMIGATION OF GRAIN:	
Indoor stack & godown fumigation	1.00
Outdoor stack fumigation	1.00
Fumigation practical & safety	2.00
7. INSPECTION, HOUSEKEEPING, & SANITATION	
Checklist & reporting	1.00
Video presentation	1.00
8. OTHER ACTIVITIES:	
Field trip to a godown complex	3.00
Open discussions	1.00
Benchmark & final examination	2.00
Training course evaluation	1.00

TOTAL HOURS (6 days)	30.00

GRAIN HANDLING, STORAGE, AND PROTECTION
SHORT COURSE

COURSE EVALUATION (COMMENTS)

1ST BATCH, LAHORE (January 4-12, 1989):

1. Please arrange more lectures and practicals on Insect/Pest control/Fumigation. Fogging practical is also required.
2. One subject matter has devoted (assigned) to more people without coordination.
3. The work should be done practically more. Research work should be done in different laboratories and different insects should be introduced.
4. This is a very good course. When an instructor shows a slide its part should be explained more and more.
5. S.T.D.T. has given new confidence. I appreciate the course especially the new techniques to combat the loss in the grain storage being observed at Manga. I recommend the participation of our seniors to make it convenient to understand the problem which create hurdle in the process of handling, purchase and storage of grain.
6. The instructor must use Urdu language. Particularly in the terminology along with the English terminology.
7. Short courses must continue but should be arranged in different operational area so that maximum number of operational person learn the relevant knowledge and have their practical implementation.
8. Period of one week is very less. It should be extended for fifteen days. Time for experiment should also be extended.
9. S.T.D.T. program has developed a new confidence. I appreciate program and recommend that our seniors should also participate in the program so that they may understand the hurdles in practicals and should solve the problems.
10. Residence facilities for the trainees should be provided.
11. For practicals latest equipments should be provided. Time should be extended for the practicals. The trainees should be taken to the big laboratory for experiments.
12. S.T.D.T. has given a new confidence and knowledge. The next short course may please be improved.

trainees must be mentally satisfied. I strongly suggest that All the Trainers must be Masters degree holders".

15. These courses are very important for storage of wheat. There should be more periods of the topic "Fumigation".
16. The subject of Mr. Dasti may be given to Mr. Shamsheer Haider and the subject of Pest Mr. Khaliq can give nicely.
17. Break time is short. After every period there should be a gap of time of 10 minutes. Class time is much. There should be arrangement of entertainment for trainees.
18. Laboratory work is too short. The time may be increased.
19. Dr. Khushi Mohammad, A. Khaliq, Shamsheer Haider, Zia Malik and Riaz-ul-Haq taught good and also gave notes. The subject of Dasti may be given to Abdul Khaliq. The training should be continued.

3RD BATCH, LAHORE (February 4-9, 1989)

1. This course is very useful and the rest of the staff may kindly be called to complete the practice.
2. Lecture time of fumigation and pest may be extended so the students can be able to gain knowledge in it frequently.
3. This course was very useful. A lot of knowledge has been gained which would be very useful in buying wheat.
4. We've gained a lot through this course. It is requested to you that this course should be taught to all the workers.
5. The time of course should be increase. More importance should be given to the subject of "insects".
6. It's important that the practicals should further be made more easy so that the person with less qualification can also learn it easily.
7. The time should be increased for this course because it is very short.
8. Good.
9. This course is more effective for new field job. We appreciate the management to introduce this short course.
10. Training period is very short. Please extend it.
11. More knowledge should be provided about fumigation.

2ND BATCH, LAHORE (January 22-30, 1989):

1. Take more time for insect identification, grain fumigation, grain quality determination and stacking of bags in godown, plinths, inspection house-keeping and sanitation.

Every topic may please be prescribed practically and individually.
2. The time of the course is very short, therefore it should be extended and number of practicals may be raised. These are technical subjects they may please be taught as technical subjects.
3. Lodging facilities may be provided for trainees.
4. Lodging facilities may be provided for trainees.
5. First-aid in case of any miss happening such as fire, gas, injury etc.
6. All the courses must be in Urdu and must be translated in English so that every one can understand. Relevant exercises should be in the practicals. This course may be of 10 days.
7. Course was interesting but fumigation and insect identification was tough.
8. All the teachers are very hard workers and their lectures are very readable but Mr. Shamsher Haider is very good.
9. For Pest control time may be increased.
10. Main time should be given to the subject of Pest control and the Practical in which the students were shown Pests should be more emphasized.
11. There should be a break after 1 and a half or 2 hours. Class duration from 9 a.m. to 4 p.m. with a break of one Hr.
12. The tenure of this course may be at least 15 days and time of daily lecture may be from 9.00 to 2.00 p.m.
13. More time may be given to the schedule because 8 hours continuous study makes the student tired. Moreover days are very few (short), students have no time to look after their other taxes (tasks). It will be better that the lodging and boarding may be provided to them and they should live near to the study center.
14. All the trainers should use simple language and all of the material taught should be supplied in photostat form. The

12. Training should be given to all the staff. Explanation should be more and the video movie should be in Urdu.
13. The period of 5 days is not sufficient, it may please be extended to maximum days. Daily time table from morning to evening is also not comfortable. Rest is O. K.
14. Lecture notes should be given in Urdu.

