*Study No.85*

# ASSESSING THE EXISTING TRAINING AND TESTING FACILITIES FOR FARM MACHINERY IN MADHYA PRADESH

SITA RAM

**AGRO-ECONOMIC RESEARCH CENTRE**
**FOR MADHYA PRADESH & CHHATTISGARH**
**JNKVV, JABALPUR 482004**
**August, 2001**

# PROJECT TEAM

## DRAFTING

SITA RAM

## COMPUTATION

J.R. SHINDE

S.J. SINGH

S.C. JAIN

SHRIKANT UPADHYE

CHANDRAKANT MISHRA

## TYPING

S.K. SHARMA

## COMPUTER TYPING

SIKANDAR KHAN

# PREFACE

At the instance of Parliamentary Committee on Agriculture (PCA), The Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, assigned a research study on "Assessing the existing training and testing facilities for farm machinery". This Centre was asked to conduct the study for the state of Madhya Pradesh. Agro-Economic Research Centre, Punjab Agricultural University, Ludhiana was made the coordinator of the study.

In Madhya Pradesh Central Farm Machinery Training and Testing Institute, Budni and Central Institute of Agricultural Engineering, Bhopal were engaged in training and testing of farm machinery in the state.

For evaluating the training facilities at beneficiaries' level a total number of 118 trainees were selected and their opinions were taken in trainees schedules. In addition, training and testing schedules were got filled from the two Institutes. Besides these, 7 manufacturers schedules were scrutinised and their opinions were noted.

It was noted that training and testing facilities at both the Institutes were adequate. With regard to facilities for training and testing, building and hostel infrastructure, training and testing machinery, library facilities, etc. were sufficient for the present and nothing was additionally required. However, looking to the increasing mechanisation of farm machinery in the state, these facilities need to be upgraded and strengthened. It is suggested that 3 more training and testing centres be developed at Jabalpur, Gwalior and Indore under the control of agricultural engineers of JNKVV, Jabalpur. Looking to the present volume of work of training and testing accomplished by CFMT and TI, Budni,
incentives in the form of higher scales of pay seem essential and have been recommended.

I am thankful to Professor Karam Singh of A.E.R.C., Ludhiana for very efficiently coordinating the study right from the initial stage.

I thank the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India and all the officials of JNK Vishwa Vidyalaya, Jabalpur for providing facilities to conduct the study. I express my heartful thanks to Training and Testing Institutes both at Budni and Bhopal for responding to our queries.

I thank Dr. R.A. Ram, Professor, College of Agricultural Engineering, JNKVV, Jabalpur for associating with the study as Expert Agricultural Engineer and making valuable comments on the draft report.

I express my deep sense of gratitude to the respondent sample beneficiaries who painstakingly and patiently filled the schedules and sent back to us.

Mr. Sita Ram of this Centre was associated with the study from the very beginning and visited CFMT & TI , Budni for collection of data and also guided the tabulation of data at the headquarter. He drafted the report which was completed under my overall guidance. He was assisted in the tabulation and analysis work by Mr. J.R. Shinde, Mr. S.J. Singh, Mr. S.C. Jain, Mr. Shrikant Upadhye and Mr. Chandrakant Mishra. While typing work was done by Mr. S.K. Sharma, the computer typing was done very efficiently by Mr. Sikandar Khan.

I thank them one and all. I hope the policy makers, researchers and others would find this study useful.

**(M.C. Athavale)**
Professor & Head
Agro-Economic Research Centre
For Madhya Pradesh & Chhattisgarh,
J.N. Krishi Vishwa Vidyalaya,
Jabalpur (M.P.)

……

# C O N T E N T S

**……..**

# LIST OF TABLES

**……**

# CHAPTER – II

# METHODOLOGY

The methodology used is in relation with the objectives of the study described earlier under paragraph 1.5. The first objective has two aspects viz. t raining and testing.

## 2 .1 Training Aspect

To evaluate the impact of training programmes conducted at the Central 3Farm Machinery Training and Testing Institute, Budni, lists of trainees trained under different courses during the last 3 years viz.1997-98,1998-99 and 1999-2000 were obtained. It may be mentioned that lists of trainees trained under F,G series and those sponsored by international organisations were not available. Moreover, addresses of trainees trained under B and D series courses were not available. Thus the lists of trainees along with addresses were available for A, C and E series courses. The total number of trainees in these three courses was 396 (230+134+32). Of these trainees 200 trainees were sampled for sending the training schedules and questionnaires. Of these 200 trainees, 103 trainees filled the schedules and gave answers to questionnaires and returned these to us. All the 103 schedules and questionnaires were subjected to further analysis. The training schedules and questionnaires were intended to collect information regarding adequacy, usefulness, effectiveness, contribution towards development of agriculture in the respective area and contribution towards economic upliftment of the trainees from training.

In addition, 10 trainees who got training at the Institute in the past were interviewed. The view points of 5 trainees under training at the time of survey were also obtained. Thus the total number of respondent trainees came to 118 (Table 2.1).

## 2.2 Testing Aspect

Testing of farm machinery was undertaken by-

1. Central Farm Machinery Training and Testing Institute, Budni, and,
2. Central Institute of Agricultural Engineering, Bhopal.

**Table 2.1 Sampling of trainees, Farm Machinery Training and Testing Institute, Budni, M.P.**

| S. No. | Code of training course | Particulars of training course | Total number of trainees | Number of sample trainees and number to whom schedules despatched | No. of schedules received. | Number of schedules subjected to analysis | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | A Series | Regular Course on Farm Machinery Utilisation and Maintenance. | 230 | 118 | 66 | 66 | -- |
| 2 | B Series | Intensive Course on Special Machines and skills. | 61 | -- | --- | -- | List of trainees and addresses not available. |
| 3. | C Series | Refresher Course on Farm Machinery Repair and Workshop Management | 134 | 66 | 30 | 30 | ---- |
| 4 | D Series | Educational Training Course on Farm Machinery Utilisation | 129 | -- | -- | -- | List of trainees and addresses not available. |
| 5 | E Series | Regular Course For Rural Youth (TRYSEM) | 32 | 16 | 7 | 7 | -- |
| 6 | F Series | Need Based Training Programme | -- | -- | -- | -- | Details not available |
| 7 | G Series | Energy Conservation Management camps. | -- | -- | -- | -- | Details not available |
| 8 | -- | Specially Designed Programmes for Officials Sponsored by International Organisations like FAO, ILO, UNDP, etc. | -- | -- | -- | -- | Details not available |
| **Total of 8 courses** | | **----** | 586 | 200 | 103 | 103 | --- |
| | | **Past trainees** | -- | -- | -- | 10 | -- |
| | | **Trainees under training at the time of survey** | -- | -- | -- | 5 | -- |
| **GRAND TOTAL** | | ----- | 586 | 200 | 103 | 118 | -- |

Testing schedules, designed by AERC, Ludhiana, the coordinating Centre, were got filled from both the Institutes. Besides the above two Institutes manufacturers schedules were sent to 48 manufacturers. Of the 48 manufacturers 7 responded by returning the schedules. Their experiences as regards testing of farm machinery at various institutes were noted. As regards objective number 2 i.e. assessing the training and testing infrastructure with the state government/institute, information was collected in training and testing schedules sent to following institutes / organisations.

1. Central Farm Machinery Training & Testing Institute, Budni, M.P.
2. Central Institute of Agricultural Engineering, Bhopal.
3. Directorate of Agricultural Engineering, Bhopal.
4. Dean, College of Agricultural Engineering, JNKVV, Jabalpur.

Of these only first two institutes / organisations confirmed that these conducted training and testing of farm machinery. The remaining two did not undertake training or testing. To identify the estimated additional requirement of training and testing for agricultural mechanisation, estimates of number of different machines by the years 2010 and 2020 were calculated. For such an increase in the number of different machines additional Farm Machinery Training and Testing Institutes were suggested on the basis of discussions with officials of the present Institutes.

…….

# CHAPTER – III

# PERFORMANCE OF TRAINING AND TESTING INFRASTRUCTURE IN THE STATE

This chapter has been divided into two parts.

1. Farm Machinery Training, and,
2. Farm Machinery Testing

## 3.1 Farm Machinery Training

The training on farm machinery was carried out in the following two institutes in the state.

a) Central Farm Machinery Training and Testing Institute, Budni, and,
b) Central Institute of Agricultural Engineering, Bhopal.

### 3.1.1 Central Farm Machinery Training and Testing Institute, Budni

The CFMT and TI, Budni is the oldest institute in the country and the details of courses conducted by it are available from 1956-57 to 1999-2000 (44 years) alongwith the number of trainees trained. During these years a total number of 12 courses have been conducted and a total number of 26,226 trainees have been trained. It may be mentioned that the number of trainees varied from course to course and not all the courses have been conducted all along the entire period of 44 years. Of the total trainees trained, maximum number of 7,552 trainees (28.80 per cent) were trained in A series course on agricultural machinery utilisation training. The number of trainees trained in C series technician's course on farm machinery service and repair was 4,333 (16.52 per cent). Two other courses, namely, D series summer course for undergraduates on agricultural machinery utilisation and F series trainers' training course had about equal number of trainees (3,119 and 3,026 constituting 11.89 and 11.54 per cent respectively). For special course for foreign nationals the number of trainees trained was least viz. 32 or 0.12 per cent of the total number of trainees. (Table 3.1).

