

PN HBS - 546 15.7 90/25

ANNUAL PROGRESS REPORT

January 1989 - January 1990

M. A. CHOUDHARY
Consultant MART/WINROCK/USAID

February 1990

PN-HBS-846
ISSN 90728

ANNUAL PROGRESS REPORT

January 1989 - January 1990

M. A. CHOUDHARY
Consultant MART/WINROCK/USAID

February 1990

PREFACE

This brief report summarizes the progress achieved during first one year of my assignment at the Farm Machinery Institute, Pakistan Agricultural Research Council between January 1989 and January 1990. The readers are reminded to note, however, that the assignment year has not been a normal working year for me because of difficulties associated with my appointment and undertaking my duties.

For the matter of record I may mention that for the first six months I was neither allowed to take charge of position of Director, Farm Machinery Institute (FMI) as appointed, nor I was provided with any technical or support facilities to undertake professional work. For the second half of the year I have had limited opportunity to do work as the leadership crisis continued at FMI despite some cosmetic action by the PARC authorities.

These difficulties have remained despite many reminders to the authorities.

MAJOR ACTIVITIES AND ACHIEVEMENTS

1. REORGANIZATION OF R&D AT FARM MACHINERY INSTITUTE

Traditionally, the agricultural machinery R & D activities have been divided into groups such as testing, research, design and mechanisation. Such a division is considered outdated, therefore a discipline-based classification has been instituted under this setup the R & D programme at FMI has been re-arranged into the following five major sections. These are:

1. Tillage and Seeding
2. Harvesting and Threshing
3. New Technologies
4. Testing and Instrumentation
5. Industrial Extension.

These sections have been designed so that expertise can be developed in specialized areas and professional and financial resources can be allocated on priority projects. In each case a Senior Engineer is heading these sections. Major R & D projects which have been taken in hand and/or in which I have provided leadership in various sections are as follows.

2. TILLAGE AND SEEDING

Lack of appropriate seedbed for crop establishment is one of the major constraints for obtaining optimum plant population and crop yields. Traditional tine cultivator is not appropriate for preparation of seedbed for optimum crop establishment particularly following crops such as rice, sugarcane or cotton.

Selected projects have been started to determine the effects of tillage intensity on crop establishment and yield in the rainfed area. Three cultivation techniques including mouldboard ploughing, zero-tillage and conventional tillage are being compared to sow wheat in rotation with selected summer crops in a long-term trial at NARC. Initial crop establishment results with zero-tillage are indeed encouraging.

Experiments for wheat establishment into previously untilled rice fields with the zero-tillage seed drill are also continuing under the wheat programme of PARC. It is planned that such experiments be expanded to other major cropping systems in Pakistan with a view to develop soil management and crop establishment technology packages.

Major emphasis during last year has been on the local production and popularization of the seed drill, originally developed in New Zealand. The drill, a specialized drill suited for sowing seeds into untilled soils, is now being produced by a company (Descon Ltd) in Lahore with financial assistance from MART Project, and technical assistance from the Farm Machinery Institute. About two dozen drills have been manufactured and distributed to selected Agricultural Research Centres throughout Pakistan for further field demonstrations and popularization particularly in the rice-wheat area. To date the drill has shown superiority in terms of crop establishment and yield compared with traditional method of sowing by broadcast.

3. HARVESTING AND THRESHING

This is one of the major area of R & D activity at FMI for some years. The institute has already in the past designed a tractor-mounted reaper windrower for harvesting wheat and rice. This machine has become quite popular among farmers and over twenty manufacturers in Pakistan are producing this machine.

Whole Crop Harvester

The whole crop harvester, a tractor-mounted combine with facility to chop wheat straw into bhoosa, is being developed at FMI in association with the AFRC, UK. Over the last twelve months the machine has been further developed to a pre-production prototype and has been field evaluated. It is expected that after the 1990 wheat harvest season, the machine will be finalized for commercial production.

The threshing part (raspbar type) of the whole-crop harvester has also been tested for threshing crops such as chickpea, soybean, sunflower, rapeseed and peanut with encouraging results to date. Further tests and evaluation of the machine will continue during 1990.

Rapeseed harvesting.

A major contract was signed with the BARD project at NARC. The project entails for the FMI to assist in the development of appropriate field machinery for rapeseed harvesting and threshing during 1990. A team of five engineers and technicians have been assigned to complete this project.

Peanut harvesting.

A major exercise was undertaken to popularize the FMI-developed peanut (groundnut) digger and the thresher for its popularization in Punjab, Sind and Baluchistan provinces during the 1989 peanut harvesting (November/December) season. Some machines were sold to farmers as a result of this popularization effort.

Mechanization of Oilseed production.

This is another major project which has been signed (end of 1989) with the Non-conventional Oilseed Programme at NARC. The machinery part of this project spread over three years includes the development of seeding, weed control, threshing, grain drying and grain cleaning machinery of major oilseed crops e.g. sunflower, soybean and rapeseed. The project has been started as of December 1989. A multi disciplinary team of five engineers have been assigned to undertake this project.