4TH BATCH, LAHORE (February 11-16, 1989):

1. Time period for the training may be increased. Subject of bardana (bags) may be added. Pakistan being an under developing country and per acre yield of grain is very low, subject for increasing acre yield may be added.
2. It'll be good if the lectures and the scientific names should be given in Urdu so that those trainees who do not understand English properly can understand all this in Urdu easily.
3. Time for Pest control may please be increased and in simple language. Practical for Spray and Fumigation may please be arranged.
4. Bardana is our main factor of our loss in procurement.
5. The period of course was very short. Please give your attention to it. The period of course should be three weeks minimum.
6. The time of course is very short. It should be increased because it will be very useful for us.
7. Notes should be supplied in Urdu and English.
8. The time for this course is very short. It should be increased and practicals should be given more importance.
9. Equipment should be provided (for each center).
10. Duration of course should be increased. Dissecting microscopes should be made available to examine the insects. For identification, insects and diseased wheat samples are not available in sufficient quantity. Boarding and lodging arrangements should be made by the organizers of the course. Smoking should be allowed in the class rooms.
11. Video films and lectures should be in Urdu. Duration of course is very short. During the training more time should be spent on the practicals and a lot of field trips should be arranged. The practicals should also be done in the fields so to understand it more quickly.

5TH BATCH, LAHORE (February 18-23, Lahore)

1. I've gained much in 6 days training course. This is a very good institution for the government employees, particularly relating to Food & PASSCO agency. I'm very much impressed.

The lecturers deliver good lectures, specially Dr. Khushi Mohammad. Such course should continue so that the untrained employees may be in a position to avail this opportunity.

2. The course should be taught in an easy Urdu language. Information has been gained about the destruction of wheat.

This course should continue so that the trainees should gain more and more knowledge.

3. The training period is very short. It should be increased. Teachers have good style of teaching.

4. This short course is a good practice for the field staff. It must continue. I'm very much impressed by the lecture of Dr. Khushi Mohammad.

5. Insects and mouse found in the godowns must be made familiar to us along with the lecturers. Moreover the field practical should be of 2 days so that good knowledge could be gained practically.

6. The course and the field work should be in Urdu. Whatever we observe here should be found in fields too.

7. Over all, the short course is good for the knowledge.

8. Practicals should be given more importance. People who've been given this training should also be provided with work.

9. All the instructors are educated and have good knowledge about the course. The time period of this course should be of two weeks.

10. The course is going very well and all the instructors teach their subjects very well. There's nothing more to say.

11. Grain handling, storage and protection short course is very useful. It should continue forever.

12. During practicals insects may please be shown. Storage methods in advanced countries may be shown on video.

Trainees may also be asked to discuss any topic given by the tutor.

13. We've gained a lot of information about wheat through this course.

14. Overall this course has been very good. The teaching method of all the lecturers were very impressible. The insects which we are taught in this course should be shown to us during the practicals and also we should be informed their names, how it exists and how it works.
15. During the course we shouldn't be taught about the kinds of insects or mouse but the important thing that should be taught are the medicines which can be used to kill all these destructive insects and mouse.

The period should be of 15 days because in such a short time this course is incomplete.

6TH BATCH, LAHORE (February 25-March 2, 1989):

1. This course is very beneficial but there is one draw-back of it is that the trainees come from far away areas. It will be good if this course should take place in their own cities in divisional head quarters. Separate accommodation should be provided for each trainee.
2. The training period is very short and sometimes it is very difficult to understand the new technology during this short period.
3. The training period should be at least of one month. All the lecturers gave lectures in a very good way.
4. Accommodation and food should be provided to the trainees.
5. Course is good but the time is short.
6. Lodging may be provided at teaching centers.
7. The course should take place in the same regions where the trainees are living and one week training period is not enough.
8. Although the time was very short but the teachers were fully trained and they have done their best in such a short time. The time may be increased so that each trainee may go through this course well.
9. The duration of this course should be at least a fortnight. Hostel facilities should be arranged for the participants. The spectrum of the course should be increased for more knowledge.
10. Lecturers should be translated into Urdu. Four hours teaching is enough for each day.
11. Outsider (private sectore) must be accommodated.

12. The training period should be for 15 days so that slow and thorough study can be done. There should be hostel (lodging & boarding) arrangement.
13. The training period should continue for 2 months.
14. The training time should be more - at least for 1 month.
15. All required equipment used in practicals should be provided to the trainees. Some terms of entomology may be explained in easy English.
16. It's good that the trainees of Food/PASSCO are given mutual training. This link of two groups would be very useful for future.
17. There should be one lecture each day so that the lecture should be understood by the trainees well.