**Table 3.1 Total number of trainees trained in different courses at CFMT and TI, Budni, from 1956-57 to 1999-2000**

| S. No. | Name of the course | Duration of course | Total number of trainees trained | Percentage to total |
|---|---|---|---|---|
| 1 | Short term | 3 months | 855 | 3.26 |
| 2 | Long term | 6 and 9 months | 303 | 1.15 |
| 3 | Farm machinery utilisation training | -- | 333 | 1.27 |
| 4 | A series - Agricultural Machinery utilisation training | 2 months | 7,552 | 28.80 |
| 5 | B series – Refesher course on agricultural machinery utilisation | 1 month | 2,319 | 8.85 |
| 6 | C series – Technician course on farm machinery service and repair | 2 months | 4.333 | 16.52 |
| 7 | D series – Summer course for under graduates on agri-cultural machinery utilisation. | 1 month | 3.119 | 11.89 |
| 8 | E series – Training on rural youth for self employment (TRYSEM). | 3 months | 2,128 | 8.11 |
| 9 | F SERIES – Trainer's training course. | 1 to 4 weeks | 3,026 | 11.54 |
| 10 | G – series – Energy Conservation. | Need based | 1,943 | 7.41 |
| 11 | Special course (Foreign Nationals) | 10 to 18 weeks | 32 | 0.12 |
| 12 | Graduates and Technician Apprentice | 12 to 24 months | 283 | 1.08 |
| | **Total** | --- | 26,226 | 100.00 |

It may be mentioned that two courses viz. short term course of 3 months duration and long term course of 6 months and 9 months duration started in 1956-57 continued till 1966-67 only. Thereafter these were abandoned. Similarly farm machinery utilisation training course started in 1967-68 continued for a total number of 3 years only i.e. till 1969-70. Thereafter the course was abandoned (Table 3.2).

**Table 3.2 Total number of trainees trained in short term, long term and farm machinery utilisation training course at CFMT & TI, Budni**

| Year | Short term course 3 months duration | Long term course 6 months and 9 months duration | Farm machinery utilisation training course |
|---|---|---|---|
| 1956-57 | 54 | 8 | -- |
| 1957-58 | 70 | 33 | -- |
| 1958-59 | 89 | 13 | -- |
| 1959-60 | 108 | 14 | -- |
| 1960-61 | 91 | 43 | -- |
| 1961-62 | 81 | 28 | -- |
| 1962-63 | 45 | 55 | -- |
| 1963-64 | 84 | 26 | -- |
| 1964-65 | 97 | 30 | -- |
| 1965-66 | 89 | 30 | -- |
| 1966-67 | 47 | 23 | -- |
| 1967-68 | -- | -- | 134 |
| 1968-69 | -- | -- | 147 |
| 1969-70 | -- | -- | 52 |
| **Total** | **855** | **303** | **333** |

Following 3 courses were started quite late –

1. F series trainers' training course since 1980-81
2. G series energy conservation course since 1984-85
3. Special course for foreign nationals since 1985-86

Of these, courses at S.Nos.2 and 3 were only intermittantly conducted. (Table 3.3).

The remaining 6 courses were comparatively old courses and were regularly conducted.

Of these courses A series agricultural machinery utilisation training course had maximum number of trainees. C series technician course on farm machinery service and repair had second largest number of trainees. D series summer course for undergraduates on agricultural machinery utilisation and E series training on rural youth for self employment had 3,119 and 2,128 trainees respectively (Table 3.4).

**Table 3.3 Total number of trainees trained in F series, G series and special Course for foreign nationals at CFMT and TI, Budni**

| Year | F series trainers training course (1 to 4 weeks) | G series energy conservation course (need based) | Special course for Foreign Nationals (10 to 18 weeks) |
|---|---|---|---|
| 1980-81 | 78 | -- | -- |
| 1981-82 | 96 | -- | -- |
| 1982-83 | 101 | -- | -- |
| 1983-84 | 104 | -- | -- |
| 1984-85 | 93 | 2 | -- |
| 1985-86 | 95 | 6 | 2 |
| 1986-87 | 86 | 55 | 3 |
| 1987-88 | 10 | -- | -- |
| 1988-89 | 56 | -- | 5 |
| 1989-90 | 51 | -- | 1 |
| 1990-91 | 101 | -- | 10 |
| 1991-92 | 179 | -- | 3 |
| 1992-93 | 127 | 567 | 5 |
| 1993-94 | 166 | 548 | 1 |
| 1994-95 | 230 | 75 | -- |
| 1995-96 | 198 | 175 | 2 |
| 1996-97 | 270 | 81 | -- |
| 1997-98 | 258 | 51 | -- |
| 1998-99 | 374 | 155 | -- |
| 1999-2000 | 353 | 228 | -- |
| **Total** | **3,026** | **1,943** | **32** |

**Table 3.4 Trainees trained in various courses at CFMT and TI Budni, M.P. from 1965-66 to 1999-2000**

| Year | A series agricultural machinery utilisation training course | B series refresher course on agricultural machinery utilisation | C series technician course on farm machinery service & repair | D series summer course for under graduates on Agricultural machinery utilisation | E series training of rural youth for self employment (TRYSEM) | Graduates and Technician apprentice |
|---|---|---|---|---|---|---|
| 1965-66 | -- | -- | -- | 20 | -- | -- |
| 1966-67 | -- | 34 | -- | 10 | -- | -- |
| 1967-68 | -- | 32 | -- | 37 | -- | -- |
| 1968-69 | 30 | 20 | -- | 30 | -- | -- |
| 1969-70 | 100 | 46 | 50 | 28 | -- | -- |
| 1970-71 | 181 | 43 | 106 | 44 | -- | -- |
| 1971-72 | 187 | 24 | 135 | 34 | 104 | 14 |
| 1972-73 | 170 | 29 | 33 | 52 | 146 | 14 |
| 1973-74 | 150 | 8 | 53 | 37 | 164 | 14 |
| 1974-75 | 225 | 15 | 103 | 76 | 78 | 13 |
| 1975-76 | 230 | 22 | 166 | 78 | 88 | 11 |
| 1976-77 | 230 | 47 | 176 | 57 | 27 | 12 |
| 1977-78 | 216 | 94 | 176 | 102 | 104 | 13 |
| 1978-79 | 193 | 135 | 178 | 85 | 53 | 11 |
| 1979-80 | 187 | 199 | 157 | 71 | 9 | 10 |
| 1980-81 | 177 | 211 | 111 | 117 | -- | 10 |
| 1981-82 | 189 | 231 | 142 | 90 | -- | 10 |
| 1982-83 | 203 | 86 | 150 | 103 | 47 | 10 |
| 1983-84 | 221 | 22 | 163 | 90 | 78 | 11 |
| 1984-85 | 145 | 59 | 133 | 85 | 125 | 10 |
| 1985-86 | 245 | 40 | 178 | 85 | 26 | 10 |
| 1986-87 | 302 | 47 | 145 | 79 | -- | 8 |
| 1987-88 | 208 | 79 | 128 | 98 | 86 | 15 |
| 1988-89 | 313 | 61 | 86 | 120 | 97 | 6 |
| 1989-90 | 271 | 47 | 122 | 160 | 81 | 11 |
| 1990-91 | 281 | 55 | 142 | 112 | 83 | 12 |
| 1991-92 | 272 | 71 | 110 | 117 | 107 | 3 |
| 1992-93 | 373 | 95 | 171 | 165 | 91 | 8 |
| 1993-94 | 351 | 85 | 167 | 105 | 109 | 6 |
| 1994-95 | 359 | 84 | 174 | 129 | 116 | 9 |
| 1995-96 | 322 | 70 | 116 | 116 | 88 | 12 |
| 1996-97 | 310 | 65 | 154 | 128 | 79 | 1 |
| 1997-98 | 412 | 45 | 214 | 108 | 68 | 5 |
| 1998-99 | 258 | 63 | 199 | 170 | 68 | 4 |
| 1999-2000 | 241 | 55 | 195 | 181 | 6 | 10 |
| **Total** | 7,552 | 2,319 | 4,333 | 3,119 | 2,128 | 283 |

### 3.1.2 Central Institute of Agricultural Engineering, Bhopal

The training courses at CIAE, Bhopal, were started in 1989-90. The training was imparted in operation/maintenance/fabrication of farm machinery. From 1989-90 till 1999-2000 a total number of 3,135 trainees were trained. The periods of trainings varied from 1 day to 1 month.

