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# List of Abbreviations

|  |  |
| --- | --- |
| AED | Agriculture Engineering Department |
| BIS | Bureau of Indian Standard |
| BT | Batch Test |
| CIAE | Central Institute of Agriculture Engineering |
| CIPHET | Central Institute of Post Harvest Engineering and Technology |
| CMVR | Central Motor Vehicle Rule |
| CRFMTTI | Central Region Farm Mechanization Training and Testing Institute |
| DoA | Directorate of Agriculture |
| DoAC | Department of Agriculture and Coopertion |
| FMC | Field Management Committee |
| FMTTI | Farm Mechanization Training and Testing Institute |
| FYP | Five Year Plan |
| ICAR | Indian Council for Agriculture Research |
| ICT | Initial Commercial Test |
| KVK | Krishi Vigyan Kendra |
| MoA | Ministry of Agriculture |
| MPUAT | Maharana Pratap University of Agriculture and Technology |
| NABARD | National Bank for Agriculture and Rural Development |
| NABCONS | NABARD Consultancy Service Pvt. Ltd |
| NERFMTTI | North Eastern Region Farm Mechanization Training and Testing Insitute |
| NRFMTTI | Northern Region Farm Mechanization Training and Testing Institute |
| OBC | Other Backward Classes |
| OECD | Office of Environmental Compliance and Documentation |
| PP | Plan Period |
| PSAMTTD | Promotion and Strengthening of Agriculture Mechanization through Training Testing and Demonstration |
| SAU | State Agriculture University |
| SC | Schedule Castes |
| SFCI | State Farm Corporation of India Ltd |
| SJGSY | Swarn Jayanti Gram Swarojgar Yojana |
| SRFMTTI | Southern Region Farm Mechanization Training and Testing Institute |
| ST | Schedule Tribes |
| UT | Union Territory |
| SFAC | Small Farmers Agribusiness Consortium |

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# Executive Summary

1. The country's agricultural production has stagnated at a time when the broader elements of the economy have grown. In order to sustain an overall growth rate of 9 per cent, it is imperative for the agricultural sector to grow at 4 per cent. Though India has achieved self sufficiency in food grain production, the last couple of decades have seen the growth rate of food grain production (1.5 per cent) lag behind that of population (1.9 per cent).

2. While efforts such as introduction of high yielding varieties and expansion of irrigated area have played a crucial role in achieving the goal of food self sufficiency in the past, rapidly growing demand for food has brought the need for building efficiencies in agriculture to the forefront. Towards this objective, it is imperative to focus on improving the intensity of farm mechanisation in the country. It facilitates timely, precise and scientific farm operations, increasing farm input and labour use efficiency. This would result in significant improvement of agricultural productivity

3. With this intent, the Department of Agriculture and Cooperation through its Mechanization and Technology Division is following a multi pronged strategy for promoting farm mechanization. The Ministry is implementing the Central Sector Scheme of Promotion and Strengthening of Agriculture Mechanization which was modified for more effective implementation, during the XI Five Year Plan period, while maintaining the funding pattern. The Scheme for Promotion and Strengthening of Agriculture Mechanization through Training Testing and Demonstration was implemented during the XI Five Year Plan period to promote agriculture mechanization by popularising new technology based equipment, human resource development in field of agriculture mechanization and quality improvement of machines and equipments.

## 4. Salient Features of the Scheme

The scheme has five embedded components:

1. Human resource development in the field of Farm Mechanization through existing Farm Mechanization Training and Testing Institutes (FMTTIs).
2. Testing of Agriculture machines and equipments for their performance evaluation and quality up gradation through existing FMTTIs.
3. Demonstration of newly developed agriculture/ horticulture equipments at farmer’s field.
4. Training of farmers by outsourcing the training.
5. Establishment of parallel line for testing for tractors at Central Region Farm Mechanization Training and Testing Institute (CRFMTTI), Budni MP.

## 5. Need for the Study

The Scheme for “Promotion and Strengthening of Agriculture Mechanization through Training Testing and Demonstration (PSAMTT&D)” was implemented during the XI Five Year Plan through different implementing agencies such as FMTTIs, State Governments, Government sponsored Institutions such as ICAR, SFCI and State Agriculture Universities for promotion of agriculture mechanization and strengthening the scope of mechanization of agriculture. The scheme has been implemented in 27 states/Union territories with total financial outlay of Rs.41.29 crore. After completion of the XI Five Year Plan period, the Mechanization and Technology Division under the Department of Agriculture and Cooperation desired to know the status of actual implementation of the scheme with respect to physical and financial progress, availability of infrastructure for implementation of mechanization strategies, extent of adoption of technologies by the farmers and constraints and bottlenecks observed during the implementation of the scheme. Such critical inputs become necessary to further refine and improve the effectiveness of the scheme by improving the overall implementation management plan. Further, before the commencement of the XII Five Year Plan, it was felt essential to evaluate the progress effectiveness and impact of the PSAMTT&D Scheme against the set objectives with a view to carry out required policy change in the scope of activities, coverage, quantum of assistance and refinement in operational guidelines. Accordingly, NABCONS was commissioned to conduct an elaborate and comprehensive evaluation of the scheme.

6. NABCONS adopted a comprehensive approach for evaluation by analysing both primary as well as secondary information available on websites, annual reports and other documents provided by the Department of Agriculture and Cooperation, Farm Mechanization Training and Testing Institutes, Directorate of Agriculture and Central Institute of Agriculture Engineering. Primary information was gathered from the beneficiaries, who had attended the training program in FMTTIs and those organized under outsourcing components by the Directorate of Agriculture and ICAR coupled with interactions with the officials of FMTTIs, DoA and Government Sponsored Institutions (ICAR). The evaluation focussed on effectiveness of training, appropriateness of training program, utilization of training skills, adoption of technology and impact of training and demonstrations.

**7. Study Findings**

* 1. **Fund allocation and utilization**

1. The PSAMTTD Scheme has been implemented through four FMTTIs located in Hissar (Haryana), Budni (Madhya Pradesh), Anantpur (Andhra Pradesh) and Biswanth Chariali (Sonitpur, Assam) and through State Governments and Government sponsored Institutions such as ICAR and SFCI. The FMTTIs conducted Training courses and Testing of the Agriculture Equipments while, in order to broad base the coverage of trainees, the training was also outsourced to State Governments and Government Sponsored Institutions (ICAR & SFCI). The State Government and ICAR also organized demonstration agriculture machineries and equipments.
2. During the XI FYP (2007-2012), the total funds allocated to State Government and Government Sponsored Institutes was Rs.4139.00 lakh, of which the state Government received 88.4% (Rs.3657 lakh) while the Government Sponsored Institutions, viz., ICAR and SFCI received 11.7%.
3. Out of Rs 3657 lakh, Manipur from North East region received the highest allocation of Rs 440 lakh, while Karnataka and Jammu & Kashmir received no allocation during the Plan period.
4. North Eastern Region received 30% of the total funds, while the Western Region received only 7%. The Northern Region (Punjab, Haryana, Uttarakhand, Uttar Pradesh), Eastern Region (Jharkhand, Bihar, West Bengal and Odisha) and the Central Region (Madhya Pradesh and Chhattisgarh) received 20%, 22% and 12% of the total funds allocated to States.
5. It is also observed that only half of the number of States, on an average, received funds each year. Funds were not allocated to Western Region (Gujarat, Maharashtra and Rajasthan) consecutively for two years (2009-10 and 2010-11). In case of Rajasthan and Maharashtra, funds were given only at the end year 2011-12. Thus both intra regional variation and inter state disparity in fund allocation was observed.
6. Only 14 out of 26 states and SFCI utilized more than 60% of the funds received, while 8 states and ICAR utilized only 30% of the funds received.
7. Andhra Pradesh, Tamil Nadu, Kerala utilized the 85% of the funds while the least was utilized by the Government Sponsored Institutions. ICAR utilized only 3% of the allocated funds. The SFCI utilized all the funds allocated to them.
8. Arunachal, Manipur, Meghalaya and Nagaland from the North Eastern region, Tamil Nadu from the Southern region, Chhattisgarh and Madhya Pradesh from the Central region and Haryana, Uttar Pradesh and Uttarakhand from Northern region registered more than 90% fund utilisation.
   1. **Testing of Agriculture Machineries by FMTTIs.**
9. The FMTTIs conduct 2 types of Tests, viz., Commercial and Confidential. The commercial test is further sub categorised in Initial Commercial Test, Batch Teas and OECD.
10. The Central Region Farm Mechanization Training and Testing Institute (Budni, MP), conducted 256 tests of which 229 (89%) were under commercial category and 27 (11%) were under the confidential category.
11. The Northern Region Farm Mechanization Training and Testing Institute (Hissar, Haryana), conducted 456 tests of which 83% were under commercial category while 17% were conducted under confidential category.
12. Southern Region Farm Mechanization Training and Testing Institute (SRFMTTI), conducted 146 tests of which 141 (97%) were under commercial category while 5 (3%) were under confidential category.
13. The North Eastern Region Farm Mechanization Training and Testing Institute (NERFMTTI) conducted 99 tests.
14. The revenue generated from testing of equipments by CRFMTTI and NRFMTTI was Rs.811.95 and Rs.331.39, respectively. The NERFMTTI generated Rs.39.1 lakh from testing during the year 2011-12.
15. With regards to testing of equipments, it was observed that under the Commercial Tests, negligible number of Batch Tests was conducted while a large number of Initial Commercial Tests were conducted.
    1. **Conduct of Training programmes by FMTTIs.**
16. The FMTTIs conducted training courses under 10 different categories under the scheme.
17. User Level Courses
18. Technician Level Courses
19. Management Level Courses
20. Academic Level Training Programmes
21. Awareness Courses through Multi Media System
22. Technology Transfer Camps
23. Training Programmes for Rural Youth Under Swarna Jayanti Grama Swarojgar Yojana
24. Need Based Training Program on Farm Mechanization
25. Training Program for Foreign Nationals
26. Special Training Program.
27. The CRFMTTI trained 9507 beneficiaries against the target of 9200. The participation was more in courses such as Technician level, Academic level and User Level courses in comparison to other courses. A small number of technology transfer camps were organized reportedly due to staff constraints. Of the total trained, 77% belonged to SC and ST category.
28. The NRFMTTI trained 9744 beneficiaries against the target of 9000 under Need based (33%), Academic (35%) and User level (20%), respectively. Trainees belonging to the Scheduled Tribes accounted for a mere 1%.
29. The SRFMTTI trained 7319 beneficiaries against the target of 6700 beneficiaries under the Need based (40%), Awareness through multimedia (22%) and Academic Level courses (18%), respectively. Of the total trained, 25% belonged to the SC category.
30. The NERFMTTI, trained 3758 beneficiaries against a target of 3700 beneficiaries under the User Level courses (38%), Technology Transfer Camps (26%) and Academic course (15%), respectively. Participation under Technical, Management and Need based courses was low.
31. In case of SRFMTTI and NERFMTTI, it was observed that more number of programs of short duration of 1-2 days was conducted in order to meet the overall targets. There is, therefore, a need for fixing course wise targets to be reviewed at the end of each year.
32. Majority of the trainees (86%) who attended the training programs felt that the training programs were relevant while 11% felt it to be partially relevant. Only 3% felt that the training courses were not relevant. Majority of the trainees felt that the training programs were appropriately designed and the contents were relevant and the courses useful. Most of the (97%) of the trainees opined that the duration of training programs was adequate.
33. More than 80% of the training beneficiaries felt that the training materials provided were adequate, boarding and lodging facilities were satisfactory, equipments provided were adequate and also use of the audio visual aids was effective.
34. Post training, 62% reported that the skills and knowledge gained were put to use while 38% had not been able to do so. The use of training skill varied depending on the occupation profile of the trainee and has been presented in para 4.4.8 of the report.
35. The trainees reported positive impact of training courses by way of reduction in hours of field operations by 8% to 13%, reduction in water use by 16% to 40%, increase in production by 17% to 32% and increase in income by 4% to 11%. The technicians and operators reported increase in income by 8% to 20%. There was enhancement of skills level among the beneficiaries.
36. On a scale of 10, the beneficiaries placed the overall impact of the training programs, on an average, at 7. The rating given depended on the occupational profile of the participants; highest being by students (7.21) followed by technicians/operators (7.17) and farmers (7.17).
    1. **Outsourcing of Training and Demonstration**
37. In order to improve the coverage of farmers and youth residing in rural areas, the State Agriculture Departments and the Government Sponsored Institutions organised training programs and demonstration of farm machineries and equipments. A total of 11 states were taken up for evaluating the performance of training programs and demonstration activities conducted by the Government Sponsored Institutions.
38. More than 29 thousand demonstrations were organised by 11 sample states and 191 new implements were introduced under the PSAMTTD Scheme. The States conducted more of demonstration activities than training programs. In many cases, it was observed that the demonstration and awareness camps were also reported as training programs. A total of 560 training programs were organized by two states Tamil Nadu (493) and Madhya Pradesh (67). Among the sample states, Tamil Nadu, Uttarakhand, Madhya Pradesh and Uttarakhand had spent more than 90% of the allocated funds for demonstrations, while Punjab had spent only 12%, West Bengal 22% and Assam 39%. The performance of Assam, Rajasthan, Uttarkhand, and Odisha remained above average while in Andhra Pradesh, it was not significant. However, agriculturally developed state of Punjab failed to utilize the funds and refunded Rs 84.4 lakh out of total Rs 96 lakh back to DoAC after the end of XI FYP.
39. Maharashtra State had received Rs.100 lakh during the month of March 2012, and therefore activities on training or demonstrations were taken up during the year. Rs 6 lakh which was found to be allocated during the year 2008-09 as per the report provided by M&T Division. This was merely an allocation and no fund was actually disbursed as reported by the agriculture department of the state. This amount was provided to Maharashtra Agro Industries Development Corporations for purchase and supply of machineries to agriculture universities. The demonstration and training programs were reported to be in progress.
40. In Rajasthan, MPUAT demonstrated various equipments, of which the garlic planter was demonstrated on a large scale.
41. Overall performance of the PSAMTTD implemented by the State Agriculture Department was satisfactory as the demonstrations played a significant role in popularising the newly developed agriculture machineries and creating awareness among the primary users of agriculture equipments/ machineries.
42. Over 90% trainees found the training to relevant, 10% as partially relevant and 96% felt that the training inputs were appropriate. More than 90% of the participants received the training materials and felt that the training was useful and duration was adequate.
43. Out of 157 beneficiaries, 27% adopted the technology, 45% felt that they had better skills to operate and maintain agriculture equipments, 14% reported lesser breakdown, 38% changed certain farm management practices, 48% trained and helped other farmers in operation and maintenance of equipments and 16% generated additional income after attending the training programs.
44. Out of 157 beneficiaries, 51% reported increase in production, 59% reported reduction in hours of field operations, 54% reported reduction in water use, 46% reported increase in productivity/ income and 89% reported overall change in skill level. Increase in productivity ranged between 23% and 42%.
45. There was, on an average, reduction of 6 hours, in time spent on field operations due to adoption of farm machines.
46. While conducting demonstrations, criteria of average plot size of 0.4 ha (0.98 acre) and one hour, as prescribed in the guidelines, were overlooked in almost all the cases, except in West Bengal. In Uttarakhand, Tamil Nadu, Madhya Pradesh and Punjab the plot sizes were almost 2 to 3 times the prescribed area. In Haryana the average size was the biggest at 5 acres and the average duration was 7 hours. In Haryana, in the guise of demonstration, the laser land leveller was put to own use by farmers.
47. More than 90% of the participants/ host farmers were satisfied with the demonstration activities.
48. Different equipments demonstrated in different States had relative preferences based on the requirement and compatibility with the agricultural practices. The laser land levellers, rotavators, zero till drills are preferred in Haryana, rotavators and seed drill were preferred in Madhya Pradesh, while paddy transplanters were preferred in Punjab, Tamil Nadu and Odisha (see table 64).
49. Out of 185 respondents, 42% reported full adoption mostly through hiring on custom basis and 37% purchased the machinery. Another 38% were inclined to purchase the machineries if the cost was subsidised. However, the farmers also responded that machineries were not readily available in the market and 68% were unaware of the place from where they could be purchased.
50. Post demonstration, the machines remained idle for long period of time without proper protection leading to depreciation. In Uttarakhand, Rajasthan and Tamil Nadu, the machines were lent to farmers for their field operations free of cost. Tamil Nadu was the exception where charges were levied and transferred to the Central Government.