7TH BATCH, LAHORE (March 4-9, 1989):

1. This is a very good course and a must for the operating staff for the betterment of proper storage and minimizing the losses. The staff coming here for the training should be accommodated properly.
2. We come to know about the inspection of godowns, use of medicines and spray through this course. Moreover we've gained a lot of knowledge of how to save the stocks from insects and mouse.
3. Implementation in field operation. Residence should be provided to the trainees.
4. This course must be for 15 days.
5. This course should be adopted practically because until and unless it won't be adopted practically it won't be useful.
6. The course was very good but the time was too short and its literature was too lengthy. It would be better if the time should be increased and it should be adopted practically.
7. This course is very useful. All the trainees should be given proper accommodation and they should be paid T.A.D.A in advance.
8. It should continue. It's very helpful for all the field workers. This course has taught us how to save the grains and how to deal with insects and mouse.
9. It should continue. It is very helpful for the country and nation.

10. If this training is not implemented then it means that there is not value of this course.
11. All the necessary equipment should be supplied to the godowns after this course so that good results should come.
12. Efforts should be made to exercise the practice of this course.
13. This system is very good. Every year such kind of refresher course must be held but facilities should be provided to the trainees.
14. This course should be adopted practically so that good practice could be gained on it.

8TH BATCH, LAHORE (March 11-16, 1989):

1. This course should be taught by the Agricultural University Faisalabad. They teach in detail. This course is essential for new men who've been recently appointed.
2. A day should be given off for the preparation of the exam. Friday should be given off for the preparation of the exam and the exam should be taken on Saturday. The lecturers should teach only those subjects with whom they are familiar with. They should not teach those subjects with whom they are not familiar so much.
3. Overall the course is very good but we're not given proper facilities in fields. Our officers should pay attention to it. The chance should be given to the people of secretarial level to attend this course so that they can also understand the problems of the field.
4. The course is very good but the time is too short. More information should be given about fumigation.
5. As this course is for Post harvest losses and to preserve the wheat or grain. Most part of this course should be on insecticides and pesticides. Lecturers should be delivered frankly. Practical time should be enhanced.
6. The period of the course is insufficient. The lecturers should be send to abroad to gain more knowledge because it is beneficial for the trainees.
7. This course is very excellent. Our other colleagues should also be taught this and it should be continued.
8. Time for practicals is little. Ratio of advance countries may be shown. Teachers should try to improve themselves.

5. This course is very important for the further knowledge of of a person.
6. During lecture reading material and printed booklet must be given to the trainees.
7. Such a course should be started in all the organizations and its time should be increased.
8. This course is useful for the benefit of PASSCO and Food Department because all the trainees who have got training in it can work better in the fields with the latest methods as they have been introduced with all the new inventions.
9. Photocopies of this lecture are not provided to us.
10. Arrangement of entertainment should be provided to use during the course. It is the responsibility of USAID to provide proper accommodation to the trainees.
11. The temperament of all the lecturers were very good but we are greatly impressed by the teaching methods of Dr. Khushi Muhammad and Mr. Abd'ul Khaliq.
12. This course is excellent. The instructors have performed their duties very well. This course is very important for all the field staff to save the Government property. The course handout must be given to every trainee.
13. The trainees should be introduced to every member of the staff. All the course should be shown through video films.

SUKKUR, SIND

1ST BATCH, SUKKUR (January 28-February 5, 1989):

1. The experimental (laboratory) apparatus should be available in working condition. Mr. Sajjad scientific officer should be given more time to deliver lectures and conduct (demonstration) experiments regarding Fumigation, Insect identification and their control. Our instructors have been overall cooperative, taking keen interest in the USAID training programme. This training should continue in future and must be imparted to rest of the operation personnel.
2. Practical is must for the next course. Teachers are very excellent and they should try to understand the problems of incharges of the centre.
3. This course is very necessary in the departments. It should only be based on theory and it should be sent to all the procurement centers. Kindly arrange all the apparatus material in the centers. TA/DA should be paid.

4. Teachers should give more attention to the practicals along with the lectures.

2ND BATCH, SUKKUR (February 11-16, 1989):

1. This course on different topics was very interesting but the time was too short. This course should continue in future.
2. In this short course literature must be supplied to the trainees.
3. This course is almost good. However there is less field exercise which is very important for our procurement operation.
4. Literature must be provided so that it should become more useful and effective.
5. There is shortage of Field/Practical exercise which is important for our operation i.e purchase, stacking of stocks, fumigation, control of insects. Such necessity may be arranged.
6. Lectures were very good, including the topics of Harvest-losses, Insects and Pest control.
7. I recommend that there is no need for any other short course.

