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DEVELOPMENT ACTIVITIES IN THE
POSTHARVEST WHEAT SECTOR
OF PAKISTAN



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DEVELOPMENT ACTIVITIES IN THE POSTHARVEST
WHEAT SECTOR OF PAKISTAN

by

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PREFACE

The purpose of this document is to provide a general description of development activities. Many international finance institutions and donor agencies are active in the postharvest wheat economy of Pakistan. Proposals, studies, and actions taken are described in Section I. Section II contains a listing of publications which are relevant to the development of the postharvest wheat sector in Pakistan. This document will be updated periodically as required by the availability of new information.

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SECTION I

DEVELOPMENT ACTIONS

The following is a description of development activities undertaken in support of the wheat postharvest sector in Pakistan.

National Logistical Studies

Prior to 1981, three major studies of procurement, handling, and storage were conducted. The first was an economic and engineering study by R.G. Watson Engineers Inc. (1970), which set forth plans and recommendations for improvements in food grain handling and storage facilities. Next, a study by MICAS Associates Ltd, Karachi, Pakistan (1976), described problems in the wheat postharvest sector. Finally, a master plan for food grain handling and storage was developed by Carr, Donald, and Associates (1980). These studies are referenced in Section II.

World Bank

The World Bank funded a wheat storage project in 1983. The project included the construction of bagged-grain storage warehouses, provision of equipment, training activities, and special studies. The project was completed in 1990.

Bagged-grain storage warehouses. Construction under the project included bagged-grain storage warehouses for both rice and wheat. Forty-thousand tons of warehouse capacity was provided for the Rice Export Corporation of Pakistan (RECP). Five-hundred thousand five-hundred (500,500) tons of warehouse capacity at 123 locations was provided for provincial food departments (PFDs) and the Pakistan Agricultural Storage and Services Corporation (PASSCO). Warehouse construction was completed in 1986. These warehouses were augmented with an additional 150,000 tons of open bulkhead storage.

Equipment. Equipment provided under the project included:

- Mechanized handling equipment
- 34 weigh bridges
- 201 sets of grading and testing equipment
- 30 open bulkheads in 26 locations
- 10 15-ton dump bed trucks
- 10 front end industrial loaders
- 20 grain pumps

Training. In November/December 1983, the Food and Feed Grains Institute (FFGI) conducted a 3-week short course in grain storage management at Kansas State University (KSU) for 11 personnel from the Ministry of Food, Agriculture, and Cooperatives (MINFA), PFDs, and PASSCO.

In July 1986, the Pakistan Agricultural Research Council (PARC), with the help of two consultants from the Overseas Development Research Institute (ONDRI), conducted two workshops. Thirteen scientists were trained as trainers to form

the nucleus of a training unit. During 1986 through 1989, PARC carried out 35 1-week training courses for 584 provincial food department personnel.

Mechanized grain handling. As part of the pilot bulk handling component of the storage project, PASSCO installed mechanical grain handling equipment at Kanewal, Punjab. Experiments were conducted with four different mechanical methods for loading hexbins. The four different methods were (1) a bucket elevator for lifting and augers for filling, (2) bucket elevators for lifting and hand-driven trolleys for filling, (3) a blower for lifting and augers for filling, and (4) a blower for lifting and filling. Records were kept for each of the methods to evaluate costs and savings.

Studies. Under the auspices of this project, a series of studies was conducted. These are:

- Food Grain Storage and Processing Study
- Grain Quality, Grain Testing, and Quality Control Study
- Food Grain Transport, Economics, and Logistics
- Losses in Public Sector Storage in Pakistan

These studies are referenced in Section II.

Danish International Development Agency

In 1985, the Danish International Development Agency (DANIDA) proposed a bulk wheat handling and storage pilot project to be implemented and operated by PASSCO. This project included the following:

- 13 modified godowns of 1,750 mt capacity each (22,750 mt)
- Four new godowns of 5,200 mt capacity each (20,800 mt)
- 13 bulkheads of 2,300 mt capacity each (29,900 mt)
- Two shipment silos of 1,500 mt capacity each (3,000 mt)
- One cleaning station of 60 mt/hr capacity
- Two weight bridges
- Computerized record system

This pilot project was not implemented.

Asian Development Bank

In 1983, ADB proposed a wheat storage project. This project included:

- 228 house-type godowns with a total storage capacity of 250,880 mt
- Three bulk storage silo complexes with a storage capacity of 50,000 mt each
- Establishment of a Federal wheat quality testing and inspection laboratory at Karachi
- 12 person-months of technical assistance
- 21 person-months of overseas training

This project was never implemented.