**8. Recommendation for improving the effectiveness of the Scheme**

* 1. **Training at FMTTIs**

1. In view of the tendency on the part of the FMTTIs to organise short duration courses only to achieve over all targets, training program wise/ course wise targets should be fixed.
2. Separate targets for the technology transfer camps, which played a significant role in adoption of technology at grassroots, should be stipulated.
3. With a view to expand the reach of the Scheme, extension centres of FMTTIs may be established in the states where FMTTIs are not located.
4. The new course may be redesigned as a refresher or crash course in addition to the existing courses with shorter duration as majority of the trainees were already aware of the major portion of the training inputs of the Academic course.
5. The old equipments may be replaced and it should be ensured that machineries used for training are in good condition.
6. Inputs of User Level courses need to be upgraded to provide appropriate inputs for upgrading the skills of the trainees. The training cell of FMTTIs may appropriately design a separate module as a hybrid of user and technical level courses.
7. There is need to increase the duration of hands-on experience in training, repair, maintenance and operations.
8. Logistic arrangements, particularly lodging, suitable to women trainees may be ensured to improve their participation. Separate targets may be given and seats may be reserved for women trainees.
9. Proper system of maintaining information relating to coverage of beneficiaries may be instituted to obtain feedback from the trainees to analyse the impact of training and make improvements in training inputs, etc., if necessary.
   1. **Testing at FMTTIs**
10. Targets for undertaking Testing activities should be decided based on the testing capacity of each testing centre of FMTTI and the types of equipments/ machineries to be tested. Proper staff strength and supporting infrastructure needed by the Institutes should be provided.
11. Number of confidential tests conducted by the FMTTIs was negligible as compared to commercial tests. Further, number of machines tested under commercial sub categories (ICT, BT and OECD) was not easily available from NRFMTTI, SRFMTTI and NERFMTTI. As per the information available from the CRFMTTI, under commercial category, most of the tests were done under Initial Commercial Test. Only 7% of the tests were conducted under Batch Test and OECD sub categories. Therefore, separate targets for testing of tractors for ICT, BT and OECD should be fixed.
12. Formats for reporting post test results may be simplified for easy understanding of local manufacturers of agriculture equipments.
13. In view of the views expressed by the institutes, adequacy of staff may be assessed, particularly with reference to off campus activities such as organizing Technology Transfer Camps, etc., and the required number of staff may be recruited.
14. Keeping in view the fast changing technology scenario, it is recommended that the staff and engineers involved in testing of equipment and training may be given adequate opportunity to enhance their skills though advance training courses both within and outside the country.
15. Conferences and workshops involving local manufacturers and large brand manufacturers may be organised to provide a platform for cross learning and creating conducive environment to enable the FMTTIs to get feedback from the manufacturers on the prevailing market demand for different farm equipments and their performance.
16. The testing equipments and test rigs used under different labs are brought and customized at FMTTIs which are too sophisticated for the local mechanics. These machines are prone to frequent breakdown and due to non availability of trained technical staffs at the institution, the machines are not repaired in time. A permanent cadre of trained mechanics at each FMTTI may be created to address the problems of such delays.
17. The replacement of old and obsolete test equipments and computers at FMTTI will improve the overall efficiency of the institution.
    1. **Outsourcing of Training and Demonstration**
18. Disparity in fund allocation both inter region and interstate level was observed. It is therefore, recommended that allocation of funds should be based on proper assessment of the requirements of various states taking into consideration the previous performance and future needs.
19. The total allocation of funds made to ICAR and SFCI during the XI Five Year Plan period was Rs.482 lakh. As per the information provided by the Farm Mechanization and Technology Division, FMTTI, the utilization made by ICAR remained low at 3%, which is a matter of serious concern. The Mechanization and Technology Division, DoAC (MoA) may put in place an effective monitoring mechanism to ensure that the funds allocated are utilised by the Institutions.
20. In most of the cases the training programs were organized through the district units of State Agriculture Departments. These programmes appeared to be more in the nature of awareness campaigns than training programs due to lack of appropriate infrastructure and technical manpower support. It is therefore recommended that, proper advance planning may be made by the Department of Agriculture/ Agriculture Engineering for collaborating with SAUs and other eligible institutions who could conduct the training programs effectively. Also, the training facilities available with the existing KVKs at district level and other such institutions with appropriate infrastructure may be identified well in advance and used for organising training activities rather than making them mere demonstration and awareness camps.
21. Maharashtra, Haryana and Rajasthan received funding at the fag end of the financial year. This defeats the very purpose of training and demonstration as agriculture is a seasonal activity and the implementing agencies are left with little time to plan the activities to organise meaningful training or demonstration. Therefore, it is necessary that funds are released at the beginning of financial year, after obtaining information on the unspent funds of the previous years, to facilitate proper planning and implementation of activities in time.
22. During the interactions with the district level functionaries of the State Agriculture Department, it was observed that the guidelines governing the Centrally Sponsored Schemes are generally not adhered to in view of the fact that the State functionaries are more conversant and comfortable with the guidelines issued by the State Agriculture Departments for implementation of similar schemes implemented by the State Government. For example, the financial targets given for demonstration of agri-implements for the benefit of large section of farmers are met by way of release of subsidy for purchase of agri-implements by select farmers at the village level on the presumption that through them other farmers would come to know about the implements. This was more in tune with the similar scheme implemented by the State Governments. Hence there is a need for ensuring uniformity in the guidelines of the Central and State Government in respect of similar schemes, keeping in view the overall objectives of the Schemes.
23. The machineries and equipments used for demonstration by the State Agriculture Departments are kept in open under the direct exposure of sun and rain resulting in faster depreciation. There is a need for additional infrastructure such as sheds for proper safekeeping of the machines and equipments.
24. Provision towards contingency expenditure for hiring of prime movers to undertake demonstration of equipments/machineries is inadequate and becomes a constraining factor, particularly for hilly states. Hence, it is felt by the officials that provision for contingency should be enhanced suitably to meet the expenditure for hiring prime movers, travel of staff undertaking and monitoring the demonstration. For hilly states the contingency should accordingly be revised from the current level of 1.5 times of the limit for non hilly areas. For demonstration of heavy equipments, provision of prime movers along with loading and unloading devices would help carrying the equipments to distant places for demonstration.
25. In most of the states, one common constraint reported was the lack of technical manpower/ operators required for conducting demonstration. It is suggested that competent technical manpower/ operators could be hired on contract basis. These contractual staff could also be used for providing services to farmers on custom hiring of equipment/ machineries.
26. The scale of demonstrations could be increased more effectively through the Farmers’ Producer Organizations (FPOs) under the FPO Initiative Project (FPO-IP) of Small Farmer’s Agribusiness Consortium (SFAC). These FPOs can act as important medium for popularising farm mechanization among the small and medium scale farmers. Hence, a collaborative effort may be initiated between the M&T Division of MoA and SFAC.
27. Government should encourage financial institutions to extend credit for setting up of centres for custom hiring of agriculture machineries . Such financing may be covered under the Credit Guarantee Scheme of the Credit Guarantee Fund Trust for Micro and Small Enterprises. MoA may evolve a Venture Capital Assistance Scheme to fund the shortfall in margin to be brought in by borrowers for availing such loans.

# Chapter 1: Introduction

Ministry of Agriculture, Government of India has estimated that the total food grain production of the country has increased from 196.8 million tonnes in year 2001-02 to 259.29 million tonnes by 2011-12, reflecting a compounded annual growth rate of 3%. The country has attained self sufficiency in food grain production, oil seeds, horticulture crops production, milk, poultry etc. Agriculture machineries have played a crucial role in increasing the productivity and overall production through mechanization of production and post production process of agriculture. The mechanization has adequately facilitated timely field operations, conservation and judicious application of water, appropriate post harvest operations to reduce losses, value addition to the produce for enhanced economic return and employment generation. Thus there is a strong linear relationship between farm power available and agriculture productivity.

## 1.1 Challenges of Farm Mechanization

Farm mechanization has contributed in increased food production and improvement the overall living standards of farmers, though a number of arguments have also been advanced against farm mechanization such as, small and scattered land holding affecting the feasibility, lack of capacity of the small and marginal farmers to invest in mechanization, lack of proper knowledge of farmers to purchase, operate and maintain farm machinery properly, lack of repair and replacement facilities especially in remote rural areas etc. All these factors result in uneconomical use of farm machines and idling of machinery leading to depreciation. Investment in farm machinery becomes economical only if it is gainfully employed.

## 1.2 Scope of Mechanization

Farm Mechanization, despite its existing challenges, has brought about significant improvement in agriculture productivity. There is therefore a strong need for mechanization of agriculture operations. Need for timeliness of operations, quality and precision of operations, achieving higher productivity of land and labour, reducing cost of production and increasing employment opportunities both on farm and non-farm sectors through increase in area under cultivation through, multiple cropping, development of agro industries and related services, justify the need for mechanization of agriculture in the country.

The adoption of machine in farming operation is increasing day by day as it is resulting in saving of cost of production and increase in income of the farmers. The farming operations in India are labour intensive. Despite high population in the country, there is acute shortage of man power for farming operations. The operational cost of human energy is more as compared to machine energy in farming (Karale et al. 2008, khambalkar et. al. 2010). The use of machine in farming operation has resulted in sustainable growth with lower cost of operations. There has been a realisation among the farmers, policy makers and development agencies that for increasing production and productivity and reduction of cost of production, agriculture mechanisation free of arduous labour input is essential.

With this intent, the Department of Agriculture and Cooperation through it Mechanization and Technology Division has adopted a multi pronged strategy for promoting farm mechanization. The Department of Agriculture & Cooperation (MoA) is implementing the Central Sector Scheme of Promotion and Strengthening of Agriculture Mechanization through Training Testing and Demonstration which was modified for more effective implementation, during the XI Five Year Plan, while maintaining the existing funding pattern. The Scheme for Promotion and Strengthening of Agriculture Mechanization through Training Testing and Demonstration was implemented during the XI Five Year Plan to promote agriculture mechanization by popularising new technology based equipment, human resource development in the field of agriculture mechanization and quality improvement of machines and equipments.

## 1.3 Components of the Scheme & Salient Feature

The scheme has five embedded components:

1. Human resource development in the field of Farm Mechanization through the Farm Mechanization Training and Testing Institutes (FMTTIs).
2. Testing of Agriculture machines and equipments for their performance evaluation and quality up-gradation through the FMTTIs.
3. Demonstration of newly developed agriculture/ horticulture equipments on the farmers’ fields.
4. Training of farmers by outsourcing the training.
5. Establishment of parallel line for testing for tractors at Central Region Farm Mechanization Training and Testing Institute (CRFMTTI), Budni MP.

A brief of each component of the Scheme is presented below:

1. Human Resource Development through FMTTIs: The four Farm Machinery Training and Testing Institutes were established in four states of Madhya Pradesh (Budni), Haryana (Hisar), Andhara Pradesh (Garladinne) and Assam (Biswanath Chariali). These four institutions are expected to play a lead role in the development of human resource through different training and academic courses. The training institutes have structured training courses that include User level courses, Technical Level courses, Earning while learning courses, Management Level Courses, Academic Level Training courses, Awareness Level courses through multimedia system and Technology Transfer Camps which are organized off campus. The training courses are designed to accommodate participants from varied backgrounds such as users, trainers, academicians, officials of state Governments, entrepreneurs, manufactures and apprentices from industries.
2. Testing of Agriculture Machines and Equipments: The four FMTTIs are set up to cater to the need of testing and evaluating the performance of agriculture machineries/ equipments and their quality up-gradation. The Central Farm Machinery Training and Testing Institute (CRFMTTI) at Budni tests tractors as per the Bureau of Indian Standards (BIS) and Office of Environmental Compliance and Documentation (OECD). The institute is also authorised to test combine harvesters for compliance under Central Motor Vehicle Rule (CMVR). The Northern Region Farm Mechanization Training and Testing Institute (NRFMTTI) at Hissar tests combine harvesters, plant protection equipments, irrigation pumps and diesel engines. The institute is also authorised to test combine harvesters and other crop production equipments. The Southern Region Farm Mechanization Training Testing Institute (SRFMTTI) located at Anantpur in Andhra Pradesh tests power tillers, self propelled crop production machines/equipments including power drawn agricultural machines and equipments. The North Eastern Region Farm Mechanization Training and Testing Institute (NERFMTTI) at Biswanth Chariali (Assam) tests bullock drawn equipments and any other power driven agriculture machines in order to meet the requirements of manufacturers of Eastern and North Eastern Regions.
3. Demonstration of newly developed agriculture equipments: Demonstration of newly developed agriculture and horticulture equipments are carried out under the scheme with the objective of disseminating information on the technology and induction of these improved technology at the field level. Demonstration activities were included since the IX Five Year Plan. Funds for demonstrations are provided to the State Government and Government Organizations such as Indian Council for Agriculture Research (ICAR) and State Farm Corporation of India Ltd (SFCI) for the purpose of demonstration.
4. Training of Farmers through outsourcing: This component has been designed to supplement the efforts of FMTTIs in human resource development by including additional set of farmers/ users of agriculture implements to improve their technical knowhow on the use of agriculture implements and ensure their effective and efficient utilization.
5. A new component of establishment of parallel line for testing for testing for tractors at CFMTTI was added in order to upgrade and modernize the existing infrastructure to meet international standards, improve the capacity of testing and reduce the waiting time and testing time of tractors.

## 1.4 Need for the Study

The Scheme for “Promotion and Strengthening of Agriculture Mechanization through Training Testing and Demonstration (PSAMTT&D)” has been implemented during the XI Five Year Plan (2007-12) through different implementing agencies such as FMTTIs, State Governments; Government sponsored Institutions such as ICAR, SFCI and State Agriculture Universities for promotion of agriculture mechanization and strengthening the scope of mechanization of agriculture. The scheme has been implemented in 26 states/Union territories with total financial outlay of Rs.41.29 crore. After completion of the XI Five Year Plan, the Mechanization and Technology Division under the Department of Agriculture and Cooperation desired to know the status of actual implementation of the scheme with respect to physical and financial progress, availability of infrastructure for implementation of mechanization strategies, extent of adoption of technologies by the farmers and constraints and bottlenecks observed during the implementation of the scheme. Such critical inputs become necessary to further refine and improve the effectiveness of the scheme by improving the overall implementation management plan. Further, before the commencement of the XII Five Year Plan, it was felt essential to evaluate the progress, effectiveness and impact of the PSAMTT&D Scheme against the set objectives with a view to carry out required policy changes in the scope of activities, coverage, quantum of assistance and refinement in operational guidelines. Accordingly, the Mechanization and Technology Division has assigned the responsibilities to NABCONS to conduct an elaborate and comprehensive evaluation of the scheme with specific Terms of Reference.

## 1.5 Term of Reference

The Terms of Reference of the Evaluation Study of the scheme for Promotion and Strengthening of Farm Mechanization through Training Testing and Demonstration has been categorised under three broad heads:-

1. Training and Testing at FMTTIs
2. To evaluate the training and testing programmes being conducted at the existing four FMTTIs located Budni (MP), Hisar (Haryana), Garladinne (Andhra Pradesh) and Biswanath Chariali (Assam) with respect to their adequacy, usefulness and effectiveness.
3. To assess the contribution of training and testing programmes in the development and modernization of agriculture.
4. To suggest restructuring of training programmes on agriculture mechanization on regional basis for the benefits of respective states/ UTs.
5. To suggest measures to improve the quality of implements/ equipments being manufactured locally.
6. Outsourcing of Training
7. To evaluate the usefulness and effectiveness of training programmes being conducted by State Government/ ICAR under the Scheme and through identified institutions and to suggest possible improvements in all dimensions of the programme.
8. Demonstration of Newly Developed Agriculture Equipment
9. To study the impact of the demonstration programme towards the adoption of new technology/ equipments in the demonstration area as well as in the states.
10. To study the role of new equipments in enhancing the agriculture production and productivity and reduction in drudgery associated with farm operations.
11. To assess the opinion of the farmers about their area/ crop specific requirement of the mechanization.
12. To suggest any improvements that may be required in this component

# Chapter 2: Research Design & Methodology

In order to evaluate the performance of the PSAMTTD Scheme, the study has adopted a holistic approach to collect data on select parameters such as Training, Testing, Demonstration and its type, adoption of technology and its impact on different variables such as production, drudgery reduction and opinion of farmers with respect to the technology demonstrated/ adopted and its usefulness.

Keeping in view the implantation modalities, all the three implementing agencies, viz., FMTTIs, State Governments and ICAR institutions, were covered in the study. Samples from each category of beneficiaries such as, trainees, entrepreneurs, manufacturer, host farmers of demonstration and demonstration participants were included which helped to consolidate their opinions on the impact of the scheme.

## 2.1 Types of Data Used for the Study

Both primary and secondary data have been analysed in the study.

Primary Data: Primary data were collected from the project beneficiaries and implementers of the scheme from the sampled states and institutions. The primary data was collected using four separate structured questionnaires covering beneficiaries who attended training programs of different levels such as Management Level, Academic level, Technical Level and User level at FMTTIs and through State Agriculture Department and ICAR sponsored institution (which incidentally is Central Institute of Agriculture Engineering). A separate check list based questionnaire was administered for the head/ lead person of the implementing agencies to collect physical and financial progress and detailed qualitative responses.

Secondary Data: The secondary data were collected in the form of disbursement and utilization of funds, physical progress of training, testing and demonstration programmes, from Mechanization and Technology Division, Dept of Agriculture & Cooperation (MoA), Directorate of Agriculture (DoA), FMTTIs, and CIAE (Bhopal) The annual reports from FMTTIs and consolidated report from the website of MoA were analysed.