The maximum number of trainees were trained in 1989-90. The number decreased in 1995-96. It again increased in 1996-97 to decrease in subsequent two years. However, the number again increased in 1999-2000 (Table 3.5).

**Table 3.5 Total number of trainees trained at CIAE, Bhopal from 1989-90 to 1999-2000**

| Year | No.of trainees trained | Percentage to total1989 |
|---|---|---|
| 1989-90 | 666 | 21.24 |
| 1995-96 | 482 | 15.37 |
| 1996-97 | 588 | 18.76 |
| 1997-98 | 421 | 13.43 |
| 1998-99 | 439 | 14.01 |
| 1999-2000 | 539 | 17.19 |
| **Total** | 3,135 | 100.00 |

However, lists of trainees desired by us for the years 1997, 1998, 1999 and 2000 were not supplied nor details of trainees trained under different programmes were provided.

## 3.2 Training Infrastructure

The training infrastructure available was noted in training schedules got filled from the institutes. The results obtained are given below.

### 3.2.1 Central Farm Machinery Training & Testing Institute, Budni

It was noted that the necessary machines for training were available in the Institute and nothing was additionally needed. The professional staff consisted of following (Table 3.6).

**Table 3.6 Professional staff available at the CFMT and TI, Budni, M.P.**

| S.No. | Name of the post | No. of posts |
|---|---|---|
| 1 | Director | 1 |
| | **Engineering Staff** | |
| 2 | Senior Training Officer (E)/Chief Instructor | 2 |
| 3 | Agronomist | 1 |
| 4 | Senior Instructor | 2 |
| 5 | Instructor/ Technician IV | 6 |
| | **Technical Staff** | |
| 6 | Senior Technician | 4 |
| 7 | Technician | 15 |
| 8 | Junior Technician | 8 |
| 9 | Foreman (Electrical) | 1 |
| 10 | Agricultural Assistant | 1 |
| 11 | Electrician Grade II | 1 |
| 12 | Oil Engine Driver/ Motor Driver | 5 |
| | **Total** | **47** |

The capacity of lodging and boarding was for 200 trainees. There was institute's transport facility (bus). Among other infrastructure facilities were lecture halls, workshops, laboratories and library. There were transportation facilities for training of trainees in camps. The training was imparted under G series energy conservation and management camps and in the year 1999-2000 a total of 228 trainees were trained. To motivate the public to attend the training, media like news papers, radio, television, posters, pamphlets, circulars to government departments / private companies, gram panchayat meetings were used. For A&C series courses advertisements were given in news papers. For D series course college heads were contacted. For TRYSEM training state government departments were contacted.

Among the facilities provided to the trainees were books, notes, other publications, field practicals and practicals on operation of machines. The trainees of C series course were sent on visit to other farms.

At the end of each course evaluation was done both of the course and of the trainees.

To the question whether the present FMT & TI located at Budni and Bhopal were sufficient the reply was that more number of sub centres should be established, preferably at Jabalpur and Indore under JNKVV, Jabalpur.

### 3.2.2 Central Institute of Agricultural Engineering, Bhopal

It was noted that the training infrastructure available at CIAE, Bhopal was adequate and nothing was additionally required. Large number and types of machines were available for training. A total number of 70 professional staff members were in the institute. In addition 200 technical staff members were on roll. There were lodging and boarding facilities for 10 trainers and 50 vehicles for transportation of trainees. There were 4 lecture halls, 4 workshops and an equal number of laboratories. There was a library for the benefit of trainers and trainees. Newspapers, circulars to government departments and private companies or individuals and grampanchayat meetings were made use of to motivate people to attend training programmes. Field practicals, practicals in operating machines, visit to other farms and publications of CIAE serve as supplementary tools in training. There was a regular system of assessment of both trainings and trainees. To the question whether additional institutes be established the answer was that the existing institutes be strengthened.

### 3.2.3 Experience of the Trainees

The information regarding various aspects of training programmes including infrastructure was obtained through 103 mailed questionnaires and by personal contact from 10 previous trainees and 5 current trainees.

#### 3.2.3.1 Sources of Information

There were nine sources of information for the trainees. The major sources were relatives and friends, news papers and agricultural officers and contributed 47 per cent, 19 per cent and 14 per cent respectively. The trainees from whom schedules and questionnaires were received reported that 52 per cent of them got information from their relatives and friends. Agricultural Officers and news papers each contributed 16 per cent to the total number of trainees. In the case of past trainees the major source of dissemination of information was news papers and contributed 60 per cent. All the current trainees were military personnel and all of them got the information from Defence Resettlement Director (Table 3.7).

**Table 3.7 Sources of information for the trainees, Central Farm Machinery Training and Testing Institute, Budni, Madhya Pradesh**

(Per cent multiple response)

| S. No | Source | Trainees from whom schedules & questionnaires were received | Past trainees | Current trainees | Total |
|---|---|---|---|---|---|
| 1 | Agricultural officers | 16 | -- | -- | 14 |
| 2 | Earlier trainees | 1 | -- | -- | 1 |
| 3 | Relatives & Friends | 52 | 10 | -- | 47 |
| 4 | University | 1 | -- | -- | 1 |
| 5 | News papers | 16 | 60 | -- | 19 |
| 6 | Sarpanch | 10 | -- | -- | 8 |
| 7 | CFMTI & TI, Budni | 4 | -- | -- | 3 |
| 8 | Neighbour | -- | 20 | -- | 2 |
| 9 | Defence Resettlement Director | -- | 10 | 100 | 5 |
| | **Total** | **100** | **100** | **100** | **100** |

### 3.2.3.2 Benefits Derived

Majority of the trainees (64 per cent) commented that training helped them in better utilisation of machinery. The training helped 29 per cent trainees to increase their farm income. Seven per cent trainees said that they learnt better utilisation of pumps/motors. There were only 25 per cent trainees from among those who responded by sending schedules who improved their farm income while 68 per cent trainees expressed that training helped them in better use of machinery. In the case of past trainees 60 per cent trainees informed that they had improved their farm income after completing the training. The benefits like better use of machinery and better use of pumps/motors was the opinion of 30 per cent and 10 per cent beneficiaries respectively. The current trainees expressed that training helped 60 per cent of them in better use of machinery and 40 per cent to increase their farm income (Table 3.8).

**Table 3.8 Types of benefits derived/expected from the training Central Farm Machinery Training &Testing Institute, Budni, Madhya Pradesh**

(Per cent multiple response)

| S. No | Particulars | Trainees from whom schedules & questionnaires were received | Past trainees | Current trainees | Total |
|---|---|---|---|---|---|
| 1 | Improved income | 25 | 60 | 40 | 29 |
| 2 | Better use of machinery | 68 | 30 | 60 | 64 |
| 3 | Better use of pumps / motors | 7 | 10 | -- | 7 |

An increased number of training programmes structured to meet the requirements of present times will help speedy flow of knowledge to the farming community and will help in improving the present status of agriculture. Although majority of trainees expect that training will help in improving incomes but it is only possible if the farm machinery is properly and adequately utilised. Almost all the trainees felt satisfied with the building of training centres, required machinery for training programmes, time given to each trainee, adequacy of training staff and their behaviour. It is good sign and highlights the adequacy of infrastructural establishment and training staff attitude (Table 3.9)

**Table 3.9 Response of trainees towards training information, Central Farm Machinery Training and Testing Institute, Budni, Madhya Pradesh**

(Per cent multiple response)

| S. No. | Particulars | Trainees from whom schedules & question-naires were received | Past trainees | Current trainees | Total |
|---|---|---|---|---|---|
| 1 | Present building | 100 | 100 | 100 | 100 |
| 2 | Required machinery | 86 | 100 | 100 | 88 |
| 3 | Proper time to every student | 100 | 100 | 100 | 100 |
| 4 | Training staff adequate | 100 | 100 | 100 | 100 |
| 5 | Behaviour of training staff / level | 98 | 100 | 100 | 98 |

All the trainees learnt something new from the training. It encouraged 93 per cent trainees to improve the agricultural situation of the area. There were 81 per cent trainees who encouraged / will encourage other persons to attend these training. There were 68 per cent trainees who had earlier trainees in the villages. Only 18 per cent trainees purchased / would purchase machines after completing the training. Nearly all, (94 per cent) trainees from whom schedules and questionnaires were received were benefitted from the training and they improved or would improve the agricultural situation of the area. The farmers who purchase or would purchase machinery after training were 21 per cent of the category from whom schedules were received. Thirty per cent past trainees and none of the current trainees purchase / or would purchase machines after training. All the trainees learnt something new and improved / or would improve the agricultural situation of the area (Table 3.10).