3RD BATCH, SUKKUR (February 18-23, 1989):

1. The course was good but I have not gained the knowledge properly of fumigation, storage and stacking. Improve the course because it is very important for the basic incharge of godown and purchase centre. TA/DA should be allowed to all the staff.
2. This course is very necessary for each employee. This training should take place every year for 15 days with sanctioned TA/DA. Instruments may be provided to each centre and godown. Godowns are not completely constructed in various provinces. Godowns may be constructed and three persons without incharge may be posted at various godowns.
3. I am satisfied with the lectures of the teachers.
4. This course is very necessary every year. It should be of 10 days. This training period because our country is in great need of it.
5. During this training we were taught very well. This course is very good for us. Everybody should be allowed to take this training.

9. The course was nice but the time was little. Time should be increased so that it should be understood well.
10. This course is very important for the field staff. Everybody must attend the course.
11. All the equipment used during this course should be provided to all the centers.
12. The course was very good. We've learnt a lot of knowledge from the teachers.
13. This course should continue so that we should keep increasing our knowledge.
14. The course is very useful because we're taught how to save the wheat. Dr. Khushi Mohammad, Mr. Shamsheer and Mr. Zia Malik has taught very well.
15. The course is good but all the teachers should take great interest in teaching it. The important thing is that after teaching this course all the things mentioned in it should be provided to us.
16. This course is very useful for the Pakistanis because in most places of Pakistan wheat is destroyed. In this course we're taught how to save it with different methods. For this reason the course should be given regularly to us and to our other colleagues so that wheat should be saved from destruction.

9TH BATCH, LAHORE (March 18-22, 1989):

1. All the teachers have taught us with great interest. But there is one great problem of accommodation. It should be arranged properly.
2. This course which has been recently started is very important. It should continue. Teachers are teaching with great efforts. The disadvantage in it is that all the trainees should be given proper accommodation with food. Their TADA should be paid on time and all the literature of the course should be provided along with the course.
3. All the photo copies of this course should be given to us. This course should be published in the shape of a book and these books should be sold to all the centers so that all those people who are not able to attend this course due to the shortage of time can gain knowledge through that book.
4. The course is very good as we come to know the latest methods of storage through this course.

6. This course should be of one week but it should take place at the end of the year too. All those insects and medicines (pesticides) which are mentioned during this course should be shown practically.
7. This course is very good. This course should be given to each inspector of the department. The time of the training is very short. It should be for 2 months at the end of the year. It should take place in the district otherwise TA/DA should be given.
8. This course is very good. It should continue and it's time should be increased.
9. This course is very important for each employee of Food and PASSCO department. This course should be at least of 15 days so that all the employees can get benefit out of it.
10. This course is very important. It should continue and the time period of it should be increased every year so that the staff should continually receive new information about it.
11. This course should be for two months at the end of the year. Training should take place in every district otherwise TA/DA should be paid.
12. We are satisfied with the technique of how to keep the wheat clean. The course is very good.

NOTE: Evaluations for batches 4-7 have not be received from Sukkur.

UAA/LAHORE 4-19, 1989

STORAGE TECHNOLOGY DEVELOPMENT AND TRANSFER
POSTHARVEST MANAGEMENT
FOOD SECURITY MANAGEMENT PROJECT

SEMINAR - WORKSHOP
STDT TRAINING CENTER, LAHORE
JANUARY 16-17, 1989

SCHEDULE OF ACTIVITIES

JANUARY 16 -
PM

1:00 - 1:30

REGISTRATION OF PARTICIPANTS

1:30 - 2:00

WELCOME REMARKS - - - - - DR. RICHARD C. MAXON
CHIEF-OF-PARTY, STDT/FSM

2:00 - 3:30

REPORTS ON:

STDT ACTIVITIES AND PROJECTS - - DR. RICHARD C. MAXON
PROGRESS OF TRAINING PROGRAM - - DR. ULYSSES A. ACASIO
TRAINING ADVISOR, STDT/FSM
1988 WHEAT QUALITY SURVEY - - - - DR. HAFIZ AHMED
AND ON-GOING RESEARCH DIRECTOR, PMRI/PARC

3:30 - 4:30

DISCUSSIONS ON THE REPORTS:

PRESIDING OFFICER: - - - - - MR. GULZAR OAZI
COORDINATOR, FCU/FSM
RAPPORTEUR - - - - - MR. SAJJAD AHMED
SCIENTIFIC OFFICER, PMRI

JANUARY 17 -
AM

8:30-9:00

FORMATION OF WORKING GROUPS:

- POLICY MATTERS - - - - - DR. R. C. MAXON, Leader
- RESEARCH ACTIVITIES - - - - - MR. MUBARIK AHMED, Leader
- TRAINING PROGRAM - - - - - DR. U. A. ACASIO, Leader

9:00-10:30

WORKING GROUP SESSION:

11:00-12:00

REPORT OF WORKING GROUPS

12:00-1:00 PM

CONCLUSION OF SEMINAR/WORKSHOP

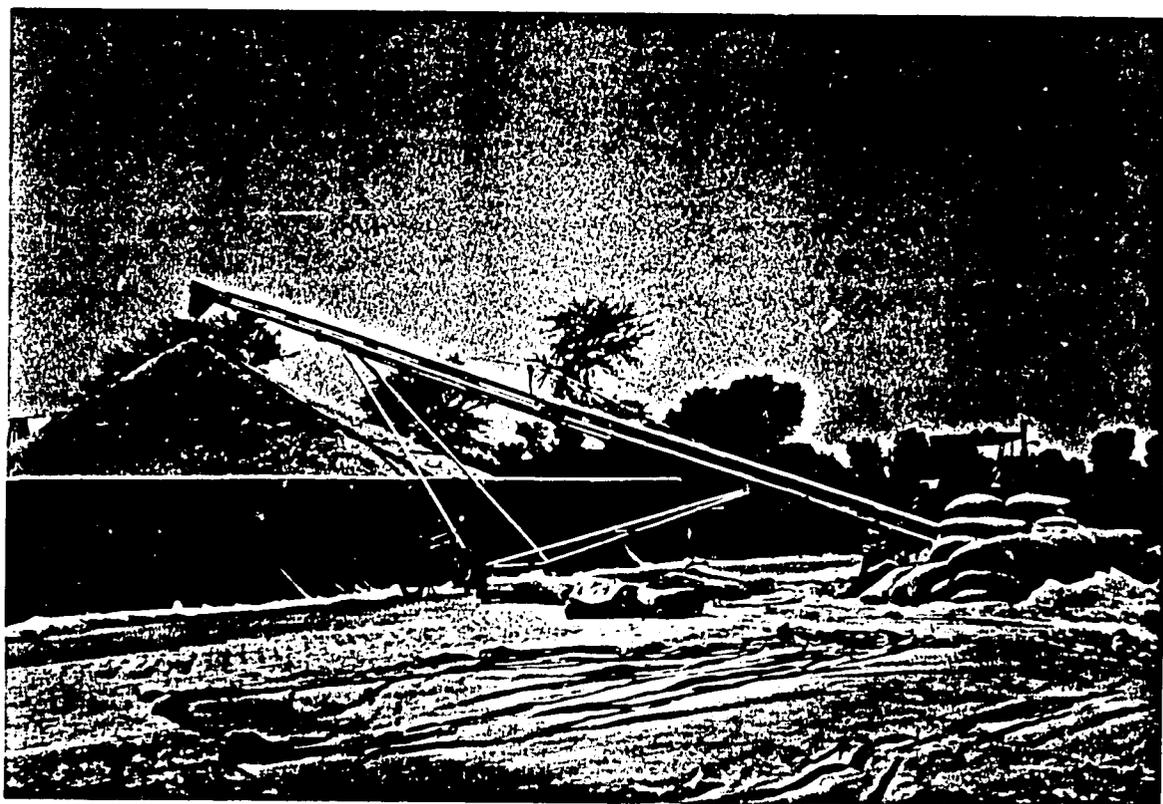
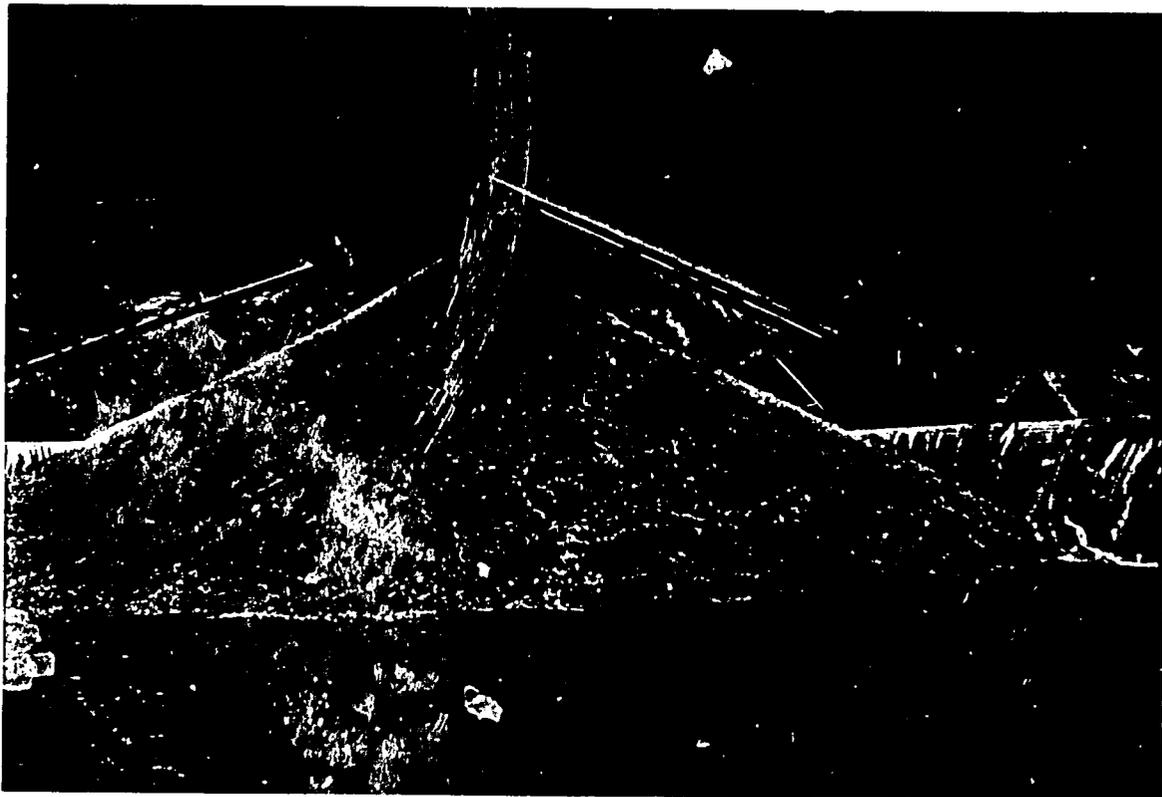
DR. RICHARD C. MAXON