## 2.2 Sampling Design

The scheme has been implemented in 27 states/ UTs with the help of respective State Governments, FMTTIs and Government Sponsored Institutions (ICAR and SAUs). Since the components of the Scheme mainly consist of training, testing and demonstration, the sampling framework involved the following approach:-

1. The coverage of scheme was spread across 26 states/UTs, to cover states from all the regions to get a comprehensive feedback. All the states and UTs covered under the scheme were grouped into six zones, i.e. North Eastern Region, Eastern Region, Central Region, Northern Region, Western Region and Southern Region.
2. Depending on the number of states falling under each region, the states were selected from each zone which varied from minimum 1 to maximum 3 state/s in a region. Data on allocation of funds provided by the Mechanization & Technology Division, DoAC (MoA) were also considered while selecting the states from each region so as to get a mixed sample.
3. A total of 1110 beneficiaries were sampled for administering the interviews keeping in view the total number of 30400 beneficiaries trained by the FMTTIs as per their Annual Reports, considering 95% confidence level and confidence interval of 3%.
4. Since the number of actual demonstration conducted and number of participants was not available, the numbers of host farmers and those who participated during the demonstrations were selected in consultations with the staffs implementing the scheme on ground.
5. The total samples targeted for personal interviews under PSAMTT&D Scheme were 1470 across all the states comprising 1110 beneficiaries from training, 50 host farmers and 310 demonstration participants. The actual sample covered was 1071 beneficiaries.

## 2.3 Selection of Institutions

Basically, there were three different types of institutions involved for training, testing and demonstration activities, viz., the FMTTIs, the Directorates of Agriculture and the CIAE (which falls under the purview of ICAR). Respondents were selected from each type of institutions so as get a comprehensive feedback on motivation of joining training, effectiveness of training courses, appropriateness of training logistic, utilization of training courses and impact of training of different variables. A separate questionnaire was developed to capture the details of implementation during the XI Five Year Plan at the level of each institutions, their insights, bottlenecks, constraints and ways forward towards improving the scheme interventions.

## 2.4 Limitations of the Study

The study has the following limitations:

i) A sample of states where the scheme has been implemented has only been covered.

ii) Due to high asymmetry of information related to training, demonstration and types of demonstration at different levels and lack of maintenance of data in proper format by the respective FMTTIs, State Governments and the ICAR sponsored institutions considerable efforts and time had to be spent to compile the list with required details. Further the basic information on the status of mechanization, fund utilization and progress under the scheme was not made available on time to the study team. In certain cases the data was not made available to the study team at all. These factors resulted in serious impediments to the study and resulted in delay in completion of the study.

Table 1 Sample Coverage under PSAMTT&D Scheme

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Region** | **States** | **Institutions** | **Sample Targeted** | | | | | | | | **Actual Coverage** |
| **Training1[[1]](#footnote-1)** | | | | | **Demonstration** | | **Total** |
| **UL** | **TL** | **ML** | **AL** | **NB** | **Host Farmer** | **Demo Participant** |
| Southern Region | Andhra Pradesh | SRFMTTI | 30 | 20 | - | 60 | 100 | - | - | 210 | 210 |
| DoA | 20 | - | - | - | - | 3 | 30 | 53 | 0 |
| Tamil Nadu | DoA | 30 |  |  |  |  | 5 | 30 | 65 | 85 |
| North Eastern Region | Assam | NERFMTTI | 100 | 30 | 0 | 50 | 30 | - | - | 210 | 158 |
| DoA | 10 | - | - | - | - | 2 | 20 | 32 | 22 |
| Western Region | Maharashtra | DoA | 30 | - | - | - | - | 5 | 30 | 65 | 0 |
| Rajasthan | DoA | 10 | - | - | - | - | 2 | 20 | 32 | 43 |
| Northern Region | Punjab | DoA | 10 | - | - | - | - | 2 | 20 | 32 | 22 |
| Haryana | NRFMTTI | 50 | 10 | 2 | 90 | 80 | - | - | 232 | 146 |
| DoA | 30 | - | - | - | - | 5 | 30 | 65 | 41 |
| Uttarakhand | DoA | 10 | - | - | - | - | 2 | 20 | 32 | 23 |
| Central Region | Madhya Pradesh | CRFMTTI | 50 | 70 | 18 | 80 | 10 | - | - | 230 | 127 |
| CIAE | 30 | - | - | - | - | 5 | 30 | 65 | 79 |
| DoA | 20 | - | - | - | - | 4 | 20 | 44 |
| Eastern Region | Orissa | DoA |  | - | - | - | - | 10 | 40 | 50 | 49 |
| West Bengal | DoA | 30 | - | - | - | - | 5 | 20 | 55 | 66 |
| **Total** | | | **460** | **130** | **20** | **280** | **220** | **50** | **310** | **1470** | **1071** |

# Chapter 3: Contextual Background and Implementation

It is a well known fact that agriculture mechanization has played a very significant role in overall improvement of agriculture scenario in India, during the post Independence period particularly after the seventies. Mechanization has not only reduced the duration of agriculture operations but considerably contributed towards the overall production pattern in the country through conservation of inputs, reduction of drudgery and improvement of the overall efficiency in production process. There has been significant increase in adoption of agriculture machines over a period of time. The increased use of farm machines has found expression in the phenomenal expansion of cropped area and cropping intensity and country’s agricultural production on all fronts. The shift has also helped in diversification of agriculture from conventional crops to commercial crops. The programmes of farm mechanization has resulted in adoption of farm machinery such as tractors, power tillers, combine harvesters, irrigation equipment plants protection equipments, threshers, improved implements and hand tools.

While the progressive Indian farmers supported by agricultural machinery and tractor manufactures played key role in the growth of agricultural mechanization, an equally important contribution to this growth was made by Central and State Governments and various organizations under their fold through a large number of programmes to facilitate transformation of Indian agriculture. The Central Tractor Organization, Training and Testing Institutions, State Agro Industries Corporations, Agriculture Universities, Krishi Vigyan Kendras, Central Institute of Agriculture Engineering (CIAE), Central Institute of Post Harvest Engineering and Technology (CIPHET) and Indian Council of Agricultural Research (ICAR) contributed their share to the development and progressive acceptance of agricultural mechanisation in India.

The Scheme for Promotion of Agriculture Mechanization and Strengthening through Training, Testing and Demonstration has been implemented in the country across 27 states/UTs. The schemes has been implemented with the help Farm Mechanization Training and Testing Institutes which are located in four states viz., Haryana, Madhya Pradesh, Andhra Pradesh and Assam, State Directorate of Agriculture and Government sponsored institutes (ICAR and SFCI). The CIAE located at Bhopal has implemented the program across different states through Krishi Vigyan Kendras (KVKs).

3.1 Component of Scheme

There are three broad components of the schemes which are presented below:

The Promotion and Strengthening of Agriculture Mechanization through Training, Testing and Demonstration Scheme includes components related to Training of Human Resources, Testing of equipments and Demonstration of newly developed equipments.

Training and Testing: Four Farm Mechanization Training and Testing Institutions (FMTTI) were set up to cater to the need of Training and Testing of Agriculture equipments and Machineries. These institutions are located in Madhya Pradesh (CRFMTTI, Budni), Andhra Pradesh (SRFMTTI, Garladinne, Anantpur), Haryana (NRFMTTI, Hissar) and Assam (NERFMTTI, Biswanath Chariali). These institutions train farmers, trainers, officials of State Governments and entrepreneurs/ manufacturers in the field of agriculture mechanization through their structured training programmes. These institutions play a lead role in development of human resources for agriculture mechanization and effect improvements in the quality of agricultural equipments through assigned mandate of Performance Testing and Evaluation. The training program designed by the institutions can be broadly categorised as under:

1. User Level Courses
2. Technician Level Courses
3. Management Level Courses
4. Academic Level Training Programmes
5. Awareness Courses through Multi Media System
6. Technology Transfer Camps
7. Training Programmes for Rural Youth Under Swarna Jayanti Grama Swarojgar Yojana
8. Need Based Training Program on Farm Mechanization
9. Training Program for Foreign Nationals
10. Special Training courses.

Outsourcing of Training: To enlarge the coverage of farmers and rural youth and supplement the efforts of FMTTIs, the training programmes are also arranged through certain indentified institutions such as State Agriculture Universities (SAUs), Agriculture Engineering Colleges/ Polytechnics and ICAR institutions such as Central Institute of Agriculture Engineering (CIAE) located at Bhopal. The duration of training programmes range from one week to a month and organized for a batch size of 20 to 25 farmers.

Demonstration of Newly Developed Agriculture Equipments: The demonstration component, largely focussing on dissemination of technology for popularisation and adoption by the farmers at the field level, positively impacts the efficiency and reduces wastage/ input costs. Under this component equipments developed for crop production, value addition and horticulture related activities are demonstrated with the objective of educating farmers with their utility and adoption. Funds are provided by the Ministry of Agriculture to the State Governments and Government Organizations such as ICAR, SFCI etc.

## 3.2 Fund Allocation under the PSAMTTD Scheme.

### 3.2.1 Year wise Fund Allocation

During the XI Five Year Plan, the scheme has been implemented across 27 states/union territories. The total financial allocation made during the XI Five Year Plan under the Centrally Sponsored Schemes (CSS) of PSAMTTD for demonstration of newly developed equipments and outsourcing of training was Rs 4139 lakh. The year wise fund allocation during the XI Five Year Plan is given in figure 1 below.

Figure 1 Year wise financial allocation for demo and outsourcing of training in PSAMTTD

Allocation for demonstration of newly developed agriculture equipments and outsourcing of training component under the scheme was highest during the financial year 2010-11 and lowest during the year 2009-10. The years 2010-11 and 2009-10 accounted for 31% and 6% of the total fund released during the entire XI Five Year Plan, respectively. Year wise percentage of fund allocation under demonstration and outsourcing of trainings is presented in figure 2 below. The year wise state wise fund allocation can be seen in Annexure-1

Figure 2 Year wise percentage fund allocation for demonstration and outsourcing training.

As can be inferred from the above figure, the highest allocation of fund (31%) was made during the year 2010-11 followed by 28% during 2011-12, 20% during 2008-09, 15% during 2007-08 and only 6% during 2009-10. Thus there was no uniformity in fund allocation during the XI Five Year Plan. A higher percentage of fund allocations for the activities were allocated during the end years of XI Five Year Plan.

### 3.2.2 Institution wise fund allocation

Out of the total fund of Rs. 4139 lakh allocated for the demonstration and outsourcing of training programmes, 88% (Rs. 3657) was released to State Governments and the rest 12% was allocated to Government Institutions such ICAR and SFCI at Rs. 384 lakh and Rs. 98 lakh, respectively.

Figure 3 Institution wise financial allocation during XI FYP

Out of Rs 3657 which was allocated to States, Manipur received the highest at Rs 440 lakh accounting for 12% of the total funds allocated during the XI Five Year Plan. The median fund allocation estimated per state was Rs 122 lakh. However states such as Karnataka and Jammu & Kashmir received no fund for the activities. Figure 4 below gives a snapshot of fund allocated to states during the XI Five Year Plan.

Figure 4 State wise fund allocation for demonstration and outsourcing training during XI FYP

As evident from figure 4, the states with larger geographical area and number of farmers such as Rajasthan, Andhra Pradesh and Karnataka received comparatively lower fund allocation or even no allocation.

### 3.2.3 Zone wise fund allocation

The states were divided into six zones; North Zone (Haryana, Himachal Pradesh, J&K, Punjab, UP, UK), South Zone (AP, Karnataka, Kerala, Tamil Nadu), East Zone (Bihar Jharkhand, West Bengal, Odisha), West Zone (Gujarat, Maharashtra, Rajasthan), Central Zone (MP, Chhattisgarh), North East Zone (Arunachal Pradesh, Assam, Manipur, Mizoram, Meghalaya, Nagaland, Tripura & Sikkim). The zone wise allocation of fund also revealed an uneven distribution of fund for demonstration and training programmes across different geographic regions of the country, as indicated in the following table:

Table 2 Zone wise fund allocation for demonstration & outsourcing training programmes

|  |  |  |
| --- | --- | --- |
| Zone | Fund Released | Allocation (%) |
| Northern Zone | 718 | 20% |
| Southern Zone | 342 | 9% |
| Eastern Zone | 812 | 22% |
| Western Zone | 260 | 7% |
| Central Zone | 421 | 12% |
| North Eastern Zone | 1104 | 30% |
| Total | 3657 | 100% |

As becomes evident from the table 2 above, Southern, Western and Central zones received allocation ranging from 7% to 12% of the total fund allocated to the states. North Eastern Region accounted for a major share at Rs. 1104 lakh, being 30% of the total allocation. Even within the regions, the financial allocation remained skewed as could be observed from the table 3.

Figure 5 No of states allocated financial assistance during the XI FYP

During the XI Five Year Plan only 50% of the 27 states, on an average received the financial allocations for demonstration and training programmes each year. Even within the zones, not all the states got the assistance in a year. There was no fund allocation to the states in Western Zone during two consecutive years 2009-10 and 2010-11. In contrast, the central zone comprising of Madhya Pradesh and Chhattisgarh were allocated funds every year during the XI Five Year Plan except in the year 2009-10. Thus an intra regional variation in fund allocation was observed during the XI Five Year Plan.

### 3.2.4 Zone wise shares of fund allocation

It was also observed that the out of the total budgetary allocation, a significant share of 55% was allocated during the last two years of XI FYP. In contrast only 20% and 19% was allocated during the initial two years of XI FYP. Table 3 below gives the details of percentage of allocation of funds for demonstration and outsourcing training programme for each zone. A comprehensive picture for each state could be seen in Annexure-2.

Table 3 Year wise/ zone wise share of fund during the XI FYP

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Zone** | **Total fund allocated (Rs lakh)** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** |
| South Zone | 342 | 23% | 25% | 18% | 20% | 15% |
| North East Zone | 1104 | 12% | 13% | 6% | 34% | 35% |
| Eastern Zone | 812 | 5% | 12% | 7% | 24% | 52% |
| Central Zone | 421 | 31% | 22% | 0% | 20% | 28% |
| Western Zone | 260 | 52% | 2% | 0% | 0% | 46% |
| Northern Zone | 718 | 14% | 40% | 10% | 26% | 10% |
| Govt Institutions | 482 | 2% | 21% | 0% | 77% | 0% |
| **Total/average** | **4139** | **20%** | **19%** | **6%** | **29%** | **26%** |

Though North East Zone received the highest share of the total financial allocation, nearly 70% of its share was received during 2010-11 and 2011-12. In case of Eastern Region as well as Government Institutions (ICAR and SFCI) too, similar allocations was observed. Western Region comprising of states of Maharashtra, Gujarat and Rajasthan having received more than 50% financial assistance of Rs135 lakh in 2007-08 received almost no assistance during the three consecutive years from 2008-09 to 2011-12. The rest 46% was allocated during the last financial year of XI Five Year Plan. Thus, there was no uniformity in allocating funds to states within the zone.

### 3.2.5 Fund Utilization

During the XI FYP period, out of Rs. 4139 lakh allocated for demonstration and outsourcing of training programmes, Rs.2667 lakh was utilized leaving Rs.1471.89 lakh unspent, accounting for 36% of the total fund allocation. Nine out of the 27 State Governments and one of the 2 Government Organizations (ICAR) utilized 30% of the allocated funds. In all 15 states as well as SFCI utilized 60% to 100% of the funds allocated (see Annexure-3 for state wise/ institution wise details). Only five states, viz., Arunachal Pradesh, Manipur, Meghalaya, Nagaland and Haryana utilized 100% of the allocated funds. SFCI which received funds during the first two years of XI Five Year Plan only also utilized 100% of the allocated funds. In contrast, the states like Rajasthan did not utilize even a small allocation of Rs 19 lakh during the year 2011-12. Karnataka did not receive any allocation during the XI FYP period. However it had an unspent balance of Rs 21.62 lakh out of the allocations made during the previous five year plans. The State, however, did not show any progress during the XI FYP. Similar situation was observed the case of Jammu & Kashmir also. Table 4 below presents the extent of State wise fund utilization in demonstration and outsourcing of training programmes.

Table 4 State wise extent of fund utilization

|  |  |  |  |
| --- | --- | --- | --- |
| **Percent Utilized** | **No of States** | **Percent** | **Cumulative (%)** |
| (0-30)% | 9 | 31% | 31% |
| (30-60)% | 5 | 17% | 48% |
| (60-100)% | 15 | 52% | 100% |
| **Total** | **29** | **100%** |  |

The figures provided by the Mechanization & Technology Division of Department of Agriculture and Cooperation (MoA) indicated unspent of Rs 3.26 lakh and Rs. 1468.63 lakh under training and demonstration component, respectively.