**Table 3.10 Other miscellaneous information, Central Farm Machinery Training and Testing Institute, Budni, Madhya Pradesh**

(Per cent multiple response)

| S. No. | Particulars | Trainees from whom schedules & question-naires were received | Past trainees | Current trainees | Total |
|---|---|---|---|---|---|
| 1 | Learnt something new | 100 | 100 | 100 | 100 |
| 2 | Any other person in village who got the training earlier | 67 | 60 | 100 | 68 |
| 3 | Encouraged / will encourage other persons to attend training | 83 | 60 | 100 | 81 |
| 4 | Purchased / will purchase machines after training | 21 | 30 | -- | 18 |
| 5 | Agricultural situation of area improved/ will improve after training | 94 | 100 | 60 | 93 |

## 3.3 Farm Machinery Testing

Farm machinery testing was done at following two institutes in Madhya Pradesh.

1. Central Farm Machinery Training & Testing Institute, Budni.
2. Central Institute of Agricultural Engineering, Bhopal

### 3.3.1 Central Farm Machinery Training and Testing Institute, Budni

The CFMT and TI was established in 1955. The institute is under the Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India. The farm machinery testing wing was started 1959.

A total number of 814 machines were tested at the institute from 1961-62 to 1999-2000. Of the total machines tested wheeled tractors were maximum in number (388) and constituted 47.67 per cent of the total machines tested. Diesel engines tested numbered 93 and constituted 11.43 per cent of the total number of machines tested. Power tillers, users survey, agricultural implements and harvesting and threshing equipments constituted between 6 to 7 per cent each. Irrigation pumps, agricultural discs, and components tested constituted between 3 to 4 per cent of the total number of machines tested (Table 3.11).

**Table 3.11 Machines tested at Central Farm Machinery Training and Testing Institute, Budni Madhya Pradesh from 1961-62 to March, 2000**

| S.No. | Category of machines tested | Total number of machines tested | Percentage to total |
|---|---|---|---|
| 1 | Wheeled Tractors | 388 | 47.67 |
| 2 | Crawler Tractors | 11 | 1.35 |
| 3 | Power Tillers | 55 | 6.76 |
| 4 | User's Survey | 50 | 6.14 |
| 5 | Diesel Engines | 93 | 11.43 |
| 6 | Agri. Implements | 52 | 6.39 |
| 7 | Land Levelling Equipments | 12 | 1.47 |
| 8 | Sowing Equipments | 12 | 1.47 |
| 9 | Irrigation pumps | 27 | 3.32 |
| 10 | Plant Protection Equipments | 02 | 0.24 |
| 11 | Harvesting and Threshing Equipments | 55 | 6.76 |
| 12 | Grain cleaners | 01 | 0.12 |
| 13 | Agricultural Discs | 28 | 3.44 |
| 14 | Components | 27 | 3.32 |
| 15 | Vehicles | 01 | 0.12 |
| | **Total** | **814** | **100.00** |

It was noted that not all the types of machinery were tested from 1961-62 to 1999-2000. Crawler tractors were tested for the first time in 1967-68. The testing of this category of machine was not done after 1978-79. During the years 1967-68 and 1978-79 a total number of 11 crawler tractors were tested. In the case of land levelling equipments the testing was first taken up in 1966-67 and was done till 1979-80 with intermittant gaps. During these years a total number of 12 land levelling equipments were tested. Sowing equipments were first tested in 1969-70 and were continued to be tested till 1980-81. After which no sowing equipment was tested. During the years 1969-70 to 1980-81 (intermittantly) a total number of 12 sowing equipments were tested. Irrigation pumps were for the first time tested in 1979-80 and were subjected to tests at the institute till 1989-90 after which these were not tested. During the 11 years period from 1979-80 to 1989-90 a total number of 27 irrigation pumps were tested. Only two plant protection equipments and alone grain cleaner was tested at the institute. A total number of 28 agricultural discs were tested at the institute between 1964-65 and 1974-75. No Agricultural disc was tested since 1974-75 till date. Only one vehicle was tested in the institute in the year 1993-94 (Table 3.12).

**Table 3.12 Machines tested at Central Farm Machinery Training and Testing Institute, Budni Madhya Pradesh from 1964-65 to 1999-2000**

| Year | Crawler Tractor | Land levelling equipment | Sowing equipment | Irriga-tion pumps | Plant protection equipment | Grain cleaner | Agricul-tural Discs | Vehicles |
|---|---|---|---|---|---|---|---|---|
| 1964-65 | -- | -- | -- | -- | -- | -- | 01 | -- |
| 1965-66 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1966-67 | -- | 02 | -- | -- | -- | -- | 01 | -- |
| 1967-68 | 01 | -- | -- | -- | -- | -- | 01 | -- |
| 1968-69 | 01 | 01 | -- | -- | -- | 01 | -- | -- |
| 1969-70 | 02 | 03 | 01 | -- | -- | -- | -- | -- |
| 1970-71 | 01 | -- | -- | -- | -- | -- | 06 | -- |
| 1971-72 | 01 | -- | 02 | -- | -- | -- | 09 | -- |
| 1972-73 | 03 | 02 | -- | -- | -- | -- | 04 | -- |
| 1973-74 | -- | -- | -- | -- | -- | -- | 03 | -- |
| 1974-75 | -- | 01 | 03 | -- | -- | -- | 03 | -- |
| 1975-76 | -- | -- | 01 | -- | -- | -- | -- | -- |
| 1976-77 | -- | -- | 01 | -- | -- | -- | -- | -- |
| 1977-78 | 01 | 01 | 01 | -- | 01 | -- | -- | -- |
| 1978-79 | 01 | -- | 02 | -- | -- | -- | -- | -- |
| 1979-80 | -- | 02 | -- | 03 | -- | -- | -- | -- |
| 1980-81 | -- | -- | 01 | 02 | -- | -- | -- | -- |
| 1981-82 | -- | -- | -- | 05 | 01 | -- | -- | -- |
| 1982-83 | -- | -- | -- | 01 | -- | -- | -- | -- |
| 1983-84 | -- | -- | -- | 01 | -- | -- | -- | -- |
| 1984-85 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1985-86 | -- | -- | -- | 02 | -- | -- | -- | -- |
| 1986-87 | -- | -- | -- | 04 | -- | -- | -- | -- |
| 1987-88 | -- | -- | -- | 06 | -- | -- | -- | -- |
| 1988-89 | -- | -- | -- | 02 | -- | -- | -- | -- |
| 1989-90 | -- | -- | -- | 01 | -- | -- | -- | -- |
| 1990-91 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1991-92 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1992-93 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1993-94 | -- | -- | -- | -- | -- | -- | -- | 01 |
| **Total** | **11** | **12** | **12** | **27** | **02** | **01** | **28** | **01** |

As mentioned earlier among the machines tested the largest number (388) was that of wheeled tractors. It was noted that these were tested consistantly since 1961-62. Also consistantly tested were power tillers (55), agricultural implements (52) and diesel engines (93). However, testing of diesel engines was started late in

1970-71. Harvesting and threshing equipments (55) and components (27) were more or less consistantly tested with small breaks in between. Machines under user survey were started to being tested (50) late in 1979-80 but were being tested more or less consistantly thereafter till date (Table 3.13).

**Table 3.13 Machines tested at Central Farm Machinery Training and Testing Institute, Budni from 1961-62 to 1999-2000**

| Year | Wheeled Tractors | Power tillers | Agricultural Implements | Diesel Engines | Harvesting and threshing equipments | Components | User's survey |
|---|---|---|---|---|---|---|---|
| 1961-62 | 01 | -- | -- | -- | -- | -- | -- |
| 1962-63 | 01 | -- | -- | -- | -- | -- | -- |
| 1963-64 | -- | -- | 01 | -- | -- | -- | -- |
| 1964-65 | 01 | 08 | -- | -- | -- | -- | -- |
| 1965-66 | 02 | 01 | 03 | -- | -- | -- | -- |
| 1966-67 | -- | 05 | 02 | -- | -- | -- | -- |
| 1967-68 | 02 | 01 | 01 | -- | 02 | -- | -- |
| 1968-69 | 04 | 03 | 01 | -- | -- | -- | -- |
| 1969-70 | 03 | 01 | -- | -- | 05 | -- | -- |
| 1970-71 | 06 | -- | -- | 01 | 02 | 02 | -- |
| 1971-72 | 07 | 01 | 13 | 02 | 03 | 02 | -- |
| 1972-73 | 08 | 01 | 01 | 01 | 02 | 01 | -- |
| 1973-74 | 07 | 01 | 01 | 01 | 05 | -- | -- |
| 1974-75 | 06 | 01 | -- | -- | 04 | -- | -- |
| 1975-76 | 04 | 01 | 02 | -- | 04 | -- | -- |
| 1976-77 | 02 | 02 | -- | 02 | 02 | -- | -- |
| 1977-78 | 05 | 02 | -- | 02 | 01 | 01 | -- |
| 1978-79 | 13 | 01 | 03 | 05 | 03 | -- | -- |
| 1979-80 | 09 | 01 | 02 | 08 | -- | 01 | 02 |
| 1980-81 | 15 | -- | -- | 11 | -- | 01 | 01 |
| 1981-82 | 04 | -- | 01 | 11 | -- | 02 | -- |
| 1982-83 | 12 | -- | 01 | 09 | 01 | 01 | -- |
| 1983-84 | 15 | 02 | -- | 03 | 01 | 02 | 01 |
| 1984-85 | 14 | 01 | -- | 04 | 02 | -- | 02 |
| 1985-86 | 13 | -- | -- | 07 | -- | -- | 03 |
| 1986-87 | 12 | 01 | -- | 07 | 01 | 01 | -- |
| 1987-88 | 17 | 03 | 01 | 06 | 01 | -- | -- |
| 1988-89 | 28 | 02 | 04 | 08 | -- | -- | -- |
| 1989-90 | 14 | 01 | 03 | -- | 05 | 01 | -- |
| 1990-91 | 15 | -- | 01 | -- | 01 | -- | 08 |
| 1991-92 | 09 | -- | 01 | 03 | -- | 02 | 10 |
| 1992-93 | 20 | -- | -- | -- | 02 | 01 | 02 |
| 1993-94 | 15 | -- | -- | -- | 01 | 02 | 05 |
| 1994-95 | 16 | 01 | 02 | -- | -- | 02 | 04 |
| 1995-96 | 16 | 01 | 05 | -- | -- | 01 | 04 |
| 1996-97 | 15 | -- | 01 | -- | 02 | 01 | 06 |
| 1997-98 | 16 | 04 | 02 | -- | 01 | 02 | 01 |
| 1998-99 | 20 | 04 | -- | 02 | 01 | -- | 01 |
| 1999-2k | 21 | 05 | -- | -- | 03 | 01 | -- |
| **Total** | **388** | **55** | **52** | **93** | **55** | **27** | **50** |