In 1987-88, the ADB proposed another wheat storage project. This project was to include:

- 364 house-type godowns with a total storage capacity of 400,400 mt. Two-hundred fifty-five of these godowns will be constructed to be convertible for the bulk storage of wheat.
- Warehouse and office equipment for the storage units
- Pilot project to assess mechanization requirements for bulk handling to be composed of three completely mechanized convertible house-type godowns for handling bulk grain
- Institutional support for the MINFA storage cell
- 48 person-month of technical assistance
- 24 person-months of overseas training

As of March 1991, the Government of Pakistan (GOP) had approved the implementation of this project. A loan agreement has yet to be finalized.

National Logistics Cell

The National Logistics Cell constructed the following wheat storage facilities:

- 50,000 mt silo, Khairpur, 1984
- 60,000 mt silo, Quetta, 1986
- 50,000 mt silo, Faisalabad under construction equipment to be installed in 1990
- 50,000 mt silo, Chichawatni, 1984
- 50,000 mt silo, Karachi, work suspended
- Unknown mt binishell storage complex, Karachi

Food And Agriculture Organization

In 1982, the Food and Agriculture Organization (FAO) of the United Nations conducted a project identification mission. This mission recommended five projects:

- Construction of 350,000 mt of storage capacity for food security reserves at four locations
- Assessment of requirements for rehabilitation of existing godowns
- Workshop on warehouse management
- Development of an early warning system
- Training in international grain trading

No activity can be identified as a direct result of this project identification study.

In 1983, FAO funded a study of losses at the farm level under the auspices of PARC.

United States Agency for International Development (USAID)

In 1984, the USAID Mission to Pakistan developed the Food Security Management (FSM) Project. The FSM project was implemented in 1985. The project was

designed to achieve the food security objectives of GOP in a manner consistent with the rational and efficient use of national resources.

The project has five components:

- Economic and Policy Analysis
- Agricultural Data Collection
- Storage Technology Development and Transfer
- Vertebrate Pest Management
- Storage Rehabilitation

Economic and policy analysis. The economic and policy analysis component consisted of:

- The establishment of an Economic Analysis Network (EAN) to coordinate and implement an increased quantity of policy-relevant analysis by Pakistani institutions and the development of these institutions' capabilities for analysis, research, and training. The EAN produced seven studies relevant to the Pakistani postharvest wheat sector. These are listed in Section II.
- A special studies program to address key issues in the food security area. This program was conducted by the International Food Policy Research Institute (IFPRI). The special studies program published 17 documents relevant to the Pakistani postharvest wheat sector. These are listed in Section II.

Agricultural data collection. The agricultural data collection component (ADC) is to improve the agricultural data collection system through introduction of a more accurate and efficient methodology.

In early 1990, ADC had installed area frame sampling technology in seven districts. This is scheduled to expand to a national system by 1994.

Quarterly data collection surveys have been conducted since 1987 with the Federal Bureau of Statistics and the Provincial Agricultural Departments. These surveys collect information on acreage planted for major crops, including wheat. Objective yield techniques (crop cutting) has been introduced for wheat, rice, maize, cotton, and sugar cane.

Extensive training programs have been held for federal and provincial personnel on data collection, survey design and management, data processing, and use of microcomputers throughout the life of the project.

Storage Technology Development and Transfer (STDT). The purposes of the STDT program were (1) to strengthen the capabilities of PARC and cooperating 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.

The technical research in wheat storage has been conducted in collaboration with the Pest Management Research Institute (PMRI), Karachi. PMRI has assigned two full-time research personnel to the Lahore Training Center (LTC). LTC is equipped with a laboratory where grain samples are analyzed. PMRI personnel lead in developing the stored wheat research programs, and are responsible for the necessary field work. STDT has supplied a research bio-statistician to PMRI, Karachi for data analysis.

Grain storage research

- Pesticide residues in grain and grain products
- Monitoring for insect resistance to pesticides
- Development of integrated pest management protocols
- Sampling of grain quality in open bulkhead, bulk/bag storage, and hexagonal bins
- Wheat quality surveys at farm, middlemen, and procurement centers
- Storage loss assessment in bulk storage

Collaborative research other than PMRI

- Producer knowledge of wheat marketing, International Food Policy Research Institute (IFPRI)
- Grain fumigation (ODNRI)
- Economics of bulk and bagged handling and storage (ODNRI)
- Flour Mill survey for impact of derationing (EAN)

Bulk wheat handling and storage research

- Review of feasibility of Bulk Wheat Handling and Storage in Pakistan, Consultants Report (listed in Section III)
- Bulk Wheat Handling and Storage Pilot Project in Pakistan Report (listed in Section III)
- Analysis of procurement and storage management procedures. Findings presented in Impact of Fair Average Quality Procurement Procedures and No Loss Policy on Public Sector Storage of Wheat Reports (listed in Section III.)
- Bulk wheat handling and storage research program. The objectives of this research were (1) to establish a small-scale bulk system from producer to flour mill that is cost effective and replicable, and (2) to develop a strategy for replication of the bulk handling system. This program made maximum possible use of existing and planned bulk handling equipment and facilities.
- Specification of equipment
- Assembly and installation of bulk handling equipment, consisting of three 65' grain pumps, nine 51' grain pumps, one car unloader, two portable truck scales, one 80' Mass-ter Mover, one 65' Mass-ter