1:00

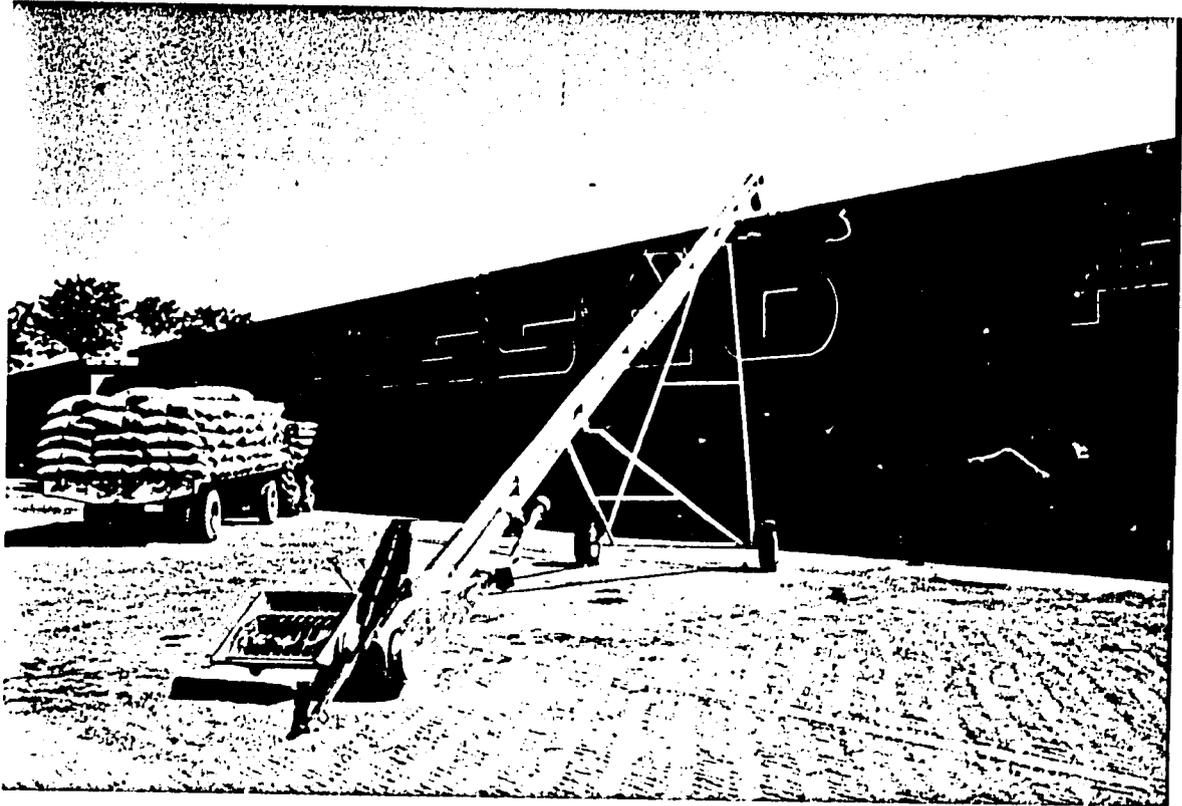
LUNCH

PRESIDING OFFICER

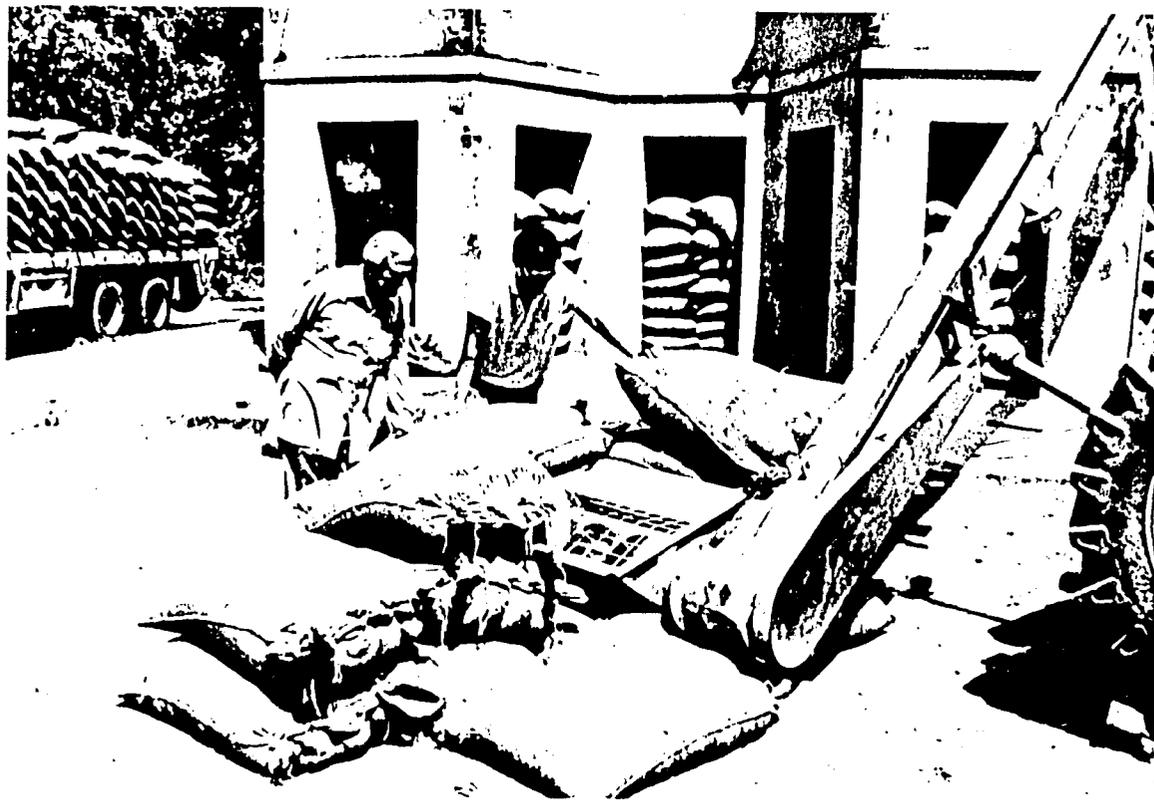