### 3.2.6 Zone wise Utilization of Fund

Zone wise analysis of fund utilization is presented in table 5 below. The last row of the table also presents the total fund allocated to Government Organizations - ICAR and SFCI. Performance of the central zone consisting of states of Madhya Pradesh and Chhattisgarh was the best. Of the total Rs. 421 lakh allocated, 96% was utilized for the demonstration and training programmes. Utilisation by ICAR was poor at 3% of Rs.384 lakhs allocated to it. In contrast, SFCI utilised 100% of the Rs 98 lakh allocated to it.

Table 5 Trend in Zone wise utilization of allocated funds for demonstration and outsourcing training programmes

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Zones** | **Fund Allocated (Rs. Lakh)** | **(%)** | **Fund Utilized (Rs. Lakh)** | **Utilization (%)** | **Fund Unutilized (Rs. Lakh)** | **Unutilized (%)** |
| South Zone | 342 | 8% | 291.23 | 85% | 50.77 | 15% |
| North Eastern Zone | 1104 | 27% | 814.6 | 74% | 289.4 | 26% |
| Eastern Zone | 812 | 20% | 393.45 | 48% | 418.55 | 52% |
| Central Zone | 421 | 10% | 402.27 | 96% | 18.73 | 4% |
| Western Zone | 260 | 6% | 104.73 | 40% | 155.27 | 60% |
| Northern Zone | 718 | 17% | 549.43 | 77% | 168.57 | 23% |
| Institutions/Organization | 482 | 12% | 111.4 | 23% | 370.6 | 77% |
| **Total** | **4139** | **100%** | **2667.11** | **64%** | **1471.89** | **36%** |

Eastern Zone comprising of the states of Bihar, West Bengal, Jharkhand and Odisha were able to utilize only 48% of the total fund allocated. Among these states, Bihar emerged as a leading state with an utilisation of 88% of the allocated funds followed by Odisha at 60%, while Jharkhand and West Bengal had utilized only 7% and 22% of their allocations. In the Western Region comprising Maharashtra, Gujarat and Rajasthan where the total utilization was 40%, Gujarat had received allocation of Rs 135 lakh during the year 2007-08 and utilized 73% of the total allocation, while Maharashtra utilized only 6% and no utilization was made by Rajasthan which had received Rs 19 lakh during the year 2011-12. Thus there was no uniformity in utilisation of allocated funds. The state wise allocation and utilization of fund under the demonstration and outsourcing training programmes to states and Government Organizations may be seen at Annexure-3.

Figure 6 State wise allocation and utilization under demonstration and outsourcing training programmes

Thus, it was observed that some states had not utilized the funds received by them for demonstration and outsourcing of training programmes and some utilized only a part of the funds received by them during the XI Five Year Plan. A large percentage of funds allocated to ICAR during 2008-09 and 2010-11 too remained unutilized, with mere 3% being utilized during the XI Five Year Plan. Highlights of achievements under the scheme, included utilisation of more than 60% of the allocated funds by 52% of the states and 100% fund utilisation by 8 states from the North Eastern Region.

With a view to assess the impact of the scheme, despite some impediments in its implementation, field data was collected from different stakeholders. The following chapter presents the finding from the field observations and data collected from the different stakeholders of the scheme which will reflect the overall performance of the scheme, investigate the appropriateness and its effectiveness in creating the intended impact on the targeted beneficiaries.

# Chapter 4: Study Findings

## 4.1 Study Coverage- Farm Mechanization Training and Testing Institutes

As already presented in Chapter 2, the present study covers 11 states from six zones. The study covered both primary beneficiaries of training and demonstration assisted under the scheme and implementers of scheme such as Directorate of Agriculture, Farm Mechanization Training and Testing Institutes and ICAR sponsored institutions such as CIAE. The study covered training beneficiaries from FMTTIs from each of the four centres, viz., NRFMTTI (Hissar, Haryana), SRFMTTI (Garladdine, Andhra Pradesh), CRFMTTI (Budni, Madhya Pradesh) and NERFMTTI (Biswanath Chariali, Assam). The study also covered host farmers and participant farmers who were trained/ given demonstration on improved machinery for agriculture mechanization under the demonstration and outsourcing training components conducted through State Government and Government Institutions. The study team also made use of secondary information in the form of reports and publications from lead institutions such as FMTTIs and CIAE and State Governments, wherever available, to study the physical and financial progress of the scheme. Detailed interactions and discussions were also held with the officers directly involved in the implementation of the program in each state/ institution and nodal officers supervising the programs, to capture in depth understanding of the operational and policy issues involved in the implementation of the Scheme. The present chapter deals with the detailed findings from lead agencies such as FMTTIs (Training and Testing Component), CIAE and State Governments and beneficiaries assisted under the training and demonstration components of the scheme.

## 4.2 Performance of the FMTTIs during the XI Five Year Plan (2007-08 to 2011-12) under Testing Activity

Keeping in view the need for acquiring capacity for sustained mechanization of agriculture and improving skills of users, entrepreneurs, scientists for proper use, maintenance and running of farm machineries and equipments and promoting production of agriculture machines, the Government of India established Farm Mechanization Training and Testing Institutes in four different locations covering each geographic location of the country. The mandate of these institutes are broadly categorised into training different categories of respondents and testing of equipments and machinery as per the guidelines of Bureau of Indian Standards (BIS) and Office of Environment Compliance and Documentation (OECD).

### 4.2.1 Testing of Machinery/Equipments

As per the Test Regulation, the testing of equipments is done under two categories:

Three types of Commercial tests are carried out for establishing performance characteristics of machines that are under commercial production or ready for commercial production. First, the initial commercial tests are performed for indigenously developed or imported archetype machines which are ready for commercial production. Second, batch tests are performed for these machineries which have already undergone initial commercial test and are being manufactured commercially. Third type of tests are done on tractors which are manufactured for export purposes to meet the standard test regulations.

In contrast, the confidential tests are performed on equipments/ machines that are required for manufacturers and applicants before taking up commercial productions.

Salient features of the Institutes are presented in table 6 below:

Table 6 Salient Feature of FMTTIs

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of Institutes** | **Location** | **Year of Establishment** | **Types of Equipment Tested** |
| Central Farm Machinery Training Testing Institute | Budni, Madhya Pradesh | 1959 | * Test Tractor as per BIS & OECD Standard * Test Self propelled machines under CMVR |
| Northern Region Farm Machinery Training and Testing Institute | Hissar, Haryana | 1963 | * Test Combine Harvesters as per BIS and CMRV * Test Plant protection equipments, irrigation pumps diesel engines under BIS and OECD standards |
| Southern Region Farm Machinery Training and Testing Institute | Anantpur, Andhra Pradesh | 1983 | * Test power tillers * Test self propelled crop production machines |
| North Eastern Region Farm Machinery Training and Testing Institutes | Biswanath Chariali (Assam) | 1990 | * Power driven agriculture equipments and bullock drawn equipments. |

### 4.2.2 Availability of Testing Infrastructure with FMTTI’s

Table 7 Availability of testing infrastructure with FMTTI's

| **S. No.** | **Parameter** | **Name of Equipments/**  **Instruments** | **Range** | **Accuracy** | **Frq. of calibration** |
| --- | --- | --- | --- | --- | --- |
| 1. | **POWER MEASUREMENT** | E-70 Eddy current Dynamometer with digital load & speed indicator (Electro-dyne) | At 1000 rpm=11 HP  At 1600 rpm=20 HP  At 6000 rpm=70 HP | ±0.2% | Before each in test |
| D-700-IE Hydraulic dynamometer | At 1000 rpm=25 KW  At 500 rpm=40 KW  At 3500 rpm  At 7500 rpm  Power-700 KW | ±0.2% | Before each in test |
| ESF-60 , Fuchino Eddy Current type Dynamometer | 25 kW | ±0.2% | Before each in test |
| ESF-60s , Fuchino Eddy Current type Dynamometer | 7 kW | ±0.2% | Before each in test |
| Digital hand tachometer | 0-9900 rpm | 1 rpm | Once in a year |
| Non contact type digital tachometer | 0-9900 rpm | 1 rpm | Once in a year |
| 2. | **COMPRESSIVE AND TENSILE FORCE MEASUREMENTS** | Universal type load cell wth3½ digit digital display indicator | 0-100 Kgf | ±0.1% | Before each in test |
| Load cell wth 4½ digit digital display indicator | 0-5000 kgf | ±0.1% | Before each test |
| Load cell wth3½ digit digital display indicator | 0-3000 kgf | ±0.1% | Before each in test |
| Universal Testing Machine | 0-20Tonne | ±1% | Proving Ring |
| 3. | **MATERIAL TESTING** | Rockwell-cum-Brinell Hardness testing machine | Of different Loading Range | ±1% | Before each test |
| 4. | **METROLOGICAL INSTRUMENTS** | Steel tape | 3M, 15 ml, 30 M | ±1% | Once in 3 years |
| Outside micrometer Dig. Type (Japan make) | 0-25 mm, 25-50 mm, 50-75 mm, 75-100mm, 100-125mm, 125-150mm, 150-175mm, 175-200mm | ±0.1% | -do- |
| Digital Inside micrometer | 5-30mm | ±0.1% | -do- |
| Digital Cylinder bore gauge | 6-10mm, 18-35mm,35-60mm, 50-150mm | ±0.1% | -do- |
| Height gauge dial | 0-600mm | ±0.1% | -do- |
| Steel micrometer | 0-25mm, Depth 0-600mm | ±0.1% | -do- |
| ‘U’ type throat micrometer | 0-175-200mm | ±0.1% | -do- |
| Point micrometer | 0-25mm, 25-50mm | ±0.1% | -do- |
| Disc micrometer | 0-25mm | ±0.1% | -do- |
| Spline micrometer | 0-25mm, 25-50mm | ±0.1% | -do- |
| Ball micrometer | 0-25mm | ±0.1% | -do- |
| Vernier caliper, dial type | 0-150mm | ±0.1% | -do- |
| Vernier caliper dial type | 200mm, 300mm, 600mm & 1000mm | ±0.1% | -do- |
| Vernier depth gauge | 200mm | ±0.1% | -do- |
| Universal vernier caliper | 0-150mm | ±0.1% | -do- |
| 5. | **ELECTRICAL POWER, VOLTAGE & CURRENT MEASUREMENT** | Dimmer stat(Voltage Trnsformrer) | 0-500 volts | ±0.5% | Once in 3 years |
| 6. | **VACUUM & PRESSURE MEASUREMENT** | Dead weight pressure gauge tester | 0-70 Kg/cm2 | 0.1 Kg | Once in 3 years |
| Vacuum gauge tester | 0 to 1 Kg/ cm2 | 0.01 Kg | Once in 3 years |
| Bourdon tube pressure gauges | 0 to 1 Kg/ cm2  0 to 2.5 Kg/ cm2  0 to 4 Kg/ cm2  0 to 5 Kg/ cm2  0 to 7 Kg/ cm2  0 to 10 Kg/ cm2  0 to 16 Kg/ cm2 | ±0.1% | Before each test |
| Exhaust gas pressure Indicator with pressure sensor | 0-760mm of Hg | ±0.1% | 4-20mA current source |
| Intake air gas pressure Indicator with pressure sensor | 0-200mm of Hg | ±0.1% | -do- |
| Engine oil pressure Indicator with pressure sensor | 0-20kg/cm² | ±0.1% | -do- |
| 7. | **TEMPERATURE MEASUREMENT** | Digital temp. indicator ( 10 channel RTD i/p) | 0-200ºC resolution 0.1ºC | ±0.1% | Once in a year from NABL accreditated lab |
| Thermocouple indicator (‘J’ and ‘K’ type i/p) | 0-1000ºC | ±5ºC | -do- |
| Industrial thermometer | 0-120ºC,  0-200ºC,  0-300ºC | ±0.5ºC  ±0.5ºC  ±0.5ºC | -do- |
| Temp. sensors(RTD) | 0-200ºC range,  Pt100 type | ±1ºC | -do- |
| K-Type thermocouple | 0-1100ºC | ±1ºC | -do- |
| Infra red temperature meter | - | - | - |
| 8. | **Other Instruments** | Rockwell –cum- Brinell Hardness testing machine | HRC-  HB- | ±1% | Standard calibration block |
| Diesel Smoke Meter | 0 to 100% Opacity | ± 1% of FSD | Before each test |
| Noise level meter | 23-130 db(A) | 0.1 db | Noise level calibrator |
| Mechanical Vibration meter | 1 Hz to 1 KHz  Disp.-.01-100mm | ±1% | Self calibration |
| Angle Protactor& Abney level | 0 to 90ºC | 0.1% | -- |
| Anemometer | 0-17kmph | 0.5% | -- |
| Fuel Consumption meter | Digital fuel meter timer  0-999.9 sec | ±0.1 sec | Before each test |
| Weights 100 gm to 1 Kg | 0.1% |
| Fuel 10 gm to 150 gm/s | 0.1% |
| Steering Effort meter | Effort-0-25kgm  Angle-Endless | 0.35% of FSD | Self check |
| Digital Soil Moisture meter | 0-50% | ±5% | Hot air oven |
| Digital Grain moisture meter(Paddy,wheat) | 8-20% | ±1% | -do- |
| Computerised Brake testing eqipment | 0-225kgf(Pedal pressure) | 0.1% | Calibrated weights |
| Spring testing machine | Load-0-10kg  Displacement-0-100mm | ±1% | Calibrated weight and measuring scale |
| Lazer beam strength meter | - | - | - |
| Optical emission Spectro meter  Metavision 1008i | - | - | - |

### 4.2.3 Quality Improvement in Major Machines Tested During Last Five Years

The following quality improvements were observed in major machines which were tested at FMTTIs-

* + - 1. Combine harvester manufacturers develop their product to comply with the performance parameters stated in IS: 15806-2008. As regards the safety aspects, machines improvise the entire essential safety feature to comply with the requirements under respective test codes & CMVR Rules 1989.
      2. Testing has led to awareness amongst users on compliance of the technical specification like safety provision of the critical components in machine like thresher, sugarcane crusher, chaff cutters, etc., which are covered under the dangerous machine act.
      3. Testing has led to operator`s comfort and improvements in the ergonomics of the machines by keeping the vibration, steering, effort and noise level of the machine within the specified limits whereever applicable.
      4. Testing has also led to improvement in durability, finishing & smooth functioning of combine harvester & other similar machines.
      5. Traditionally combine harvesters & other harvesting machines were suitable only for wheat & paddy. However improvements through testing has lead to these machines being now used for other crops such as maize, soya bean, mustard, pulses etc.
      6. Tractor powered combines are being provided with 4 wheel drive to make it suitable for paddy harvesting. Track type combines are being widely introduced in the paddy regions.
      7. The combine harvester with an integrated attachment of straw reaper combine for preparation straw for animal feed or mulching have been also developed during testing of the machines.
      8. Combine harvesters have been introduced for sugarcane while cotton picker is in the process of field testing.
      9. Machines like balers and straw racks tested at the institutes are being widely introduced for straw management.
      10. The manufacturers of the lazar leveller have applied for testing of their products at FMTTI Hissar and there has been a significant improvement in their performance and quality.

### 4.2.4 Issues faced by FMTTI’s during the conduct of testing activities

* + - 1. The demand for testing of new machines at FMTTI’s are growing at an increasing rate. However, the institute lacks the resource of trained man power to cater to the increasing need. Insufficient trained manpower and non-availability of requisite infrastructural facilities are key issues for the FMTTIs in general.
      2. Most of the test equipments and test rigs used under different labs are bought and customized at the FMTTI which are too sophisticated for the local mechanics. These machines are prone to frequent breakdowns and due to non availability of adequate technical staff, these machines are not repaired in time. A permanent cadre of trained mechanics at each FMTTI may be created to address the problems of such issues. Non-availability of Test Codes for new machines.
      3. FMTTI Hissar lacks sufficient land area for conduct of testing activity. There is an immediate need to purchase new land in nearby area of smooth conduct of testing activities by the institute.
      4. FMTTI Hissar also lacks availability of water at the institute which hinders the work to a large extent.
      5. There is a need to bring in new computers and other relevant machines for all the FMTTIs. The old and obsolete nature of available resources has hindered the record keeping process to an extent.

## 4.3 Performance of the FMTTIs during the XI Five Year Plan (2007-08 to 2011-12) under Training Programmes

### 4.3.1 Central Region Farm Mechanization Training and Testing Institutes-Budni (Madhya Pradesh)

#### 4.3.1.1 Course wise number of Training Programs conducted in CRFMTTI

During the XI Five Year Plan, the FMTTI- Budni conducted training courses as per their course structure and covered every type of courses. A total of 310 training programs were organized under different courses comprising of User Level, Technician Level, Management Level, Academic level, Awareness, Technology Transfer Camps, Need based and Apprenticeship training. Year wise & course wise training programs organized is presented in table 8 below. A total 308 training courses were organized during the period 2007 to 2012 of which 33% was Technician Level courses followed by 19% Academic Level and 18% User Level courses. The need based training courses were organized as per the demand which is accounted for 9% of the total training programs. The detailed break up of number of training programmes and courses is presented in table 8 below.