It may be added that the target of number of machines to be tested in a year was 25. Looking to the data one can infer that the target was achieved in all the years.

To the question whether the staff available at the institute was adequate for testing, the answer was in the affirmative and it was commented that no additional staff was necessary. However, it was expressed that there was a need of additional machines for upgrading the testing facilities. Among the machines desired were-

1. Emission Test Equipment and
2. ROPS machine (Roll Over Protective Structure).

A set each of these two machines was needed and the approximate cost estimated was Rs.6 crores.

It was commented that the present number of testing centres in the state was adequate. However these needed to be strengthened.

### 3.3.2 Central Institute of Agricultural Enginering, Bhopal

The CIAE, Bhopal was established in 1976 and is under the Indian Council of Agricultural Research, New Delhi.

At this institute research based prototypes are tested by scientists. Testing is also done for industries, occassionally on demand.

There was no staff exclusively for testing of machinery. It was expressed that there was need of additional machines for upgrading the testing facilities. It was opined that the existing number of testing centres in the state was adequate but the centres be strengthened.

In addition to getting testing schedules filled up from the officers of the two institutes, 48 manufacturers whose list was obtained from CFMT & TI, Budni were requested to fill the manufacturers' schedules. This schedule, besides other things contained information about testing of farm machinery. However, of the 48 manufacturers only 7 responded and sent back the filled up schedules.

The information contained in the 7 schedules about testing facilities is summarised below. The seven manufacturing firms were located each at Bangalore, Pinjore (Haryana), Ernakulam (Kerala), Pune (Maharashtra), Patiala (Punjab), Chandigarh and Hyderabad. While one was established in 1967, three were established each in 1971, 1973 and 1974 and two were established in the nineties (1993 and 1998). All of them had the knowledge about testing facilities provided by the government and all except one had got the testing done of farm machinery manufactured by them.

A total number of 14 tractors of the sampled manufacturers was tested during the period 1990-2000. The combines tested were 3 and 1 each was tested in the year 1984, 1986 and 1989. Only three power tillers of the manufacturers were tested, 2 in 1987, 1 in 1998 (Table 3.14).

**Table 3.14 Number of farm machinery sent by manufacturers tested at CFMT & TI, Budni, Madhya Pradesh**

| Year | Tractor | Combines | Power tiller |
|---|---|---|---|
| 1984 | -- | 1 | -- |
| 1986 | -- | 1 | -- |
| 1989 | -- | 1 | -- |
| 1990 | 1 | -- | -- |
| 1995 | 1 | -- | -- |
| 1996 | 1 | -- | -- |
| 1997 | 5 | -- | 2 |
| 1998 | 1 | -- | 1 |
| 1999 | 2 | -- | -- |
| 2000 | 3 | -- | -- |
| **Total** | **14** | **3** | **3** |

## 3.4 Experiences of Manufacturers

Of the total manufacturers who responded 57.14 per cent felt that infrastructure available with the CFMT and TI, Budni, was not adequate. They suggested that installation of emission test facility was essential. Some of them remarked that ROPS test facility was essential. Majority of them said that the testing equipments were out dated and new equipments should be brought. They remarked that due to old equipments testing took much more time than necessary. Among other suggestions were : Test track was worn out, there was shortage of funds and there was shortage of manpower. When asked their opinion whether

testing of farm machinery should be made mandatory 57.14 per cent affirmed. To the question whether the government should establish more number of testing centres 85.77 per cent replied in the positive. The suggested locations of such centres were : Hissar, Cochin, Chennai, Bangalore, Ludhiana and Patiala. Some also suggested Ambala and Chandigarh. Among other comments were regarding necessity of E mail facility and another was about very long time taken for testing. Some also suggested that the concerned manufacturer should be present at the time of testing so that suggestions could be made on the spot and improvement could be immediately undertaken.

**…….**

# CHAPTER IV

# STATUS OF FARM MACHINERY

The present chapter gives the behaviour of growth of farm machinery and equipments in the state and the number expected in future. Due to green revolution, improved irrigation system, larger use of fertilisers and pesticides and use of better and high yielding seeds the production and productivity have increased. The cropping intensity has increased and the need for conducting field operations at faster speed has been felt. All this has resulted in higher use of farm machinery and equipments. The level of farm machinery over time in the state shows that the number of electric pumps would increase to 15,55,145 by 2009-2010. The number would further increase to 21,53,277 by 2019-2020. Due to increasing electrification of villages the number of diesel pumps might decrease to 1,18,856 in 2009-2010. But the number might increase to 1,64,567 in 2019-2020. The number of tractors estimated would increase to 2,91,650 by 2009-2010 and to 4,01,403 by 2019-2020. Sugarcane crushers are of two types. The number of power driven crushers is estimated to increase to 10,114 in 2009-2010 and to 10,890 by 2019-2020. On the other hand the number of bullock driven crushers would decrease to 10,903 by 2009-2010 and further to 7,845 by 2019-2020. In a similar way while the number of wooden ploughs is likely to go down to 5,089 in 2009-2010 and to 4,832 in 2019-2020 that of the number of iron ploughs is likely to increase to 799 in 2009-2010 and further to 1,022 by 2019-2020 (Table 4.1).

**Table 4.1 Agricultural machinery and implements in Madhya Pradesh**

(Unit – Number**)**

| Year | Pumps | | Tractor | Sugarcane Crushers | | Ploughs | |
|---|---|---|---|---|---|---|---|
| | Electric | Diesel | | Power driven | Bullock driven | Wooden (‘000) | Iron (‘000) |
| 1984-85 | 3,37,455 | 1,52,646 | 33,766 | 7,180 | 18,503 | 5,373 | 233 |
| 1985-86 | 3,71,684 | 1,52,214 | 39,179 | 7,710 | 17,966 | 5,455 | 246 |
| 1986-87 | 3,90,037 | 1,60,666 | 43,774 | 8,227 | 18,068 | 5,939 | 253 |
| 1987-88 | 4,68,111 | 1,73,801 | 46,200 | 6,260 | 15,296 | 5,655 | 378 |
| 1988-89 | 4,87,156 | 1,71,234 | 56,252 | 9,886 | 18,944 | 5,625 | 269 |
| 1989-90 | 5,31,254 | 1,71,628 | 63,880 | 10,583 | 20,018 | 5,582 | 303 |
| 1990-91 | 5,97,187 | 1,83,800 | 76,248 | 9,666 | 18,544 | 5,648 | 316 |
| 1991-92 | 6,60,291 | 1,90,022 | 86,420 | 9,880 | 16,258 | 6,016 | 313 |
| 1992-93 | 7,14,226 | 2,10,730 | 90,060 | 6,428 | 13,427 | 5,670 | 773 |
| 1993-94 | 7,97,862 | 2,01,308 | 1,09,039 | 9,662 | 16,259 | 5,535 | 458 |
| 1994-95 | 8,89,860 | 1,94,675 | 1,21,949 | 9,914 | 14,105 | 5,661 | 440 |
| 1995-96 | 9,72,709 | 1,98,832 | 1,32,408 | 9,464 | 13,218 | 5,706 | 488 |
| 1996-97 | 10,14,233 | 2,04,270 | 1,46,545 | 11,287 | 13,030 | 5,438 | 509 |
| 1997-98 | 10,39,805 | 2,00,175 | 1,75,300 | 7,335 | 14,745 | 4,430 | 501 |
| 1998-99 | 11,57,631 | 2,26,559 | 1,90,400 | 7,300 | 17,700 | 5,546 | 479 |
| 2009-2010* | 15,55,145 | 1,18,856 | 2,91,650 | 10,114 | 10,903 | 5,089 | 799 |
| 2019-2020* | 21,53,277 | 1,64,567 | 4,01,403 | 10,890 | 7,845 | 4,832 | 1,022 |

*Represents the projected figures for the relevant years

The projected figures have been examined, discussed and supported by farm machinery expert of the College of Agricultural Engineering, J.N.K. Vishwa Vidyalaya, Jabalpur.