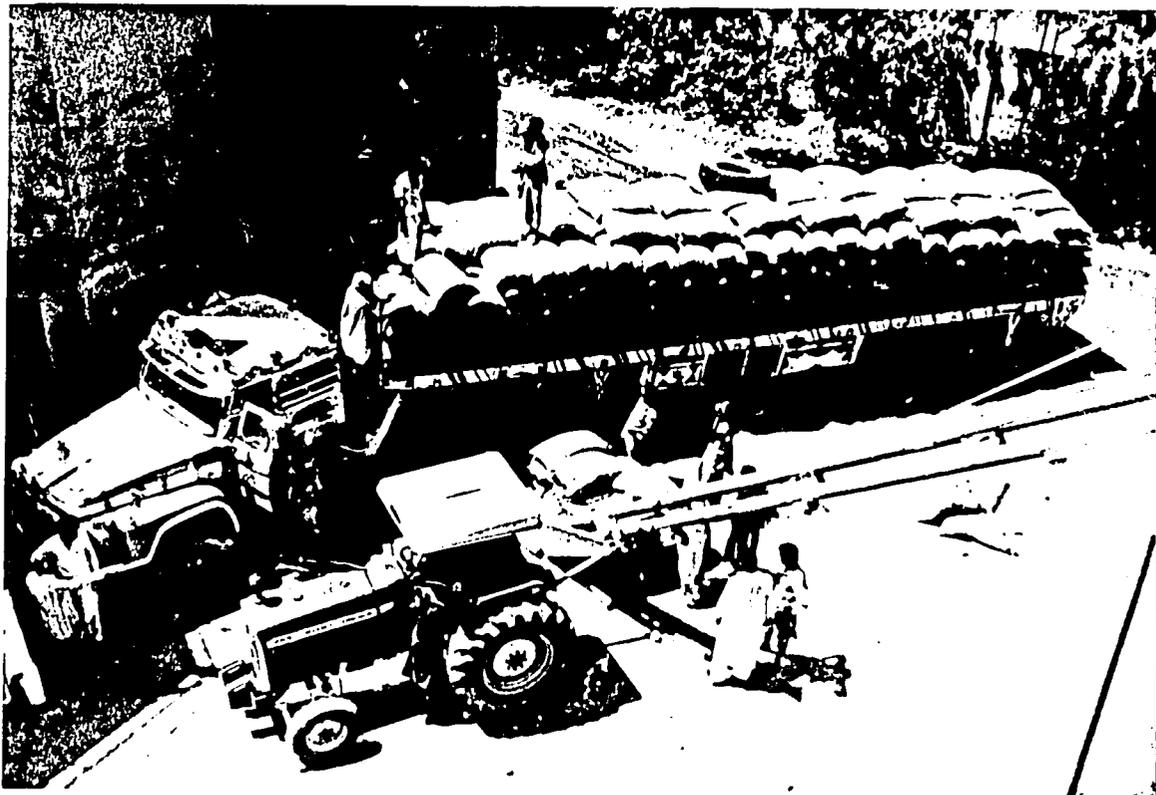
APPENDIX IV
USING PORTABLE BULK GRAIN HANDLING EQUIPMENT