Table 8 Types of training course and number of training programs organized in CRFMTTI

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Course** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** | **Percent** |
| U- User's Level | 13 | 14 | 6 | 12 | 10 | **55** | **18%** |
| T- Technician's Level | 17 | 22 | 15 | 24 | 23 | **101** | **33%** |
| M- Management Level | 0 | 0 | 9 | 12 | 22 | **43** | **14%** |
| A- Academic Level | 7 | 9 | 11 | 18 | 15 | **60** | **19%** |
| AW- Awareness through Multimedia system | 0 | 0 | 3 | 0 | 0 | **3** | **1%** |
| TT- Technology Transfer Camps | 0 | 0 | 5 | 0 | 0 | **5** | **2%** |
| NB- Need Based Training | 12 | 5 | 4 | 3 | 3 | **27** | **9%** |
| APP- Apprenticeship Training | 2 | 2 | 2 | 3 | 5 | **14** | **5%** |
| **Total** | **51** | **52** | **55** | **72** | **78** | **308** | **100%** |

The number of training programs organized has shown an increasing trend with addition of approximately 5 training programs per year. Figure 7 below gives the trend of training program organized during the XI Five Year Plan.

Figure 7 Trend of training program organized during the XI Five Year Plan -CRFMTTI

#### 4.3.1.2 Course wise targets and achievements in training

From inception till the end of XI Five Year Plan, FMTTI Budni has trained 48,309 persons. The annual target of the training programmes stood at 1800 persons from 2007-08 till 2009-10 and then increased to 1900 persons for the last two years of the XI Five Year Plan. The institute achieved the targets every year. The participation rate in the training courses showed a compounded annual growth rate of 2.5%. During the XI FYP period the total numbers of persons trained were 9507 against the target of 9200 thus achieving 103% of the targets. It is also observed that the number of persons participated in Academic Level courses was the highest (35%) followed by 28% in Technician Level course and 20% in User Level courses. Number of courses conducted and number of trainees trained by the institute, year wise, is presented in table 9 below:

Table 9 Course wise trainees participation in CRFMTTI

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Training/Course** | **2007-08** | | **2008-09** | | **2009-10** | | **2010-11** | | **2011-12** | | **Total** | |
| **Target** | **Achievement** | **Target** | **Achievement** | **Target** | **Achievement** | **Target** | **Achievement** | **Target** | **Achievement** | **Target** | **Achievement** |
| U- User's Level | 550 | 533 | 550 | 544 | 225 | 226 | 350 | 345 | 320 | 320 | 1995 | 1968 |
| T- Technician Level | 520 | 512 | 520 | 557 | 400 | 398 | 620 | 622 | 550 | 568 | 2610 | 2657 |
| M- Management Level | 0 | 0 | 0 | 0 | 275 | 280 | 150 | 168 | 380 | 465 | 805 | 913 |
| A- Academic Level | 550 | 567 | 550 | 586 | 650 | 690 | 750 | 785 | 630 | 668 | 3130 | 3296 |
| AW- Awareness through Multimedia | 0 | 0 | 0 | 0 | 35 | 37 | 0 | 0 | 0 | 0 | 35 | 37 |
| TT- Technology Transfer Camps- off campus | 0 | 0 | 0 | 0 | 50 | 61 | 0 | 0 | 0 | 0 | 50 | 61 |
| NB- Need Based Training | 170 | 200 | 170 | 117 | 150 | 148 | 20 | 23 | 0 | 37 | 510 | 525 |
| FN- Foreign National Training | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 20 | 0 |
| APP- Apprenticeship Training | 10 | 7 | 10 | 18 | 15 | 16 | 10 | 9 | 0 | 0 | 45 | 50 |
| **Total** | **1800** | **1819** | **1800** | **1822** | **1800** | **1856** | **1900** | **1952** | **1900** | **2058** | **9200** | **9507** |

Figure 8 below also presents the trend of trainees targeted and achieved during each year of XI Five Year Plan.

Figure 8 Targets and achievements in training program conducted by CRFMTTIs

The total participation in the training programs at 103% of the target indicated a good performance in terms of coverage of trainees by the institute during the XI Five Year Plan. The percentage distribution according to the training courses is presented in figure 9 below.

Figure 9 Percentage distribution of trainees according to training course-CRFMTTI

As can be inferred from figure 9 above, out of total 9507 trainees who participated in different training courses, the Academic Level courses accounted for the largest share (35%) followed by Technician Level courses (28%) and User Level courses (21%). This indicated the popularity and usability of Academic Level courses. The participation under Technology Transfer, Management Level, Awareness through Multimedia, etc., was low.

#### 4.3.1.3 Category Wise Participation in Training Courses

Of all the 9500 training participants, the number of trainees belonging to Schedule Tribes, Schedule Castes and Other Backward Classes was 43%, 35% and 14%, respectively. This indicated the efforts of the Institute in encouraging the trainees from these categories to participate in the training programmes. Figure 10 below reflects the percentage distribution of the category wise trainees attending the training programmes.

Figure 10 Category wise distribution of trainees attended the program in CRFMTTI

The year wise category wise number of trainees attending the training program can be seen in table 10.

Table 10 Year wise category wise participation in training courses in CRFMTTI

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Year** | | | | | |
| **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** |
| SC | 812 | 501 | 783 | 522 | 708 | 3326 |
| ST | 572 | 959 | 723 | 953 | 880 | 4085 |
| OBC | 265 | 259 | 257 | 260 | 335 | 1373 |
| General | 170 | 103 | 93 | 217 | 135 | 716 |
| Total | 1819 | 1822 | 1856 | 1952 | 2058 | 9507 |

As evident from the table above, the numbers of trainees showed an increasing trend over the years under the XI FYP which is a good indicator of performance. The CRFMTTI Budni appeared to have put in efforts for covering trainees belonging to Schedule Tribe category which also has shown an increasing trend. The SCs and General Category participation has shown a marginal decrease in number while the there has been an overall increase in numbers of trainees belonging to ST and OBC category. Almost 10% of the total trainees were female.

#### 4.3.1.4 Regional Participation of Trainees

During the XI Five Year Plan, participants from 27 states were covered under the different training courses in CRFMTTI- Budni. Out of the total participants, nearly 58% belonged to Madhya Pradesh and the rest 29% were from neighbouring states of Rajasthan, Gujarat, Maharashtra, Uttar Pradesh and Chhattisgarh sharing geographical boundary with Madhya Pradesh. Out of these states, the largest participation was from Maharashtra (16%) followed by Uttar Pradesh (6.20%), Chhattisgarh (2.45%), Gujarat (2.30%) and Rajasthan (1.85%). An interesting observation was that Chhattisgarh which got separated from MP had a lower participation in terms of number of trainees.

Table 11 Regional participation in training courses in CRFMTTI

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **States** | **2007-08** | | **2008-09** | | **2009-10** | | **2010-11** | | **2011-12** | | **During XI FYP** | |
| **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** |
| Madhya Pradesh | 1103 | 60% | 1120 | 62% | 958 | 51% | 1304 | 67% | 1037 | 51% | 5522 | 58% |
| Neighbouring States[[2]](#footnote-2) | 593 | 32% | 500 | 27% | 576 | 31% | 385 | 20% | 719 | 35% | 2773 | 29% |
| Other States | 137 | 7% | 198 | 11% | 228 | 18% | 254 | 13% | 295 | 14% | 1212 | 13% |
| **Total** | **1833** | **100%** | **1820** | **100%** | **1864** | **100%** | **1945** | **100%** | **2051** | **100%** | **9507** | **100%** |

Table 11 above presents year wise number of participants during the XI Five Year Plan and share of different regions. From the remaining 20 states, the participation ranged between 7% during 2007-08 and 18% during 2009-10. The number of trainees participating from different states and their percent distribution can be seen in Annexure-4.

#### 4.3.1.5 Target & Achievements-Testing of Equipments in FMTTI- Budni

The annual target of testing is set by the Central Government. The achievements against target for testing of equipment are presented in table 12 below.

Table 12 Targets and Achievement of testing in CRFMTTI

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Total Target** | **Types of Machine and No of Machines Tested** | | | | | |
| **Tractor** | **Power Tillers** | **Combine Harvester** | **Components** | **Total** | **Percent to total** |
| 2007-08 | 35 | 36 | 6 | 0 | 1 | 43 | 17% |
| 2008-09 | 35 | 44 | 0 | 0 | 0 | 44 | 17% |
| 2009-10 | 35 | 50 | 0 | 0 | 1 | 51 | 20% |
| 2010-11 | 38 | 52 | 0 | 0 | 1 | 53 | 21% |
| 2011-12 | 38 | 61 | 0 | 1 | 0 | 62 | 25% |
| **Total** | **181** | **243** | **6** | **1** | **3** | **253** | **100%** |

Against a target of testing 181 machines/equipments during the XI Five Year Plan, the institution has tested 253 equipments/machines recording an achievement of 39% higher than the target. Out of total 253 machines tested during the XI Five Year Plan, 96% were tractors and the rest were power tillers, combine harvester and various other farm equipments.

Figure 11 Percentage of Machines tested during XI Five Year Plan in CRFMTTI

It was also observed that against the annual capacity of testing 35 machines of the Institute, actual number of tractors tested varied from 36 to 61 reaching almost twice the capacity, while the number of other machines such as power tillers, combines, and other components was almost negligible. The testing capacity with respect to each equipment might not have been estimated and therefore it is not possible to assess the adequacy of tests conducted with respect to each type of equipments.

#### 4.3.1.6 Number of Machines Tested by Types of Test

Out of 256 machines tested during the XI Five Year Plan (2007-08 to 2012-13), 89% were tested under the Commercial Category of which 50% (128) were tested under the Initial Commercial Testing, 7% under Batch test and OECD requirements. Remaining 26% falls in variant sub category.

Figure 12 Distribution by types of tests of machine during XI Five Year Plan in CRFMTTI

Table 13 gives a glimpse of number of tests under each category carried out during the XI Five Year Plan.

Table 13 Number of equipments by types of tests during the XI Five Year Plan in CRFMTTI.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Types of Test** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** |
| Commercial | 35 | 40 | 46 | 49 | 56 | 229 |
| *ICT* | *22* | *28* | *29* | *26* | *20* | 128 |
| *OECD* | *5* | *1* | *1* | *3* | *7* | 17 |
| *BT* | *6* | *3* | *1* | *5* | *3* | 18 |
| *Variant* | *2* | *8* | *15* | *15* | *26* | 66 |
| Confidential | *8* | *4* | *5* | 4 | 6 | 27 |
| **Total** | **43** | **44** | **51** | **53** | **62** | **253** |

Of these total tests conducted, 96% were for tractors as indicated above in table 13 above. Five percent of the tests remained incomplete, 5 machines remained under incomplete test schedule during 2007-08. The number reduced to 1 during 2008-09 and 2009-10 and the last incomplete test was reported during the year 2010-11. No incomplete test was reported during the year 2011-12. A complete list of Machines tested during the XI FYP may be seen in Annexure- 5.

In addition to the above tests, the CRFMTTI has also conducted tests according to the Central Motor Vehicle Rules (CMVR). The information was available from 2010-11 onwards. From 2010-11 till 2011-12 a total of 177 machineries were tested which largely included tractors and also few power tillers and combine harvesters. The list may be seen in Annexure- 6.

#### 4.3.1.7 Training & Testing Infrastructures

The CRFMTTI has two wings; Training Wing and Testing Wing. The training wing has a building well equipped with different laboratories to cater to the needs of demonstrations, on the job training, etc. The training hall is well equipped with modern Audio Visual aids for imparting training/ lectures. The campus has 500 acre farm where the trainees learn practical operations of different farm machineries. The training centre has more than 225 training equipments and machineries which the trainees use during their course of study. The machineries include wheel tractor, crawler tractor, transport vehicle, stationery, transport vehicle, stationary engines, irrigation pump, farm equipments, plant protection equipment, harvesting and threshing machine.

The Testing Wing is also well equipped with two sets of labs spread over an area of 3600 sq meters, 600 meter long oval shaped concrete test track of and 5km long haulage test track with varying gradient. The testing wing has also modern infrastructure and facilities for conducting computerised tests as indicated by the Institute. It is evident from the figures presented above that the institute has performed well during the XI Five Year Plan both in terms of training and testing.

The institute is facing challenges in terms of human resources required to operate the functions effectively. There is a shortage of staff resulting in pressure of work for the existing staff. At present there are 38 staffs in testing wing against the required 58 staffs as reported by the officials of CRFMTTI. Shortage of staff has restricted the ability of the Institute to use its full testing potential.

#### 4.3.1.8 Revenue Generated by the Institute

Despite the staff shortage, the institute has been able to generate revenue of Rs 9.36 crore during the entire XI Five Year Plan, of which Rs. 8.1 crore was from testing alone. The details of revenue generated during the XI Five Year Plan from different activities are presented in table 14 below.

Table 14 Revenue generated during the XI Five Year Plan by CRFMTTI

(Rs in lakh)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Activity** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** | **Percent** |
| Testing | 129.28 | 147.22 | 195.21 | 179.7 | 160.54 | 811.95 | 87% |
| Training | 3.67 | 3.33 | 4.05 | 4.09 | 6.87 | 22.01 | 2% |
| Farm | 10.23 | 11.15 | 8.93 | 16.57 | 16.06 | 62.94 | 7% |
| Other | 5.28 | 7.3 | 2.72 | 4.5 | 19.69 | 39.49 | 4% |
| **Total** | **148.46** | **169** | **210.91** | **204.86** | **203.16** | **936.39** | **100%** |

During the XI FYP period, the revenue generated was higher at Rs.936.39 lakh as compared to Rs.678.18 lakh, during the X FYP period, thus recording increase of 38%. The revenue from each component has recorded an increase over the period during the XI Five Year Plan.

#### 4.3.1.9 Total Receipt and Expenditure

During the XI Five Year Plan, the Institute received Rs 46.64 crore as grant from the MoA towards expenditure under Planned, Non Planned components and for meeting administrative expenditure. Against this, the total expenditure was Rs 29.85 crore (64%). The details of receipts and expenditure under each head are given below in table 15.

Table 15 Receipts and Expenditure during the XI Five Year Plan by CRFMTTI.

(Rs in lakh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Budget Heads** | **2007-08** | | **2008-09** | | **2009-10** | | **2010-11** | | **2011-12** | | **Total** | |
| **Receipt** | **Expenditure** | **Receipt** | **Expenditure** | **Receipt** | **Expenditure** | **Receipt** | **Expenditure** | **Receipt** | **Expenditure** | **Receipt** | **Expenditure** |
| Admin | 366.25 | 318.09 | 463.61 | 403.86 | 606.55 | 485.43 | 536.27 | 506.86 | 632.29 | 553.81 | 2604.97 | 2268.05 |
| Non Plan | 49.00 | 21.00 | 42.00 | 30.30 | 32.50 | 20.47 | 16.00 | 13.91 | 30.33 | 22.30 | 169.83 | 107.98 |
| Plan | 195.00 | 181.88 | 270.00 | 64.60 | 360.00 | 97.94 | 565.00 | 55.28 | 500.00 | 210.19 | 1890.00 | 609.89 |
| **Total** | **610.25** | **520.97** | **775.61** | **498.769** | **999.05** | **603.84** | **1117.27** | **576.05** | **1162.6** | **786.3** | **4664.8** | **2985.9** |

The maximum fund utilization was made in the year 2007-08 at 85% of the total receipts. During the year 2010-11 expenditure decreased to 51% of the total allocated funds received. A closer examination of Non Plan and Plan Head Component, however, revealed a different picture. On an average, utilization was 32% of the funds receive for Plan Expenditure covering major works, purchase of machinery and equipments. During the initial years of the five year plan, the utilization was at 93% of the funds received which decreased to 10% in the year 2010-11. The utilization under Non Plan budget head, on the other hand, which was 43% during the year 2010-11 increased to 74% by the end of the XI Five Year Plan. Separate funds are not allocated for training and testing activities and same has to be met out of the funds allocated grant for Plan Expenditure.

Figure 13 Expenditure incurred and Revenue Generated by CRFMTTI

Against the total expenditure of Rs 29.85 crore during the XI Five Year Plan, CRFMTTI has been able to generate revenue of Rs 9.36 crore only accounting for 31% of the total expenditure incurred. However, revenue generated, in fact, recorded an increase of Rs 2.5 crore from the previous XI Five Year Plan, which is a significant achievement.

### 4.3.2. Northern Region Farm Mechanization Training and Testing Institute (NRFMTTI)- Hissar (Haryana)

#### 4.3.2.1 Targets and Achievements in Training

During the XI Five Year Plan, NRFMTTI exceeded the annual target of 9000 trainees to be trained, with target of training 1800 trainees for each year from 2007-08 to 2011-12. 9744 trainees were trained during the entire XI Five Year Plan, covering highest number of trainees (2048) during the year 2009-10. The number of persons trained, however, showed a decreasing trend in the later years of 2009-10 till 2011-12. Figure 14 below gives a snapshot of training programs conducted by the NRFMTTI- Hissar, during the XI Five Year Plan.