Mover, three swing-away hoppers, six portable bulk scales, five portable generators, one grain slinger, four roto-cleaners, two gravity flow cleaners, two storage unloaders, eight gravity beds trailers, six portable augers, eight distributing augers, unloading spouts, two single axle grain hopper trailers, two dual axle grain hopper trailers, four 75 hp tractors, three vehicles, maintenance tools, and locally fabricated items.

- Training of PASSCO staff in equipment operation and maintenance

Training

- Invitational study tours
- Academic training
- External seminars and short courses
- External conferences
- LTC development
- Master Trainers
- Training of operational personnel for PASSCO, PFDs, and the private sector
- Development and publication of three training manuals (listed in Section II)
- National Seminar and Workshop on Wheat Procurement and Storage Policies
- Flour milling seminars
- Equipment field days and demonstration

To date, a total of 1,325 Pakistani nationals have been through training courses.

Bulk storage conversion program

Technical assistance was given to assist in the renovation/conversion of selected sites for the bulk storage of wheat. The objectives were (1) to assist in needed design, specifications, installation, and testing of the renovation/conversion activities undertaken by PASSCO, (2) to assess and evaluate the results of renovation/conversion actions, (3) to provide required and relevant training, and (4) to coordinate this program with the bulk wheat handling and storage research program.

- Assistance in design and specification of equipment, Multan silo (60,000 mt), Chichawatni silo (50,000 mt), seven hexagonal bin sites (40,000 mt)
- Design and provision of components for mechanization of a 1,100 mt PASSCO godown with a grain loop pump system and gravity cleaner.
- Recommendations for rehabilitation of the Quetta silo
- Assistance in design and specification of equipment, 4,000 mt godown to accommodate bulk handling of the storage of wheat (Private Sector Flour Mill)

- Technical and economic analysis assistance for receiving and storage complex at Port Qasim, Karachi.

Other activities

- Assistance to World Bank Transportation Project preparation
- Technical advice to PASSCO and the private sector on rice drying and storage
- Assistance to Australian Wheat Sector Development Mission
- Assistance to ADB storage loan appraisal team
- Assistance to storage rehabilitation program teams

Storage rehabilitation program. The purpose of the storage rehabilitation program was to rehabilitate and recondition 750,000 mt of bagged-grain storage capacity owned by the public sector.

- Recurrent cost analysis and management audit resulting in Godown Rehabilitation Recurrent Cost Analysis and Management Audit of Public Sector Grain Storage Report (listed in Section III)
- Rehabilitation of 334,500 mt of bagged-grain storage capacity under supervision of the PASSCO Engineering Department.

Vertebrate pest control program. The purpose of the vertebrate pest control program was to initiate additional applied research in the control of birds and rodents in stored grains. The results of this program as applicable to the Pakistani postharvest wheat sector were published in eight reports and one manual. These are listed in Section II. The program has published 21 technical reports, six informational brochures, and training manuals in English and Urdu, a handbook, two video cassettes, slide sets, and poster sets.

The program has contributed materials to and assisted STDT LTC in training programs for Master Trainers and operating personnel.

Overseas Development of Natural Resources Institute

ODNRI has initiated a research project aimed at strengthening the research capacity of PARC in the fumigation technology of stored grains.

- Fumigation of rice at the RECP Bin Qasim complex near Karachi
- Fumigation of wheat at the PASSCO Manga Mindi complex near Lahore
- Fumigation of wheat at the PFD storage complex in Rawalpindi, Peshawar, and Quetta
- Testing godowns of various types of construction for suitability for whole godown fumigation in 1987 and 1989

Three publications detailing this work are listed in Section III.

World Bank Transportation Project

The World Bank is developing a transportation project aimed at increasing the capability of Pakistan's transportation sector. A component of the project which deals with improving the Pakistan rail system operations and encouraging the handling and transit of bulk commodities has a direct application to the postharvest wheat sector.

Australian Overseas Development Fund

- Introduced open bulkheads to PASSCO in 1984 with study tours and donation of materials and equipment at Okara
- Project identification mission in November 1989 to discuss additional bulkhead storage with PASSCO and look at port grain handling facilities. No actions or proposal to date. Mission to return in mid-1990.

SECTION II

PUBLICATIONS

Feasibility studies, project preparation reports, research reports, and training manuals which deal with the postharvest sector in Pakistan are listed in the following subsections.

Feasibility and Project Preparation

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Research

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