FILLING OPEN BULKHEAD AT DEPALPUR



PREPARATION FOR FILLING BAG/BULK GODOWN AT MANGA HANDE



PREPARATION FOR FILLING HEX BINS AT BADEMI BAGH



**LOADING OF HEX BINS AT BADEMI BAGH
36 to 38 MT CAN BE LOADED IN APPROXIMATELY 40 MINUTES**

APPENDIX V

SUMMARY OF STDT PROJECT TRAINING ACTIVITIES TO DATE

Invitational Study Tours

Postharvest Technology in Agriculture

Umar Khan Baloch, PARC

Bulk Grain Handling and Storage Facilities Management

Mohammad Tariq Janjuah, MINFA

Muhammid Rashid Sheikh, MINFA

S. Anwar Haider, Sind Food Department

Shaukat Gul, NWFP Food Department

Muhammad Taj, PASSCO

Haji Muhammad Kahn, PASSCO

Naiz Mohammad Khan, Baluchistan Food Department

Zia Ul Huq, Punjab Food Department

M. Gulzar Qazi, USAID

Muhammad Akram, PASSCO

Muhammad Bashir Ahmad, Ministry of Finance

Anwar Malik, MINFA

Salahuddin Soliman, MINFA

C. Shah Muhammad, PASSCO

Muhammad Ayub Shah, MINFA

Yousaf Pathan, Baluchistan Food Department

Shoukat Ali Chaughtai, USAID

Thomas Olson, USAID

Postharvest Literature Documentation

Shaheen Majid, NARC Library

Postharvest Research Procedures

Ahmed Mubarik, PMRI

Total of 21 individuals

External Short Courses

Grain Storage and Marketing Short Course, Kansas State University

1987

M. Rafiq Khan, University of Agriculture, Faisalabad

Maken Sikander Hayat, MINFA

Mukhtar Ali Baig, PASSCO

Abdul Latif Dasti, Punjab Food Department

Sohrab Khan Kalwar, Sind Food Department

1988

Ghulam Rasul, Ayub Agricultural Research Institute, Faisalabad

Irshad Ahmed Junejo, Sind Food Department

Ghulam Ally Memon, Sind Food Department

1989

Iqbal Ahmed Baluch, private farmer

Nasrullah Khan Malik, MINFA

Abdul Hameed Chaudhry, Punjab Seed Corporation

Shahabuddin, MINFA

Total of 12 individuals

External Conferences

Sirajuddin Ahmend, MINFA - 10th ASEAN Seminar on Grain Postharvest Technology
Hafiz Ahmed, PMRI - 11th ASEAN Conference on Postharvest Technology

Total of 2 individuals

Academic Training

N. Ullah, PMRI, PH.D. Grain Science
Faqir Mohammad Anjum, Ayub Research Institute, Ph.D. Grain Science
Abdul Hamid, Punjab Agricultural Department, M.S. Agricultural Engineering

Total of 3 individuals

In-country Short Courses

Statistical Analysis for Microcomputer Course - ADC/FSM

Jamshed Khan, PMRI
Aklaq Ahmed, PMRI

STDT Lahore Training Center - Master Trainers Course

Nazar Muhammad Khan, Baluchistan Food Department
Akhtar Muhammad Khan, Baluchistan Food Department
Muhammad Paryal Channa, PASSCO
Abdul Latif Menon, Sind Food Department
Haibat Khan Rind, Sind Food Department
Kiushi Muhammad, PASSCO
Shamsher Haider Khan, PASSCO
Abdul Khaliq, PASSCO
Mohammad Ibrahim Dasti, Punjab Food Department
Zia Ahmed Malik, Punjab Food Department
Riaz-ul-Haq Chaudhry, Bahawalpur, Punjab
Rana Abbas Ahmed, Lahore, Pakistan

STDT Lahore Training Center - PASSCO and PFD Operational Personnel

PASSCO - 205 operational personnel
Punjab and Sind Food Departments - 132 operational personnel

Total of 351 individuals

Total of individuals in training programs to date - 390