Figure 14 Targets and Achievements of training program conducted by NRFMTTI- Hissar

Table 16 below presets the course wise number of persons trained during the XI Five Year Plan.

Table 16 Course wise number of trainees trained by NRFMTTI- Hissar

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Training/Course** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** |
| User Level- U | 164 | 485 | 655 | 408 | 284 | **1996** |
| Technician Level- T | 48 | 50 | 86 | 50 | 81 | **315** |
| Management Level-M | 33 | 8 | 0 | 2 | 42 | **85** |
| Academic Level- A | 707 | 422 | 521 | 784 | 942 | **3376** |
| Technology Transfer- TT | 287 | 0 | 0 | 266 | 225 | **778** |
| Need Based- NB | 727 | 1083 | 696 | 376 | 312 | **3194** |
| **Total** | **1966** | **2048** | **1958** | **1886** | **1886** | **9744** |

Out of 9744 trainees trained during the XI Five Year Plan in different courses, the highest participation was in Academic Level course with 3376 (35%) trainees, followed by Need Based training course with 3194 (33%) trainees. An interesting observation during the XI Five Year Plan is that the participation in Academic Level and Technician Level courses increased during 2009-10 to 2011-12. In contrast, though Need Based training programs accounted for the second highest number of trainees, the numbers covered during 2011-12 decreased drastically to 1/3rd of trainees covered during 2008-09. Percentage wise distribution of trainees who have attended the training programs is presented in shown in figure 15 below.

Figure 15 Percentage distribution of trainees according to types of courses-NRFMTTI (Hissar)

#### 4.3.2.2 Category Wise Participation in Training Courses

Out of 9744 trainees who participated in different training courses, 51% belonged to the General Category, 30% to the Other Backward Classes and 18% were Scheduled Castes. Only 1% of the total beneficiaries were Scheduled Tribes. It was observed that while the number of general category trainees decreased over the period, the number of participants belonging to Schedule Castes increased. The number of OBC participants also increased over the period during the XI Five Year Plan. Figure 16 presents the category wise participation in various training courses during the XI Five Year Plan. Table 17 presents the year wise category wise number of farmers covered in various training courses.

Figure 16 Category wise participation in training course in NRFMTTI (Hissar) during XI FYP

Table 17 Year wise categorical representation in training courses during XI PP in NRFMTTI

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Year** | | | | | |
| **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** |
| SC | 256 | 293 | 394 | 357 | 474 | 1774 |
| ST | 20 | 10 | 9 | 11 | 16 | 66 |
| OBC | 590 | 487 | 494 | 630 | 690 | 2891 |
| General | 1100 | 1258 | 1061 | 888 | 706 | 5013 |
| **Total** | **1966** | **2048** | **1958** | **1886** | **1886** | **9744** |

#### 4.3.2.3 Regional Participation in Training Programs

The NRFMTTI at Hissar was established to facilitate the Farm Mechanization process with special focus on Northern Region though other states of India were not excluded. The NRFMTTI has been able to cater to the training needs of farmers from all parts of the country and more specifically from Rajasthan, Punjab, Uttar Pradesh, Himachal Pradesh, Uttarakhand and Delhi which share their boundaries with Haryana.

During the XI Five Year Plan, participants from 26 states participated in different training courses in NRFMTTI- Budni. Out of these, nearly 53% were from Haryana, 16% were from the neighbouring states/UTs, comprising Delhi, Punjab, Chandigarh, Himachal Pradesh, Uttarakhand, Rajasthan and Uttar Pradesh and the rest 31% were from other states. The state wise coverage in training courses can be seen in Annexure- 7. From among the states neighbouring Haryana, the largest representation was from Uttar Pradesh (11%) followed by Rajasthan (3%), while the rest shared less than 1% each. Among other states, the share of Goa which is much smaller in size had the largest share (13%), even exceeding those of the neighbouring states, followed by Bihar and Maharashtra, at 9% and 4%, respectively.

Table 18 Regional Participation in Training Program in NRFMTTI (Hissar)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **States** | **2007-08** | | **2008-09** | | **2009-10** | | **2010-11** | | **2011-12** | | **During XI PP** | |
| **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** |
| Haryana | 1425 | 72% | 3 | 0% | 1460 | 75% | 1116 | 59% | 1150 | 61% | 5154 | 53% |
| Neighbouring States[[3]](#footnote-3) | 313 | 16% | 293 | 14% | 319 | 16% | 308 | 16% | 280 | 15% | 1513 | 16% |
| Other States | 218 | 11% | 1752 | 86% | 179 | 9% | 462 | 24% | 456 | 24% | 3067 | 31% |
| **Total** | **1966** | **100%** | **2048** | **100%** | **1958** | **100%** | **1886** | **100%** | **1886** | **100%** | **9744** | **100%** |

During the year 2008-09, the share of Haryana was negligible as compared other states. The data got skewed due to participation of 1303 trainees in the training programs during the year. Interestingly, farmers from Goa participated in the training programs only during 2008-2009.

In addition to training of beneficiaries, the institution has also conducted demonstration activities of improved and newly developed machineries and equipments during the year 2007-08, 2010-11 and 2011-12. A total of 778 demonstration activities with 287, 266 and 225 were organized during the year 2007-08, 2010-11 and 2011-12, respectively.

#### 4.3.2.4 Targets and Achievements- Testing of Equipments in NRFMTTI (Hissar)

Two sets of tests, commercial and confidential, were carried out as a part of the testing activities with the objectives of verifying the claims/ declaration of manufacturers with respect to the performance characteristics of the machines and, whether they are ready for commercial production. During the XI five year plan, a total of 456 machines were tested, almost twice the annual target of 244.

Table 19 Year wise type of equipment tested in NRFMTTI (Hissar) during XI PP

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Total Target** | **Types of Machine and No of Machines Tested** | | | | | | | | | **Percent** |
| **Wheeled Tractor** | **IC Engine** | **Tillage Implement** | **PP Equipment** | **Harvesting & Threshing Equip** | **Seed Dril Planter** | **Irrigation Pumps** | **Components** | **Total** |
| 2007-08 | 40 | 0 | 12 | 13 | 5 | 5 | 4 | 1 | 15 | 55 | 12% |
| 2008-09 | 40 | 0 | 0 | 18 | 6 | 16 | 6 | 0 | 31 | 77 | 17% |
| 2009-10 | 45 | 0 | 0 | 41 | 31 | 29 | 17 | 0 | 12 | 130 | 29% |
| 2010-11 | 45 | 0 | 0 | 62 | 12 | 22 | 18 | 0 | 5 | 119 | 26% |
| 2011-12 | 74 | 0 | 0 | 20 | 17 | 28 | 7 | 0 | 3 | 75 | 16% |
| **Total** | **244** | **0** | **12** | **154** | **71** | **100** | **52** | **1** | **66** | **456** | **100%** |

The number of equipments/ machineries tested during the year 2009-10 was the highest at 130 accounting for 29% of the total equipments tested during the XI Five Year Plan. In the year 2010-11, 119 machines were tested. From year 2008-09 till 2010-11, the performance in terms of testing was significant achieving almost 3 times of the target. Of all the types of machineries, tillage implements accounted for the largest share at 34 % followed by harvesting equipments at 22%. Figure 17 below presents the percentage distribution by machines tested during the XI FYP period.

Figure 17 Percentage of machines tested during the XI Five Year Plan in NRFMTTI.

#### 4.3.2.5 Number of Machine Tested by Types of Test

During the XI Five Year Plan, 456 machines were tested against the target of 244. Of these, 83% (377) tests were commercial while 17% (79) tests were confidential. During the first two years of the XI Five Year Plan, the difference between the number of implements tested under commercial and confidential was low but from 2009-10 onwards, the machines tested under commercial categories tests exceeded significantly. Table 20 below presents the year wise types of tests performed during the XI Five Year Plan by the NRFMTTI- Hissar.

Table 20 Year wise types of tests performed in NRFMTTI-Hissar

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Types of Test** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** | **Percent** |
| Commercial | 20 | 42 | 123 | 116 | 73 | 377 | 83% |
| Confidential | *35* | *35* | *7* | 3 | 4 | 79 | 17% |
| **Total** | **55** | **77** | **130** | **119** | **77** | **456** | **100%** |

During the XI Five Year Plan, the institute has also tested 14 Combine Harvesters with regards to CMVR certification to comply with Bharat Stage III and Term III emission norms. Out of 14, 10 were self propelled combine harvesters and rest 4 were power operated.

#### 4.3.2.6 Training and Testing Infrastructure

With regards to infrastructure set up, the institute has two wings, the training wings and the testing wing. Both the wings are well equipped with modern facilities and amenities to facilitate conduct of training programs as well as testing equipments. On the testing front, the institute is well equipped with modern technologies and computerised systems to carry out tests on wide range of agriculture machineries. The testing wing has following laboratories:

1. Engine test laboratory
2. Plant protection equipment test laboratory
3. Irrigation pump test laboratory
4. Fuel filter test laboratory
5. Design and drawing section
6. Instrumentation cell
7. Computer cell and reprographic section.

Apart from above regular testing activities, the testing wing also undertakes evaluation of samples under Consumer Protection Act through the District Consumer Redressal Forum.

#### 4.3.2.7 Revenue Generated by NRFMTTI- HIssar

The institute generated revenue of Rs 3.31 crore during the XI FYP period from Training, Testing, and Farm activities. Table 21 below presents the details of the revenue generated by the institute during the XI Five Year Plan.

Table 21 Revenue Receipts by NRFMTTI during XI FYP

(Rs. In lakh)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Activity** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** | **Percent** |
| Training | 1.86 | 2.11 | 2.31 | 2.99 | 2.73 | 12.00 | 4% |
| Testing | 29.26 | 43.22 | 53.22 | 48.8 | 78.59 | 253.09 | 76% |
| Farm | 5.15 | 10.86 | 5.16 | 6.81 | 17.48 | 45.46 | 14% |
| Other | 0.87 | 1.35 | 2.47 | 13.53 | 2.62 | 20.84 | 6% |
| **Total** | **37.14** | **57.54** | **63.16** | **72.13** | **101.42** | **331.39** | 100% |

As can be seen from the above table, the revenue generated almost trebled from Rs 37.14 lakh during the year 2007-08 to 101.42 lakh during the year 2011-12. Of this, Rs 253.09 lakh (76%) was generated from testing activity and Rs 45.46(14%) from farm level activities. Only 4% of the revenue was generated from Training Programs.

#### 4.3.2.8 Total Receipt and Expenditure- NRFMTTI

Table 22 below presents the snapshot of total receipts and expenditure of the NRFMTTI during the XI Five Year plan. The institute received Rs 20.12 crore as per the revised estimates out of which 17.53 crore was spent under different heads accounting to 86% of the total receipts of Rs 20.12 crore.

Table 22 Receipt and Expenditure by NRFMTTI during XI FYP

(Rs. In lakh)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Budget Heads** | **2007-08** | | **2008-09** | | **2009-10** | | **2010-11** | | **2011-12** | | **Total** | |
| **Receipt** | **Expenditure** | **Receipt** | **Expenditure** | **Receipt** | **Expenditure** | **Receipt** | **Expenditure** | **Receipt** | **Expenditure** | **Receipt** | **Expenditure** |
| Admin | 228.6 | 213.84 | 292.79 | 276.11 | 348.71 | 340.53 | 342.58 | 332.4 | 407.65 | 351.7 | 1620.33 | 1514.58 |
| Non Plan | 33 | 26.15 | 35 | 34.03 | 32.5 | 11.7 | 23 | 9.4 | 29.6 | 13.65 | 153.1 | 94.93 |
| Plan | 9.57 | 8.92 | 25 | 22.24 | 39 | 5.5 | 65 | 30.79 | 100 | 58.37 | 238.57 | 125.82 |
| **Total** | **271.17** | **248.91** | **352.79** | **332.38** | **420.21** | **357.73** | **430.58** | **372.59** | **537.25** | **423.72** | **2012** | **1735.33** |

The maximum proportion of fund was used during the year 2008-09. The second highest utilization was made during 2007-08. During these two years of implementation more than 90% of the receipts was spent. The average spending under Non Plan and Plan head was 60% .The highest expenditure under Non Plan head (97%) was during the year 2008-09. During the subsequent years, the expenditure varied between 36% and 46% of the total revised expenditure. Under Plan Head too, 93% of the total revised expenditure was incurred during 2007-08 which was only 14% during 2009-10. During the subsequent years, the expenditure increased, reaching a maximum of 58% during the year 2011-12.

NRFMTTI could generate revenue of Rs.3.31crore only, being 19% of the expenditure of Rs 17.35 crore during the XI Five Year Plan.

Figure 18 Expenses made and revenue generated by NRFMTTI

### 4.3.3 Southern Region Farm Mechanization Training and Testing Institute (SRFMTTI)

The Southern Region Farm Mechanization Training and Testing Institute were established in the year 1983 at Anantpur in Andhra Pradesh to promote and strengthen agriculture mechanization through training, testing and demonstration in the Southern Region. During the XI FYP, the institute has carried out both training and testing activities as envisaged.

#### 4.3.3.1 Course wise number of Training Program conducted in SRFMTTI

The SRFMTTI has conducted a total of 290 different training programs as per their course structures. Table 23 below gives a comprehensive picture of number of training courses organized by the institute during the XI FYP period.

Table 23 Number of training programs organized under different course structure by SRFMTTI

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Courses** | **No of Training Program Organized** | | | | | | **Percent** |
| **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** |
| U- User's Level | 7 | 5 | 7 | 8 | 6 | **33** | 11% |
| T- Technician's Level | 7 | 6 | 8 | 3 | 5 | **29** | 10% |
| M- Management Level | 0 | 0 | 0 | 0 | 0 | **0** | 0% |
| A- Academic Level | 7 | 8 | 8 | 5 | 5 | **33** | 11% |
| AW- Awareness through Multimedia system | 4 | 12 | 11 | 13 | 9 | **49** | 17% |
| TT- Technology Transfer Camps | 0 | 0 | 0 | 0 | 3 | **3** | 1% |
| NB- Need Based Training | 29 | 24 | 24 | 36 | 30 | **143** | 49% |
| **Total** | **54** | **55** | **58** | **65** | **58** | **290** | 100% |

Need Based training programmes accounted for the largest share of 49% of the total training programmes during the XI Five Year Plan. User Level and Technical Level courses accounted for 11 and 10% of the total training programmes, respectively. Management Level courses were not organized by the Institute during the XI FYP period. Hence, it appears from the data that Needs Based training programs were organized to achieve the target during the XI Five Year Plan. An increasing trend in the number of training program in all the years during the XI Five Year Plan is observed except during the year 2011-12.

Figure 19 Trend in training program conducted during XI PP by SRFMTTI

#### 4.3.3.2 Course wise targets and Achievements in Training

The SRFMTTI has conducted 290 training programs during the XI Five Year Plan. In all 7319 persons were trained under their course modules. Table 24 below gives the details of targets and achievements in respect of no of trainees to be covered under the training courses.

Table 24 Course wise targets and achievements in Training by SRFMTTI

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Training/Course** | **2007-08** | | **2008-09** | | **2009-10** | | **2010-11** | | **2011-12** | | **Total** | |
| **Target** | **Achievement** | **Target** | **Achievement** | **Target** | **Achievement** | **Target** | **Achievement** | **Target** | **Achievement** | **Target** | **Achievement** |
| U- User's Level | 225 | 113 | 250 | 80 | 250 | 211 | 250 | 175 | 200 | 189 | 1175 | 768 |
| T- Technician Level | 125 | 114 | 125 | 88 | 125 | 125 | 125 | 84 | 125 | 104 | 625 | 515 |
| M- Management Level | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 50 | 0 |
| A- Academic Level | 200 | 256 | 225 | 293 | 225 | 231 | 275 | 263 | 275 | 304 | 1200 | 1347 |
| AW- Awareness through Multimedia | 250 | 106 | 250 | 425 | 250 | 465 | 250 | 401 | 300 | 181 | 1300 | 1578 |
| TT- Technology Transfer Camps- off campus | NA | - | NA | - | NA | - | NA | - | NA | 211 | 0 | 211 |
| NB- Need Based Training | 450 | 711 | 400 | 414 | 400 | 419 | 450 | 683 | 450 | 673 | 2150 | 2900 |
| DF- Special Training for Defence Personal | 40 | 0 | 40 | 0 | 40 | 0 | 40 | 0 | 40 | 0 | 200 | 0 |
| **Total** | **1300** | **1300** | **1300** | **1300** | **1300** | **1451** | **1400** | **1606** | **1400** | **1662** | **6700** | **7319** |

From the table above, it is observed that under User Level and Technical Level training courses the coverage of trainees was 35% and 18% of the targets, respectively, while the targets were achieved under the Academic Level, Awareness Level and Need Based training courses. The Institute did not organise any Management Level or Defence Personal training programmes. One Technology Transfer Camp was organized as a demonstration activity during the last year of XI Five Year Plan. Figure 20 below presents the trend of participation against the targets by SRFMTTI.