**……**

# CHAPTER – V

# FUTURE REQUIREMENTS AND POLICY SUGGESTIONS

The findings of the study, the suggestions and policy implications are listed below.

1. The training facilities at the CFMT & TI, Budni, are adequate. The trainers, the training machines, hostel facilities, transport facilities, library, laboratories are satisfactory. However, looking to the volume that has to be tackled in future years both training and testing facilities ought to be strengthened and improved.

2. During the training more attention and period should be devoted to repairs, workshop management and intensive training of some specialised machinery. The successful trainees should be advanced loans by the banks so that they would be able to start independent repairing workshops. It will solve the present problem of unemployment among trainees.

3. The testing infrastructure in the state needs to be strengthened. There is need to instal emission test facility and ROPS test facility at the CFMT & TI, Budni.

4. Testing of farm machinery adds to the cost of production.

5. Testing a machine is a lengthy and time consuming process. The machine needs to be tested after every modification made.

6. Machine costing more than Rs. 20,000 must pass the testing. Similarly all the machines which are both produced and sold in large numbers should be tested because that will benefit both manufacturers and users.

7. It is suggested that training and testing infrastructure should be developed at Jabalpur, Gwalior and Indore under the control of Agricultural Engineers of JNKVV, Jabalpur. Some preliminary training and testing facilities should be available at the Krishi Vigyan Kendras.

8. Looking to the volume of work of training and testing accomplished by CFMT & TI, Budni, incentives in the form of higher scales of pay seem essential. With the revision of scales of pay in both Central Government and University Grants Commission following scales of pay are recommended for different posts in the CFMT & TI, Budni.

The revisions are necessary for both existing senior staff as well as junior staff. The senior staff members are experts in their fields and are dedicated and can not easily leave the present jobs to take up jobs elsewhere at this age. Junior staff members are attracted towards more remunerative jobs in the private sector and their exodus can not be stopped unless the scales of pay are revised (Table 5.1).

**Table 5.1 List of posts sanctioned, the existing scales of pay and recommended scales of pay, Central Farm Machinery Training & Testing Institute, Budni (M.P.)**

| S.No. | Name of Post | Existing scale of pay | No. of sanctioned posts | Recommended Scale of pay |
|---|---|---|---|---|
| 1 | Director | 12,000-375-16,500 | 1 | 16,400- 22,400 |
| 2 | Chief Instructor | 10,000-325-15200 | 1 | 12,000- 16,500 |
| 3 | Agronomist | -- do -- | 1 | 12,000- 16,500 |
| 4 | Senior Test Engineer | -- do -- | 2 | 12,000- 16,500 |
| 5 | Instrumentation Engineer | -- do -- | 1 | 12,000- 16,500 |
| 6 | Senior Trg. Officer (E) | -- do - | 1 | 12,000- 16,500 |
| 7 | Test Engineer* | 8,000-275-13,500 | 1 | ---- |
| 8 | Assistant Engineer (T) | 6,500-200-10,500 | 1 | 8,000 – 13,500 |
| 9 | Assistant Engineer (ST) | -- do -- | 1 | 8,000 – 13,500 |
| 10 | Assistant Engineer (Inst.) | -- do -- | 1 | 8,000 – 13,500 |
| 11 | Assistant Engineer (W) | -- do -- | 1 | 8,000 – 13,500 |
| 12 | Senior Instructor | -- do -- | 2 | 8,000 – 13,500 |
| 13 | Technical Assistant (Inst.) | 5,500–175-9,000 | 1 | 6,500 –10,500 |
| 14 | Technical Assistant | -- do -- | 7 | 6,500 –10,500 |
| 15 | Foreman (Workshop) | -- do -- | 1 | 6,500 –10,500 |
| 16 | Instructor | -- do -- | 2 | 6,500 –10,500 |
| 17 | Senior Technician | 4,500 – 125- 7000 | 4 | 6,500 –10,500 |
| 18 | Senior Technical Assistant | -- do -- | 4 | 6,500 –10,500 |
| 19 | Draughtsman Gr.I | -- do -- | 1 | 6,500 –10,500 |
| 20 | Instrument Mechanic-II | -- do -- | 1 | 6,500 –10,500 |
| 21 | Foreman (Electrical) | -- do -- | 1 | 6,500 –10,500 |
| 22 | Instrument Mechanic- I | 4,000-100-6,000 | 1 | 5,500 – 9,000 |
| 23 | Technician | -- do -- | 22 | 5,500 – 9,000 |
| 24 | Welder | -- do -- | 1 | 5,500 – 9,000 |
| 25 | Agricultural Assistant | -- do -- | 1 | 5,500 – 9,000 |
| 26 | Blacksmith-II | -- do -- | 1 | 5,500 – 9,000 |
| 27 | Electrician Gr.I | -- do -- | 1 | 5,500 – 9,000 |
| 28 | Junior Technician | 2,650-65-3,300-70-4,000 | 15 | 3,050 – 4,590 |

- ***It is recommended that a post of Chief Test Engineer in the scale of pay of Rs.14,300-18,3000 be created.***

.....

# CHAPTER VI

# SUMMARY AND CONCLUSIONS

**6.1** After the implementation of HYV Programme popularly known as green revolution agricultural production in the country and in the states increased substantially. Due to increase in productivity of crops, extension in irrigated area and higher consumption of inputs like fertilisers and pesticides there was a continuous increase in production of crops during the last three decades.

Increase in production of crops demanded faster and timely agricultural operations and also larger handling of agricultural produce. All these necessitated adoption of mechanised farming practices.

Mechanisation of agricultural machinery has two aspects : The machinery requires proper handling so that operations are not only fast, economical and efficient but also accident free. The second aspect is about testing of machinery. This is necessary to see that the farm machinery which passes to the consumer is of good quality, easy in handling, economical and also efficient. With these two aspects in view government of India set up four training and testing institutes of farm machinery in different parts of the country. The government of India, Ministry of Agriculture wanted to evaluate the training and testing institutes with following objectives :

1. To evaluate the impact of training and testing programmes being conducted at the Farm Machinery Training and Testing Institute (FMT and TI) and other Institutes in Madhya Pradesh as to their adequacy, usefulness, effectiveness and contribution to the development of agriculture besides suggesting on restructuring of the training and testing programmes.

2. To assess the training and testing infrastructure available with the State Government / Organisations including industry and trade.

3. To identify the gaps and additional requirement of training and testing for agricultural mechanisation by 2020 A.D. in the context of fast changing agricultural mechanisation scenario in the state.

4. To identify the location of the FMT & TIs in Madhya Pradesh for undertaking these programmes. If the requirement is for more than one FMT and TI in the state, the same may also be indicated.

There has been phenomenal growth in the number of different kinds of farm machinery in the country. For example the number of harvesters was 450 in 1971-72. It increased to 4,100 by the year 1995-96. There was a similar increase in the machinery like power sprayers/ dusters/ mould board ploughs, disc harrows, cultivators, etc.

The Central Farm Machinery Training & Testing Institute, Budni which this Centre was asked to evaluate is the oldest among the similar institutes of the country. Other such institutes are located at Hissar (Haryana), Garladine Anantpur (Andhra Pradesh) and Vishwanath, Chariali (Assam).

**6.2** To evaluate the impact of training and testing programmes conducted by CFMT and TI, Budni, lists of trainees trained under different courses during the last three years viz. 1997-98, 1998-99 and 1999-2000 were obtained. Such lists and addresses of trainees were available only for A, C and E series courses. The total number of trainees was 396. Of the 396 trainees 200 trainees were sampled for sending the schedules and questionnaires. Of the 200 trainees , 103 trainees filled the schedules and questionnaires and returned these to us . All the 103 schedules were subjected to further analysis. In addition to 103 schedules 10 trainees who got trraining at the institute in the past were interviewed. The view points of 5 trainees under training at the time of suvery were also obtained. Thus the total number of respondent trainees was 118.

Testing scheduled were got filled from CFMT and TI, Budni, and Central Institute of Agricultural Engineering, Bhopal. Besides, the above two institutes manufacturers schedules were sent to 48 manufacturers. Of the 48 manufacturers 7 responded by returning the schedules. Their experiences as regards testing of farm machinery were noted. For assessing the training and testing infrastructure information was collected in training and testing schedules from 1. CFMT and TI, Budni, 2. Central Institute of Agricultural Engineering, Bhopal. Estimates of number of different machines by the years 2010 and 2020 were made with the help of simple regression analysis.