4. NEW TECHNOLOGIES.

This group which has been newly formed at the FMI is to concentrate its efforts into agricultural mechanization areas which are not part of mainstream research and development at FMI. These include areas such as dairy engineering, horticultural engineering and post-harvest technology.

At present three projects are in hand:

1. Development of mobile milking machine suitable for buffalo milking. For this purpose an imported machine has been adopted and being commercialized.
2. An on-floor grain dryer-cum-storage system which uses ambient air as main source of energy, is planned to be developed. This concept allows for continuous grain drying at slow rate in stored condition using ambient air energy. Such dryers are in common use in many countries overseas.
3. Preliminary studies are in hand to evaluate the status of fruit and vegetable handling, grading and packaging in Pakistan. To date no major agricultural mechanization efforts have been undertaken in this important field. Further R&D in this area will be undertaken during 1990 and beyond.

4. Cloud seeding machine for artificial rain. A special project has been undertaken jointly with the Remote Sensing Unit at NARC, to develop a machine to be mounted in the aeroplane (C-130 herculice) for dispensing dry ice (CO²) onto clouds for inducing rain. The machine is now ready for tests in cooperation with the Pakistan Air Force.

5. INDUSTRIAL EXTENSION

Industrial extension of locally developed machinery is considered to be major part of the indigenisation of local manufacture. The purpose of such a programme is not only to enhance the capabilities of local manufacturers but also to provide technical assistance to agric. machinery industries both in the public and private sectors in devising longer term policies and strategies in relation to supply of raw material, marketing and in the resource management.

Over the later part of 1989, a number of major studies have been launched. Some of these are as follows:

1. Current policies and strategies of agricultural mechanization in Pakistan. This study has been completed as of Nov. 1989.
2. Demand surveys of agricultural machinery (in progress).
3. Compilation of catalogues of successful machineries in Pakistan (in progress).
4. Development of database for raw material requirement for the agricultural machinery manufacturing industry in Pakistan (in progress).
5. Bench mark studies of pilot areas where selected machineries are to be introduced (in progress).
6. Mechanization impact studies of introduced machinery in selected areas (to be undertaken shortly).

FUNDING FOR RESEARCH.

Research funding has been on a decreasing side over recent years. During 1989/90 budget year, total allocations for the Farm Machinery Institute was Rs. 3.10 millions of which over 80% was earmarked for salaries and benefits. This did not leave much funds for research

and development activities.

Therefore, efforts were made to obtain outside funding for FMI's R&D activities. In this respect following contract were negotiated both within PARC as well as with outside agencies.

1. Development of harvesting and threshing machinery for rapeseed.

The Barani Agricultural Research and Development (BARD) programme, a Canadian-funded projects has subcontracted FMI to develop the rapeseed harvesting and threshing mechanization package during 1990.

| | |
|------------------------------------|------------|
| Contract value: Operational funds: | Rs.73,380 |
| Machinery purchase: | Rs.529,000 |
| Total: | Rs.602,380 |

2. Oilseed production mechanization.

This project has been on the anvil for some time waiting for funds from the World Bank. These funds came through in December 1989. In this project the Non-Conventional Oilseeds Programme at NARC has subcontracted FMI to design and develop machinery for planting, weed control, harvesting, grain cleaning and drying of sunflower, soybean and safflower.

Contract value: Rs.1.85 million (over three years).

3. Development of cloud seeding machine for artificial rain.

This project was undertaken in association with the Remote Sensing Unit of NARC. This machine has been designed and successfully operated. Comprehensive studies on cloud seeding is to be undertaken shortly in association with the Pakistan Air Force.

Contract value: Rs. 100,000

(It is anticipated that actual developmental costs will be less than half the contract value).

4. Development of crop establishment technology based on minimum tillage in rainfed area.

The USAID funded MART Project has kindly agreed to provide financial support to this project. The machinery testing and operational fund allocation is as follows.

Contract value : Rs.27,000

5. Database development for raw material requirement of agricultural machinery manufacturing industry in Pakistan.

This important project is being undertaken with the strategic view to help setup guidelines for the establishment of Raw Materials Bank in Pakistan.

The United Nations Industrial Development Organization (UNIDO) has indicated it's willingness to financially support this project.

Contract value: Rs. 42,000

6. Miscellaneous Projects.

The PARC has kindly agreed to allocate additional funds for selected priority projects. These project were although already underway but needed additional operational funding to continue progress.

Funding value: Rs. 201,000.

VISITS.

During the year, a number of important visits were undertaken both within the country as well as overseas. Most visits were routine but selected ones are as below:

1. Visits to agricultural education and research institutions, machinery manufacturers and selected farmers. This rather extended visit was undertaken to assess the status of education, manufacturing and related aspects (Twelve days during June/July 1989).

2. Visit to the Islamic Republic of Iran.

This one-month long visit during October/November was undertaken under the sponsorship of Regional Network of Agricultural Machinery (RNAM) to assess the need for mechanization of dryland agriculture in Iran.

3. Visit to Nepal.

As representative of Pakistan (participating country) in the RNAM, I attended the Technical Advisory Committee, General Body and Tri-partite Review meeting of RNAM in Kathmandu, Nepal, 10-19 December, 1989.