Figure 20 Trainees participation trend in SRFMTTI during XI FYP

During the first two years of the XI Five Year Plan, the targets were met. However during the remaining 3 years of the XI FYP, the Institute covered more than the targets. Out of the total trainees covered, 40% attended the Need Based Training course followed by Awareness (20%) and Academic Level Course (18%), respectively. Figure 21 below gives the course wise participation of trainees.

Figure 21 Course wise trainees participation in SRFMTTI during XI PP

#### 4.3.3.3 Category wise participation in Training Courses

Of the total 7319 trainees who attended different courses in SRFMTTI, 31% were from the Other Backward Classes, 35% from the General Category, 25% from the Scheduled Castes and the rest 8% were from the Scheduled Tribes.

Figure 22 Category wise distribution of trainees- SRFMTTI

Category wise participation of farmers is presented in Table 25 below:

Table 25 Year wise attendance of trainees by different category

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Category** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** |
| SC | 550 | 507 | 250 | 269 | 281 | 1857 |
| ST | 162 | 211 | 130 | 60 | 53 | 616 |
| OBC | 56 | 57 | 612 | 768 | 775 | 2268 |
| General | 532 | 525 | 459 | 509 | 553 | 2578 |
| **Total** | **1300** | **1300** | **1451** | **1606** | **1662** | **7319** |

It is interesting to note that the share of Schedule Caste category decreased from 42% to 17% from the first two years of the XI FYP. Similarly the share of Scheduled Tribe trainees too decreased to 3% by the end of XI Five Year Plan from 12% during 2007-08. During the corresponding period, the share of the OBC category increased from 4% to 46%. It appears that participants from the General Category were covered to meet the overall targets during the later years of the XI FYP.

#### 4.3.3.4 Regional Participation of Trainees

Participants from Andhra Pradesh accounted for 48% of the total participants with 41 % share being accounted for by neighbouring states including Orissa, Chhattisgarh, Karnataka and Tamil Nadu. The share of other states was mere 10% of the total. Among the neighbouring states, the Karnataka accounted for the maximum share at 22% (1591) followed by Tamil Nadu at 13% (954).

Table 26 Regional Participation in training program in SRFMTTI during XI PP

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **States** | **2007-08** | | **2008-09** | | **2009-10** | | **2010-11** | | **2011-12** | | **During XI PP** | |
| **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** | **Total** | **Percent** |
| Andhra Pradesh | 424 | 33% | 441 | 34% | 826 | 57% | 900 | 56% | 919 | 56% | 3510 | 48% |
| Neighbouring States[[4]](#footnote-4) | 713 | 55% | 674 | 52% | 495 | 34% | 586 | 36% | 560 | 34% | 3028 | 41% |
| Other States | 162 | 12% | 185 | 14% | 130 | 9% | 120 | 7% | 170 | 10% | 767 | 10% |
| **Total** | **1299** | **100%** | **1300** | **100%** | **1451** | **100%** | **1606** | **100%** | **1649** | **100%** | **7305** | **100%** |

Among all other states, Kerala with 323 trainees accounted for the highest number, followed by Uttar Pradesh with 184 trainees. State wise participation of trainees in training program organized by SRFMTTI can be seen in Annexure-8.

#### 4.3.3.5 Target & Achievements- Testing of Equipment in SRFMTTI-Anantpur

During the XI Five Year Plan, the SRFMTTI at Garladinne conducted 146 tests against the target of 145 machines to be tested. Tillage Implements accounted for the largest share during the XI FYP period. Out of 146 implements tested, 58% were tillage implements, 16% were power tillers and 14% were post harvest machines. The components were tested only during 2010-11. Table 27 gives the details of equipments tested by the SRFMTTI during the XI Five Year Plan.

It may be observed from the table 27 that actual testing of tillage implements often exceeded the capacity of the Institute at 15, except for year 2011-12, which indicated good demand for testing such equipments.

Table 27 Year wise type of equipments tested against the target by SRFMTTI during XI FYP

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Total Target** | **Types of Machine and No of Machines Tested** | | | | | | **Total** | **Percent** |
| **Power Tiller** | **Tillage Implement** | **Sowing & Planting** | **Post Harvest Machines** | **Components** | **Miscellaneous** |
| 2007-08 | 25 | 4 | 15 | 2 | 3 | 0 | 1 | 25 | 17% |
| 2008-09 | 25 | 4 | 18 | 0 | 3 | 0 | 0 | 25 | 17% |
| 2009-10 | 25 | 2 | 17 | 0 | 2 | 0 | 4 | 25 | 17% |
| 2010-11 | 35 | 5 | 22 | 1 | 4 | 2 | 2 | 36 | 25% |
| 2011-12 | 35 | 8 | 12 | 0 | 8 | 0 | 7 | 35 | 24% |
| **Total** | **145** | **23** | **84** | **3** | **20** | **2** | **14** | **146** | **100%** |

#### 4.3.3.6 Machines Tested by Types of Tests

Out of 146 machines tested during the XI FYP period, 97% (141) machines/ equipments were tested under Commercial category and the remaining 3% (5) machines were tested under confidential category.

Table 28 Year wise types of tests conducted by SRFMTTI

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Types of Test** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** | **Percent** |
| Commercial | 22 | 25 | 25 | 35 | 34 | 141 | 97% |
| Confidential | 3 | 0 | 0 | 1 | 1 | 5 | 3% |
| **Total** | **25** | **25** | **25** | **36** | **35** | **146** | **100%** |

During the years 2008-09 and 2009-10 only Commercial category tests were undertaken indicating good demands for testing of such tests. No tests under confidential category were conducted during these years.

#### 4.3.3.7 Training and Testing Infrastructure

The training wing of the Institute is well equipped with infrastructure including demonstration labs, training equipments, library, audio visual aids, etc. The demonstration lab consists of tractor system, tractor hydraulic system, plant protection demonstration, irrigation pump and auto electric demonstration laboratories. In addition, the centre also has a museum which has agriculture machineries of varied nature from different time periods.

The equipments such as tractors, bull dozers, vehicles, pumps, plant protection equipments, power tillers, combine harvesters and various different forms of agriculture implements are available to provide the trainees with hands-on experience of operations and maintenance of these equipments. The audio visual aids supplement the training programs. The hostel facility available can accommodate 100 participants at a time and lodging facility is provided to the trainees at a nominal charge.

### 4.3.4 North Eastern Region Farm Mechanization Training and Testing Institute- Assam

#### 4.3.4.1 Course wise number of Training Program Conducted by NERFMTTI-Assam

During the XI Five Year Plan, the North Eastern Region Farm Mechanization Training and Testing Institute (NERFMTTI) conducted 115 training programs under different courses. Table 29 gives the course wise number of training programs organized by the NERFMTTI.

Table 29 Course wise number of trainings organized by NERFMTTI

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Courses** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** | **Percent** |
| U- User's Level | 12 | 7 | 14 | 18 | 15 | 66 | 57% |
| T- Technician's Level | 3 | 1 | 2 | 3 | 10 | 19 | 17% |
| M- Management Level | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| A- Academic Level | 3 | 3 | 5 | 2 | 4 | 17 | 15% |
| AW- Awareness through Multimedia system | 1 | 0 | 0 | 0 | 0 | 1 | 1% |
| TT- Technology Transfer Camps | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| NB- Need Based Training | 0 | 1 | 3 | 2 | 2 | 8 | 7% |
| SJGSY | 3 | 1 | 0 | 0 | 0 | 4 | 3% |
| APP- Apprenticeship Training | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| **Total** | **22** | **13** | **24** | **25** | **31** | **115** | **100%** |

Out of 115 training programs organized by the institute, 57% were User’s Level followed by 17% Technical Training and 15% Academic Level. It is interesting to note that in contrast to other FMTTIs, the NERFMTTI organized four training programmes under Swarn Jayanti Gram Swarojgar Yojana (SJGSY) during the years 2007-08 and 2008-09. However, the Institution did not conduct any training programs under Management Level Training Course. Awareness Generation training programmes were conducted during the first year of the XI FYP Period only.

#### 4.3.4.2 Year wise Target and Achievements in Training

Under different courses the target for coverage of trainees during the XI Five Year Plan was 3700. The NERFMTTI achieved the targets during XI FYP period except during the year 2009-10 when 672 trainees were trained against the target of 700 trainees. Table 30 below shows the course wise coverage of trainees during the XI Five Year Plan.

Table 30 Course wise coverage of trainees by NERFMTTI

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Target** | **Courses** | | | | | | | | | **Total** |
| **User Level** | **Technician Level** | **Management Level** | **Academic Level** | **Awareness** | **Technology Transfer** | **Need Based** | **SGJSY** | **Apprentice** |
| 2007-08 | 700 | 155 | 58 | 0 | 123 | 11 | 320 | 0 | 67 | 1 | 735 |
| 2008-09 | 700 | 136 | 12 | 0 | 72 | 0 | 471 | 10 | 18 | 5 | 724 |
| 2009-10 | 700 | 296 | 36 | 0 | 114 | 0 | 92 | 133 | 0 | 1 | 672 |
| 2010-11 | 800 | 467 | 63 | 0 | 85 | 0 | 99 | 97 | 0 | 0 | 811 |
| 2011-12 | 800 | 357 | 171 | 0 | 167 | 0 | 0 | 119 | 0 | 2 | 816 |
| **Total** | **3700** | **1411** | **340** | **0** | **561** | **11** | **982** | **359** | **85** | **9** | **3758** |

Figure 23 below shows the targets vs. achievements trainees’ coverage by NERFMTTI during the XI Five Year Plan.

Figure 23 Trainees targets and achievement of NERFMTTI during the XI PP

As evident from the table above, the highest number of trainees were covered under the User Level Course (38%) followed by 26% under Technology Transfer Camps. Ten percent (10%) and 9% of the trainees were covered under the Need based and Technical Level courses respectively. It may be mentioned here that the Institute did not organise any Management Level training programs s. Though no separate course structures were provided for covering apprenticeship, 9 apprentices joined the training courses during the XI FYP period. Further, Awareness Level training course were not organized after 2007-08. Figure 24 below gives the percentage distribution of trainees covered under different courses.

Figure 24 Trainees distribution by types of training courses.

Although, demonstration of new technology equipment does not fall under the mandate of the Institute, a total of 38 demonstrations were organized by the institute on its own initiative based on demand. The institute is also making their in updating and upgrading the latest technology required for testing agriculture implements/ machines.

#### 4.3.4.3Regional Participation of Trainees

Due to non availability of data on training participation for the XI FYP, the state wise percentage participation in the training programs of NERFMTTI were calculated solely based available data of 2011-12. Out of the 816 participants, 552 (68%) were from Assam followed by 17% (137) from Nagaland, Tripura, Arunachal Pradesh and Sikkim. From among the States of the North Eastern Region excluding Assam, Tripura accounted for the largest share of 36% (77 participants) during the year 2011-12.

The participation from the remaining states was low. Participants from Maharashtra and Uttar Pradesh were 67 and 22, respectively. Shares of various states are presented in figure 25 below.

Figure 25 Regional Participation of trainees in NERFMTTI in 2011-12

As per the information provided by the officials of NERFMTTI, the institute intends to increase the number of training programs to disseminate knowledge on Farm Mechanization to a larger number of farmers, but this will require additional support from the State Government for creating publicity of the courses and its benefits among the farmers/ rural youths. The man power and infrastructure facilities at the Institute also need to be strengthened.

#### 4.3.4.4 Targets and Achievements- Testing of Equipment in NERFMTTI-Guwahati

The performance of the NERFMTTI under their testing mandate has been satisfactory during the XI FYP period. A total of 99 equipments were tested during the XI Five Year Plan which is more than 50% of the target of 66 machines. The highest 27 machines were tested during the year 2010-11 and lowest (11) during the year 2007-08.

As evident from the table 30 below, among the different machines, 46 machines were Rotavators accounting for 47% of all the machines tested during the XI FYP period followed by Seed cum Fertilizer drills at 11% and Reversible/ Plough and Threshers at (9%) each. Figure 26 gives the percentage of equipments tested during the XI FYP.

Table 31 Types of machine tested in NERFMTTI during XI FYP

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Total Target** | **Types of Machine and No of Machines Tested** | | | | | | | | | | **Total** | **Percent** |
| **TD Cultivators** | **Seed/Fertilizer Drill** | **Reversible MB Plough** | **Rotavator** | **Tiller/Harrow** | **Paddy cum Weed Cutter/Reaper** | **Potato Planter** | **Weeder** | **Thresher/ Multi crop thresher** | **Miscellaneous** |
| 2007-08 | 10 | 1 | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 11 | 11% |
| 2008-09 | 10 | 2 | 0 | 0 | 6 | 2 | 0 | 0 | 0 | 7 | 0 | 17 | 17% |
| 2009-10 | 10 | 3 | 2 | 4 | 12 | 1 | 2 | 1 | 0 | 0 | 0 | 25 | 25% |
| 2010-11 | 18 | 0 | 4 | 2 | 15 | 0 | 0 | 0 | 2 | 1 | 3 | 27 | 27% |
| 2011-12 | 18 | 0 | 2 | 1 | 10 | 1 | 1 | 0 | 3 | 0 | 1 | 19 | 19% |
| **Total** | **66** | **6** | **11** | **9** | **46** | **4** | **3** | **1** | **5** | **9** | **5** | **99** | **100%** |

Figure 26 Percentage of machines tested by NERFMTTI during XI PP

#### 4.3.4.5 Revenue Generated by NERFMTTI-Guwahati

The institute generated revenue worth Rs 0.4 crore during the XI Five Year Plan. The total revenue increased over the XI Five Year Plan from Rs 5.7 lakh during the year 2007-08 to 13.29 lakh during the year 2011-12. Among all the different components, testing cell contributed the maximum revenue as can be seen from the table 32 below.

Table 32 Revenue generated by the NRFMTTI

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Activity** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** |
| Training | NA[[5]](#footnote-5) | NA | NA | NA | 0.71 | 0.71 |
| Testing | NA | NA | NA | NA | 8.23 | 8.23 |
| Farm | NA | NA | NA | NA | 3.95 | 3.95 |
| Other | NA | NA | NA | NA | 0.4 | 0.40 |
| **Total** | **5.7** | **4.18** | **11.35** | **8.39** | **13.29** | **42.91** |

#### 4.3.4.6 Revenue Generated by NERFMTTI-Guwahati

The institution received Rs 7.9 crore during the XI FYP period, of which Rs 6.29 crore was spent for various activities. The institution did not face any funds constraints for meeting the expenditure.

Table 33 Receipts and Expenditure of NERFMTTI

(Rs. In lakh)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Particulars** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** |
| Receipts | 82 | 133 | 173 | 194 | 209 | 791 |
| Expenditure | 69 | 99 | 127 | 151 | 181 | 627 |
| % Expenditure | 84% | 74% | 73% | 78% | 87% | 79% |

The Institute could generate only 6% of its expenditure by way of revenue which is the lowest among all the FMTTIS. Figure below presents the expenditure made by the institution and revenue generated during XI Five Year Plan.

Figure 27 Expenditure and revenue generated by NERFMTTI

## 4.4 Response of Trainees on Training Conducted by FMTTIs

To assess the adequacy, usefulness and effectiveness of training programs conducted by four FMTTIs located at Budni (Madhya Pradesh), Garladinne (Andhra Pradesh), Hissar (Haryana) and Biswanath Chariali (Assam), and their subsequent contribution to the development of agriculture through their direct and indirect impact, trainees from different institutes were covered through structured set of questionnaires to capture their response. The training beneficiaries were covered across different courses. A total of 571 training beneficiaries were covered against the target of 882 which resulted in confidence interval of approximately ±4%.

Table 34 below indicates the samples covered under training programs conducted by different FMTTIs for assessing their adequacy, usefulness, effectiveness and contribution to the development of agriculture.

Table 34 Training sample covered across different courses and FMTTIs

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Institute** | **Proposed Sample** | **Sample Covered** | | | | | **Actual** |
| **User Level** | **Management Level** | **Academic Level** | **Technical Level** | **Need based** |
| Madhya Pradesh | CRFMTTI | 210 | 61 | 4 | 44 | 18 | - | 127 |
| Haryana | NRFMTTI | 232 | 56 | - | 40 | - | 50 | 146 |
| Andhra Pradesh | SRFMTTI | 230 | 30 | - | 60 | 20 | 100 | 210 |
| Assam | NERFMTTI | 210 | 119 | - | 20 | 19 | - | 158 |
| **Total** | | **882** | **266** | **4** | **164** | **57** | **150** | **641** |

The details of state wise respondents interviewed presented in the table above shows variations from the proposed sample, on account of non traceability of the trainees indicated in the list obtained from the institutes due to lack of proper contact details.