**6.3** To know the training infrastructure information collected from CFMT and TI, Budni and Central Institute of Agricultural Engineering, Bhopal was analysed.

The CFMT and TI, Budni has conducted a total number of 12 courses and total number of 26,226 trainees have been trained in the last 44 years. Of the total

trainees trained maximum number of 7,552 trainees (28.80 per cent) were trained in A series course. The number of trainees trained in C series course was 4,333 (16.52 per cent). It may be mentioned that not all the courses have been conducted all along the entire period of 44 years. Some courses were conducted for a period of 10 years and some were conducted for 3 years. While some were conducted continuously, others were conducted intermittantly.

The Central Institute of Agricultural Engineering, Bhopal, started training courses since 1989-90. The training was imparted in operation/ maintenance/ fabrication of farm machinery from 1989 – 90 till 1999-2000. A total number of 3,135 trainees were trained.

As regards training infrastucture it was noted that at CFMT and TI, Budni, all the necessary machines for training were available in the institute and nothing was needed. Among the professional staff were :

| S.No. | Post | Number |
|---|---|---|
| 1 | Director | 1 |
| 2 | Engineering staff | 11 |
| 3 | Technical staff | 35 |

The capacity of lodging and boarding was for 300 trainees. There was institute's transport facility (bus). Among other infrastructure facilities were lecture halls, workshops, laboratories and library. There was transportation facilities for training of trainees in camp. To motivate the public to attend the training, media like news papers, radio, television, posters, pamphlets circulars to government departments, private companies, gram panchayat meetings were used. For A and C series courses advertisements were given in news papers. For D serious course, college heads were contacted. For TRYSEM training state government departments were contacted. Among the facilities provided to the trainees were books, notes, other publications, field practicals and practicals on operation of machines. The trainees of C series course were sent on visits to other farms. At the end of each course evaluation was done both of the course and of the trainees.

At the Central Institute of Agricultural Engineering, Bhopal the training infrastructure was adequate and nothing was additionally required. Large number

and types of machines were available for training. A total number of 70 professional staff members were in the Institute. There were four lecture halls, four workshops and an equal number of laboratories. There was a library for the benefit of trainers and trainees. Newspapers, circulars to government departments and private companies or individuals and grampanchayat meetings were made use of to motivate people to attend training programmes. Field practicals, practicals in operating machines, visits to other farms and publications of CIAE, Bhopal serve as supplementary tools in training. There was a regular system of assessment of both training and trainees

As regards experiences of trainees of the CFMT and TI, Budni, it was observed that there were 9 sources of information for the trainees. The major sources were relatives & friends (47 per cent), newspapers, (19 per cent), and Agricultural Officers, (14 per cent). Majority of the trainees (64 per cent) commented that training helped them in better utilisation of machinery. The training helped 29 per cent trainees to increase their farm income. Seven per cent trainees said that they learnt better utilisation of pumps and motors. Almost all the trainees were satisfied with the buildings of the training Centre, machinery for training programmes, time given to each trainee, adequacy of training staff and their behaviour. All the trainees learnt something new from the training. It encouraged 93 per cent trainees to improve the agricultural situation of the area. There were 81 per cent trainees who encouraged/ will encourage others to attend the training. Only 18 per cent trainees purchased/ would purchase machines after training.

As regards farm machinery testing at the CFMT & TI, Budni a total number of 814 machines were tested from 1961-62 to 1999-2000. Of the total machines tested wheeled tractors were maximum (388 in number) and constituted 47.67 per cent of the total machines tested. Diesel engines tested numbered 93 and constituted 11.43 per cent of the total number of machines tested. Power tillers, users survey agricultural implements and harvesting and threshing equipments were also important. Not all the types of machinery were tested from 1961-62 to 1999-2000. Some were started to being tested during the years between 1961-62 to 1999-2000. While some were tested continuously for some years, others were tested only intermittantly.

The target of number of machines to be tested in a year was 25. The data shows that the target was achieved in all the years.

It was commented by the authorities that two machines were desired for better testing facilities. These were :

1. EMISSION TEST EQUIPMENT , and,
2. ROPS MACHINE (Role Over Protective Structure)

It was also commented that although the number of testing Centres in the state was adequate, these needed to be strengthened. The authorities at the Central Institute of Agricultural Engineering, Bhopal also commented that the testing Centres in the state were adequate but the Centres needed to be strengthened.

In addition to getting testing schedules filled up from the two institutes 48 manufactures were requested to fill the manufacturers' schedules. However, only 7 manufacturers responded by sending the manufacturers' schedules, A total number of 14 tractors of the sampled manufactures were tested during the period 1990-2000) The combines tested were 3 and 3 power tillers were tested. Of the total number of manufacturers 71.14 per cent felt that infrastructure available with the CFMT & TI, Budni, was not adequate. They suggested that Emission Test facility was essential. Some of them remarked that ROPS Test facility was also needed. They commented that testing equipments were out dated and therefore, testing required much more time than necessary. The other comments were : test track was worn out there was shortage of funds and man power at the institute. There was need to establish more number of testing centres in different states. Some suggested that concerned manufacturer should be present at the time of testing so that testing and correction of mistake would take shorter period.

**6.4** The level of farm machinery over time in the state shows that the number of electric pumps would increase to 15,55,145 by 2009-2010. The number would further increase to 21,53, 277 by 2019-2020. The number of diesel pumps would be 1,18,856 in 2009-2010. It might further increase to 1,64,567 by 2019 – 2020. The number of tractors is estimated to increase to 2,91,650 by 2009-2010 and to 4,01,403 by 2019- 2020. The number of power driven sugarcane crusher is estimated to be 10,124 in 2009-2010 and 10,890 by 2019- 2020. On the other hand the number of bullock driven crushers would be 10,903 by 2009-2010 and 7,845 by 2019-2020, While the number of wooden ploughs is likely to go down to 5,089 in 2009-2010 and to 4,832 in 2019-2020 that of the number of iron ploughs is likely to increase to 799 in 2009-2010 and further to 1,022 by 2019-2020.

**6.5** The training facilities at the CFMT & TI, Budni, are adequate. The trainers, the training machines, hostel facilities, transport facilities, library and laboratories are satisfactory. However, looking to the volume that has to be tackled in future years both training and testing facilities ought to be strengthened and improved. The successful trainees should be advanced loans by the banks so that they would be able to start independent repairing workshops. It will solve the present problem of unemployment among the trainees. The testing infrastructure in the state needs to be strengthened. There is need to instal emission test facility and ROPS test facility at CFMT and TI, Budni. Testing a machine is a lengthy and time consuming process. Machines costing more than Rs.20,000 must pass the testing. Similarly all the machines which are both produced and sold in large numbers should be tested because that will benefit both manufacturers and users. It is suggested that training and testing infrastructure should be developed at Jabalpur, Gwalior and Indore under the control of Agricultural Engineers of JNKVV, Jabalpur. Looking to the present volume of work of training and testing accomplished by CFMT and TI, Budni, incentives in the form of higher scales of pay seem essential and have been recommended elsewhere in the report.

**……**

# EXECUTIVE SUMMARY

## Introduction

After the implementation of HYV Programme popularly known as green revolution agricultural production in the country and in the states increased substantially. Due to increase in productivity of crops, extension in irrigated area and higher consumption of inputs like fertilisers and pesticides there was a continuous increase in production of crops during the last three decades.

Increase in production of crops demanded faster and timely agricultural operations and also larger handling of agricultural produce. All these necessitated adoption of mechanised farming practices.

Mechanisation of agricultural machinery has two aspects : The machinery requires proper handling so that operations are not only fast, economical and efficient but also accident free. The second aspect is about testing of machinery. This is necessary to see that the farm machinery which passes to the consumer is of good quality, easy in handling, economical and also efficient. With these two aspects in view government of India set up four training and testing institutes of farm machinery in different parts of the country. The government of India, Ministry of Agriculture wanted to evaluate the training and testing institutes with following objectives :

1. To evaluate the impact of training and testing programmes being conducted at the Farm Machinery Training and Testing Institute (FMT and TI) and other Institutes in Madhya Pradesh as to their adequacy, usefulness, effectiveness and contribution to the development of agriculture besides suggesting on restructuring of the training and testing programmes.

2. To assess the training and testing infrastructure available with the State Government / Organisations including industry and trade.

3. To identify the gaps and additional requirement of training and testing for agricultural mechanisation by 2020 A.D. in the context of fast changing agricultural mechanisation scenario in the state.

4. To identify the location of the FMT & TIs in Madhya Pradesh for undertaking these programmes. If the requirement is for more than one FMT and TI in the state, the same may also be indicated.

There has been phenomenal growth in the number of different kinds of farm machinery in the country. For example the number of harvesters was 450 in 1971-72. It increased to 4,100 by the year 1995-96. There was a similar increase in the machinery like power sprayers/ dusters/ mould board ploughs, disc harrows, cultivators, etc.

The Central Farm Machinery Training & Testing Institute, Budni which this Centre was asked to evaluate is the oldest among the similar institutes of the country. Other such institutes are located at Hissar (Haryana), Garladine Anantpur (Andhra Pradesh) and Vishwanath, Chariali (Assam).

**Methodology**

To evaluate the impact of training and testing programmes conducted by CFMT and TI, Budni, lists of trainees trained under different courses during the last three years viz. 1997-98, 1998-99 and 1999-2000 were obtained. Such lists and addresses of trainees were available only for A, C and E series courses. The total number of trainees was 396. Of the 396 trainees 200 trainees were sampled for sending the schedules and questionnaires. Of the 200 trainees , 103 trainees filled the schedules and questionnaires and returned these to us . All the 103 schedules were subjected to further analysis. In addition to 103 schedules 10 trainees who got trraining at the institute in the past were interviewed. The view points of 5 trainees under training at the time of suvery were also obtained. Thus the total number of respondent trainees was 118.

Testing scheduled were got filled from CFMT and TI, Budni, and Central Institute of Agricultural Engineering, Bhopal. Besides, the above two institutes manufacturers schedules were sent to 48 manufacturers. Of the 48 manufacturers 7 responded by returning the schedules. Their experiences as regards testing of farm machinery were noted. For assessing the training and testing infrastructure information was collected in training and testing schedules from 1. CFMT and TI, Budni, 2. Central Institute of Agricultural Engineering, Bhopal. Estimates of number of different machines by the years 2010 and 2020 were made with the help of simple regression analysis.

**Farm Machinery Training**

To know the training infrastructure information collected from CFMT and TI, Budni and Central Institute of Agricultural Engineering, Bhopal was analysed.

The CFMT and TI, Budni has conducted a total number of 12 courses and total number of 26,226 trainees have been trained in the last 44 years. Of the total trainees trained maximum number of 7,552 trainees (28.80 per cent) were trained in A series course. The number of trainees trained in C series course was 4,333 (16.52 per cent). It may be mentioned that not all the courses have been conducted all along the entire period of 44 years. Some courses were conducted for a period of 10 years and some were conducted for 3 years. While some were conducted continuously, others were conducted intermittently.

The Central Institute of Agricultural Engineering, Bhopal, started training courses since 1989-90. The training was imparted in operation/ maintenance/ fabrication of farm machinery from 1989 – 90 till 1999-2000. A total number of 3,135 trainees were trained.

As regards training infrastucture it was noted that at CFMT and TI, Budni, all the necessary machines for training were available in the institute and nothing was needed. Among the professional staff were :

| S.No. | Post | Number |
|---|---|---|
| 1 | Director | 1 |
| 2 | Engineering staff | 11 |
| 3 | Technical staff | 35 |

The capacity of lodging and boarding was for 300 trainees. There was institute's transport facility (bus). Among other infrastructure facilities were lecture halls, workshops, laboratories and library. There was transportation facilities for training of trainees in camp. To motivate the public to attend the training, media like news papers, radio, television, posters, pamphlets circulars to government departments, private companies, gram panchayat meetings were used. For A and C series courses advertisements were given in news papers. For D serious course, college heads were contacted. For TRYSEM training state government departments were contacted. Among the facilities provided to the

trainees were books, notes, other publications, field practicals and practicals on operation of machines. The trainees of C series course were sent on visits to other farms. At the end of each course evaluation was done both of the course and of the trainees.

At the Central Institute of Agricultural Engineering, Bhopal the training infrastructure was adequate and nothing was additionally required. Large number and types of machines were available for training. A total number of 70 professional staff members were in the Institute. There were four lecture halls, four workshops and an equal number of laboratories. There was a library for the benefit of trainers and trainees. Newspapers, circulars to government departments and private companies or individuals and grampanchayat meetings were made use of to motivate people to attend training programmes. Field practicals, practicals in operating machines, visits to other farms and publications of CIAE, Bhopal serve as supplementary tools in training. There was a regular system of assessment of both training and trainees

As regards experiences of trainees of the CFMT and TI, Budni, it was observed that there were 9 sources of information for the trainees. The major sources were relatives & friends (47 per cent), newspapers, (19 per cent), and Agricultural Officers, (14 per cent). Majority of the trainees (64 per cent) commented that training helped them in better utilisation of machinery. The training helped 29 per cent trainees to increase their farm income. Seven per cent trainees said that they learnt better utilisation of pumps and motors. Almost all the trainees were satisfied with the buildings of the training Centre, machinery for training programmes, time given to each trainee, adequacy of training staff and their behaviour. All the trainees learnt something new from the training. It encouraged 93 per cent trainees to improve the agricultural situation of the area. There were 81 per cent trainees who encouraged/ will encourage others to attend the training. Only 18 per cent trainees purchased/ would purchase machines after training.

**Farm Machinery Testing**

As regards farm machinery testing at the CFMT & TI, Budni a total number of 814 machines were tested from 1961-62 to 1999-2000. Of the total machines tested wheeled tractors were maximum (388 in number) and constituted 47.67 per cent of the total machines tested. Diesel engines tested numbered 93 and constituted 11.43 per cent of the total number of machines tested. Power tillers, users survey agricultural implements and harvesting and threshing equipments

were also important. Not all the types of machinery were tested from 1961-62 to 1999-2000. Some were started to being tested during the years between 1961-62 to 1999-2000. While some were tested continuously for some years, others were tested only intermittently.

The target of number of machines to be tested in a year was 25. The data shows that the target was achieved in all the years.

It was commented by the authorities that two machines were desired for better testing facilities. These were :

1. EMISSION TEST EQUIPMENT , and,
2. ROPS MACHINE (Role Over Protective Structure)

It was also commented that although the number of testing Centres in the state was adequate, these needed to be strengthened. The authorities at the Central Institute of Agricultural Engineering, Bhopal also commented that the testing Centres in the state were adequate but the Centres needed to be strengthened.

In addition to getting testing schedules filled up from the two institutes 48 manufactures were requested to fill the manufacturers' schedules. However, only 7 manufacturers responded by sending the manufacturers' schedules, A total number of 14 tractors of the sampled manufactures were tested during the period 1990-2000) The combines tested were 3 and 3 power tillers were tested. Of the total number of manufacturers 71.14 per cent felt that infrastructure available with the CFMT & TI, Budni, was not adequate. They suggested that Emission Test facility was essential. Some of them remarked that ROPS Test facility was also needed. They commented that testing equipments were out dated and therefore, testing required much more time than necessary. The other comments were : test track was worn out there was shortage of funds and man power at the institute. There was need to establish more number of testing centres in different states. Some suggested that concerned manufacturer should be present at the time of testing so that testing and correction of mistake would take shorter period.

**Status of Farm Machinery in 2010 – 2020**

The level of farm machinery over time in the state shows that the number of electric pumps would increase to 15,55,145 by 2009-2010. The number would

further increase to 21,53, 277 by 2019-2020. The number of diesel pumps would be 1,18,856 in 2009-2010. It might further increase to 1,64,567 by 2019 – 2020. The number of tractors is estimated to increase to 2,91,650 by 2009-2010 and to 4,01,403 by 2019- 2020. The number of power driven sugarcane crusher is estimated to be 10,124 in 2009-2010 and 10,890 by 2019- 2020. On the other hand the number of bullock driven crushers would be 10,903 by 2009-2010 and 7,845 by 2019-2020, While the number of wooden ploughs is likely to go down to 5,089 in 2009-2010 and to 4,832 in 2019-2020 that of the number of iron ploughs is likely to increase to 799 in 2009-2010 and further to 1,022 by 2019-2020.

**Policy Suggestions and Action Points**

The training facilities at the CFMT & TI, Budni, are adequate. The trainers, the training machines, hostel facilities, transport facilities, library and laboratories are satisfactory. However, looking to the volume that has to be tackled in future years both training and testing facilities ought to be strengthened and improved. (Ministry of Agriculture, Government of India).

The successful trainees should be advanced loans by the banks so that they would be able to start independent repairing workshops. It will solve the present problem of unemployment among the trainees. (Ministry of Agriculture, Government of India and Ministry of Finance Banking Division).

The testing infrastructure in the state needs to be strengthened. There is need to instal emission test facility and ROPS test facility at CFMT and TI, Budni. (Ministry of Agriculture, Government of India).

Testing a machine is a lengthy and time consuming process. Machines costing more than Rs.20,000 must pass the testing. Similarly all the machines which are both produced and sold in large numbers should be tested because that will benefit both manufacturers and users. It is suggested that training and testing infrastructure should be developed at Jabalpur, Gwalior and Indore under the control of Agricultural Engineers of JNKVV, Jabalpur. (Ministry of Agriculture, Government of India and ICAR, New Delhi).

Looking to the present volume of work of training and testing accomplished by CFMT and TI, Budni, incentives in the form of higher scales of pay seem essential and have been recommended elsewhere in the report. (Ministry of Agriculture, Government of India).

.....