### 4.4.1 Demographic Details of Respondents

A total of 641 training beneficiaries were interviewed who attended the training programs in four different FMTTIs. Out of total beneficiaries covered, 77% (491) were males and rest 23% (150) were females. Further, 63% of the beneficiaries were in the age group of 20 to 30 years. The minimum and the maximum age were 17 years and 72 years with median and average age of 22 and 24 years. This indicates a positively skewed age group which indicate that most of the values are in the lower portion of the distribution while a few of the data is large enough to increase the average age. In total, 83% of the respondents were in the age group of 17 to 30 years. Table 35 below gives the age wise and sex wise distribution of samples covered from different FMTTIs:

Table 35 Distribution of respondents by age group

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Age Group** | **CRFMTTI** | | **NRFMTTI** | | **SRFMTTI** | | **NERFMTTI** | | **Total** | | **Grand Total** |
| **Male** | **Female** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** |
| Less than equal to 20 Year | 37 | 12 | 31 | 9 | 35 | 0 | 11 | 3 | 114 | 24 | 138 |
| 20-30 Year | 33 | 25 | 87 | 0 | 118 | 14 | 91 | 38 | 330 | 77 | 407 |
| 30-40 Year | 7 | 2 | 16 | 0 | 0 | 24 | 8 | 7 | 31 | 33 | 64 |
| 40-50 Year | 0 | 6 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 16 | 16 |
| Greater than 50 Year | 4 | 0 | 3 | 0 | 9 | 0 | 1 | 0 | 17 | 0 | 17 |
| **Total** | **81** | **46** | **137** | **9** | **162** | **48** | **111** | **47** | **491** | **150** | **641** |

The largest share of female respondents was accounted for by Andhra Pradesh (32%) while the least were from Haryana with only 6%.

### 4.4.2 Education wise distribution Respondents

Table 36 below presents the distribution of respondents based on their educational qualifications. Most of the training beneficiaries were found to be educated and having some qualifications except 6% who had no educational qualification. Forty one percent of the total respondents were educated up to higher secondary followed by 34% with a graduate degree.

Table 36 Distribution of respondents based on education

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Education** | **SRFMTTI** | | **NERFMTTI** | | **NRFMTTI** | | **CRFMTTI** | | **Total** | |
| **Number** | **%** | **Number** | **%** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Graduation & Above | 90 | 41% | 13 | 6% | 64 | 29% | 54 | 24% | 221 | 34% |
| Higher Secondary | 70 | 27% | 72 | 28% | 68 | 26% | 51 | 20% | 261 | 41% |
| Primary | 13 | 28% | 29 | 63% | 2 | 4% | 2 | 4% | 46 | 7% |
| Secondary | 10 | 13% | 43 | 57% | 12 | 16% | 10 | 13% | 75 | 12% |
| None | 27 | 71% | 1 | 3% | 0 | 0% | 10 | 26% | 38 | 6% |
| **Grand Total** | **210** | **33%** | **158** | **25%** | **146** | **23%** | **127** | **20%** | **641** | **100%** |

A cross tabulation was done between the types of courses and education status of the beneficiaries to understand the distribution of respondents based on the types of courses. Table 37 below illustrates the educational background of the trainees and the courses attended.

Table 37 Distribution of respondents based on the types of course attended

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Education | **Academic Level** | **%** | **Management Level** | **%** | **Need Based** | **%** | **Technician Level** | **%** | **User Level** | **%** | **Grand Total** | **%** |
| Graduation & Above | 153 | 24% | 2 | 0.3% | 23 | 4% | 17 | 3% | 26 | 4% | 221 | 34% |
| Higher Secondary | 47 | 7% | 2 | 0.3% | 9 | 1% | 52 | 8% | 151 | 24% | 261 | 41% |
| Secondary | 0 | 0% | 1 | 0.2% | 0 | 0% | 9 | 1% | 64 | 10% | 74 | 12% |
| Primary | 0 | 0% | 0 | 0.0% | 0 | 0% | 9 | 1% | 37 | 6% | 46 | 7% |
| None | 0 | 0% | 0 | 0.0% | 0 | 0% | 0 | 0% | 39 | 6% | 39 | 6% |
| **Grand Total** | **200** | **31%** | **5** | **0.8%** | **32** | **5%** | **87** | **14%** | **317** | **49%** | **641** | **100%** |

It is evident from the table 37 above, that 31% of the total respondents who attended the Academic Level training had education of higher secondary and above. Of them 24% were graduates and above, some of whom were also undergoing M.Tech degree. The participation in Management Level course was low as compared to other courses. The training programs under the Need Based courses mostly accommodate candidates sponsored by industries and institutions. Most of them had held graduate degrees and above. The only course which catered to beneficiaries from all educational backgrounds was the User Level and Technician Level course. This is due to the fact that in these two training programs, either the farmers or the practitioners’ technicians who desired to enhance their technical skills and awareness of new technology participated.

### 4.4.3 Caste/Category wise Distribution of Respondents

Out of 641 respondents, 36% each belonged to General Category and Other Backward Classes each while 21% of the respondents were from Schedule Castes and rest 7% from Schedule Tribes. It could also be observed from the data that no Scheduled Caste respondents were covered by Northern Region FMTTI (Hissar). As per the data provided by the Institute only 66 candidates belonging to ST category participated in the training programs.

Table 38 Caste wise distribution of respondents

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **FMTTIs** | **General** | **%** | **OBC** | **%** | **SC** | **%** | **ST** | **%** | **Grand Total** | **%** |
| SRFMTTI | 15 | 2% | 32 | 5% | 26 | 4% | 15 | 2% | 88 | 14% |
| NERFMTTI | 112 | 17% | 95 | 15% | 61 | 10% | 6 | 1% | 274 | 43% |
| NRFMTTI | 35 | 5% | 36 | 6% | 17 | 3% | 0 | 0% | 88 | 14% |
| CRFMTTI | 70 | 11% | 65 | 10% | 32 | 5% | 24 | 4% | 191 | 30% |
| **Grand Total** | **232** | **36%** | **228** | **36%** | **136** | **21%** | **45** | **7%** | **641** | **100%** |

Of all the trainees, the largest share (17%) was from NERFMTTI followed by 11% from CRFMTTI. The lowest was from SRFMTTI (2%). Among the trains belonging to the OBCs, 15% were from NERFMTTI followed by 10% from CRFMTTI. Among the under privileged category belonging to the SCs, 10% were from NERFMTTI followed by 5% from CRFMTTI. Among ST category, 4% were from CRFMTTI and 2% from SRFMTTI.

### 4.4.4 Respondents Distribution Occupation wise

Out of 641 respondents administered 280 (44%) were farmers, followed by students (18%) who attended the Academic, Management and Need Based training. Further 15% of the respondents were driver/operators of various farm equipments such as tractors, power tillers, combines harvesters etc. Unemployed youth with an intention to enhance their skill level and increase their employability accounted for 5% of the beneficiaries. Figure 28 below illustrates the distribution of respondent’s by their occupation.

Figure 28 Distribution of respondents by education

Though 1% of the total trainees were housewives and engaged in handloom, they were also engaged in farming activities which is their primary occupation.

Details of respondents with primary occupation of engaged in agriculture and attended training program in four FMTTIs, are provided in table 39 below.

Table 39 Land holding status of respondent farmers

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Institute** | **Small/Marginal (≤ 2 ha)** | **%** | **Medium (2 to 5ha)** | **%** | **Large (> 5 ha)** | **%** | **Total** | **%** |
| SRFMTTI | 9 | 6% | 20 | 20% | 3 | 19% | 32 | 11% |
| NERFMTTI | 112 | 69% | 53 | 52% | 6 | 38% | 171 | 61% |
| NRFMTTI | 10 | 6% | 10 | 10% | 3 | 19% | 23 | 8% |
| CRFMTTI | 31 | 19% | 19 | 19% | 4 | 25% | 54 | 19% |
| **Total** | **162** | **100%** | **102** | **100%** | **16** | **100%** | **280** | **100%** |

It can be seen from the table above that, 58% of the total respondents were Small and Marginal Farmers (Landholding upto 2 ha), 36% were medium farmers (landholding 2-5 ha) and 6% were large farmers (landholding more than 5 ha). This indicates that the largest percentage of farmers who attended the mechanization training in FMTTIs were from small and medium category who face the challenge of smaller scale of operations while going in for farm mechanisation. Another 36% were medium farmers and rest 5% only were large farmers. Hence, the FMTTIs have played a significant role in popularizing the mechanization and enhancing skills among small, marginal and medium category farmers.

Among 162 small/marginal farmers, 69% were trained by North Eastern Region FMTTI followed by 19% in Central Region FMTTI and 6% each by SRFMTTI and NRFMTTI.

### 4.4.5 Sources of Information on Training Programs

Respondents reported various sources from where they received information about the training courses. Majority (37%) of the respondents reported Friends and other students who underwent the training courses earlier. Sixteen percent (16%) became aware of the training programs due its popularity among the manufacturers and dealers of the equipments. For students who accounted for 23% either the academic institutes or the sponsorers were the sources of information. In addition, the State Government have also played significant role in disseminating the information of the training courses among the farmers through their extension officers in the field. As such, 19% of the respondents indicated that they received the information about the training programs from the State Agriculture departments, State Agriculture Universities, KVKs, etc. FMTTIs on their own have done very little to popularise the programs and hence their involvement in publicity of programs appeared to be low. None of the respondents revealed newspaper as a source of information.

### 4.4.6 Motivation for Attending Training Programs

With a view to understand the motivation for attending various training courses in FMTTIs, the responses have been compiled below. A total of six options were provided to the respondents to indicate the reason for attending the training courses in FMTTI. They were multiple which showed a correlation with type of training courses attended. Figure 29 below gives the comprehensive picture of motivation for attending the courses by trainees across all the FMTTIs. The total responses under each course were converted to percentage because of the multiple responses by each individual, as one exclusive choice was difficult to opt.

Figure 29 Motivation for joining different courses in FMTTIs

From the figure 29 above, it becomes evident that need for Enhancement Skill and Increased Awareness of Improved Technological Innovations of Farm Machinery were major motivators accounting for 48% and 45% responses, respectively. Similarly among the management category students, Enhance Skills and Increased Awareness accounted for equal shares of 50%. While, among those attending the Technical Level course, the strongest motivating factor was Increased Awareness of Improved Farm Technology (38%) followed by “Improved Employment/ Earning Opportunity” (45%). Enhancing skills & Improve efficiency at 28% followed by Employment Opportunities at 20% were the major motivating factors for those who attended User Level programs. A good number of respondents under this category were farmers, 18% of who indicated Increased Awareness and 13% Improving Farm Productivity as the motivating factors. A small percentage (9%) attended to utilize their spare time and learn new technological innovations in the area of farm mechanization. Similarly for Need Based training Enhancing the Skill Level and Improve Farm Productivity were the major motivating factors.

Thus Enhancing Skills & Improving Efficiency and Increase of awareness of improved technology were leading motivating factors for attending the training courses, although their relative importance have varied depending on the types of courses attended. It can also be interpreted that ‘subsidised courses’ was not a major motivating factors for trainees to attend the training programs. Majority have expectations to learn and improve their skills with the exception of certain numbers of trainees from Need based and User Level Courses who attended as the course was free.

### 4.4.7 Effectiveness of Training Program

To measure the extent of effectiveness of training courses organized by the FMTTIs, the trainees were administered the questionnaire in person on the 5 different factors; Training Program’s relevance to the need of trainees, Appropriateness of content, Provision for course material, Usefulness of course materials and Length of training program. Majority of the respondents did not mind the long duration of 3 days to 6 months for in house training programs; most of the beneficiaries expressed their agreement on the designed length, except 3% belonging to Need Based training and User Level training, felt the duration of training to be increased.

With respect to relevance of training programs and their suitability, 86% of the trainees indicated that the training was relevant, 11% opined partially relevant and merely 3% felt it irrelevant (2% from NERFMTTI and 1% from CRFMTTI). Hence in total 97% felt that training programs suit their needs and were relevant for them.

Table 40 Beneficiaries response on Relevance of Training Program and Appropriate of content

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Institutes** | **Training Program Relevance to Need of Trainees** | | | | | | **Appropriateness of Content** | | | |
| **Relevant** | **%** | **Partially Relevant** | **%** | **Not Relevant** | **%** | **Yes** | **%** | **No** | **%** |
| SRFMTTI | 210 | 33% | 0 | 0% | 0 | 0% | 210 | 33% | 0 | 0% |
| NERFMTTI | 116 | 18% | 30 | 5% | 12 | 2% | 144 | 22% | 14 | 2% |
| NRFMTTI | 131 | 20% | 12 | 2% | 3 | 0% | 140 | 22% | 6 | 1% |
| CRFMTTI | 95 | 15% | 28 | 4% | 4 | 1% | 113 | 18% | 14 | 2% |
| **Overall** | **552** | **86%** | **70** | **11%** | **19** | **3%** | **607** | **95%** | **34** | **5%** |

The course content ensures exhaustive coverage on various aspects like orientation, topic coverage, theme related to operational aspects, field operation, repair & maintenance and even sources of availability of spare parts, cost of economics while selecting an equipments, etc. With regards to the appropriateness of contents of the training programs, 95% expressed that the contents of the training program were appropriately designed with only 5% expressing dissatisfaction. Table 41 below indicates trainees’ responses on Provision of course material, its usefulness and duration of training programs.

Table 41 Beneficiaries response on Course material, its usefulness and duration of training program

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Institutes** | **Provision of Course Material** | | | | **Usefulness of Course Material** | | | | | | **Adequate Length of Training Program.** | | | |
| **Yes** | **%** | **No** | **%** | **Useful** | **%** | **Partially Useful** | **%** | **Not Useful** | **%** | **Yes** | **%** | **No** | **%** |
| SRFMTTI | 210 | 33% | 0 | 0% | 201 | 31% | 9 | 1% | 0 | 0% | 191 | 30% | 19 | 3% |
| NERFMTTI | 157 | 24% | 1 | 0% | 142 | 22% | 16 | 2% | 0 | 0% | 158 | 25% | 0 | 0% |
| NRFMTTI | 143 | 22% | 3 | 0% | 127 | 20% | 19 | 3% | 0 | 0% | 143 | 22% | 3 | 0% |
| CRFMTTI | 121 | 19% | 6 | 1% | 105 | 16% | 20 | 3% | 2 | 0% | 127 | 20% | 0 | 0% |
| **Overall** | **631** | **98%** | **10** | **2%** | **575** | **90%** | **64** | **10%** | **2** | **0.3%** | **619** | **97%** | **22** | **3%** |

Ninety eight percent of trainees received the training materials while attending the training course. The remaining 2% had not received any training material. A majority of the trainees (90%) indicated that the course material provided during the training was useful and was used during the post training period for the purpose of learning and understanding the operations and concepts. However, 10% felt that course material was partially useful and did not suit their need and expectations. As regards the duration of the training courses, 97% felt that it was adequate while only 3% felt that it was not adequate. These 3% were mostly those attending the training courses on crop specific equipment operation of 2-3 days, who advocated increase of duration from the present 2-3 days to atleast 5 days to enable better understanding of operating procedure as well as repair and maintenance issues in detail, particularly in case of machineries which are sensitive. Also, learning to operate and maintain new equipment initially takes more time. Among all four FMTTIs, 19 respondents from SRFMTTI felt that the duration was inadequate followed by 3 respondents on NRFMTTI. Though these numbers are very less compared to the total sample, but the respective institutions may take note of this aspect.

### 4.4.8 Appropriateness of Training Logistics

All the respondents were asked about the logistic arrangements to make an assessment of the arrangements and availability of logistics in the institutions. Almost all the respondents felt satisfied with the provision of training materials and said to be adequate to cater the training purpose, except 3 respondents form NRFMTTI who felt that training material were inadequate and more material on practical aspects of the training could be added. Regarding boarding and lodging arrangements and canteen facility, 88% of the respondents were satisfied, while 12% of the participants felt the boarding arrangements to be partially satisfactory and felt that food quality may be improved. The highest percentages of such respondents were found from NRFMTTI (Hissar, 7%). With regards to availability of equipments/ machinery to trainees during the course of training, 80% felt that machineries and equipments were adequate in number while 20% said it to be inadequate as the equipments/machines had to be shared by more number of trainees and making it difficult to get equal chance during the training. There were incidents of some trainees dominating the session or even keeping the machine under their control. Hence, trainees felt that number of machines may be increased to provide adequate chance and time to each trainee during the training course. The trainees also felt that operational aspects are very important for comprehensive understanding and absence of field operations and lack of enough chance and time during practical session’s hindered learning.

Table 42 Response of beneficiaries on adequacy and appropriateness of logistic arrangements

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Institution** | **Training Materials** | | | | **Boarding/Lodging Facilities** | | | | | | **No. of Equipment/Machinery provided** | | | | **Audio/Visual Aids Used** | | | |
| **Adequate** | **%** | **Inadequate** | **%** | **Satisfactory** | **%** | **Partially Satisfactory** | **%** | **Not Satisfactory** | **%** | **Adequate** | **%** | **Inadequate** | **%** | **Yes** | **%** | **No** | **%** |
| SRFMTTI | 210 | 33% | 0 | 0% | 197 | 31% | 13 | 2% | 0 | 0% | 147 | 23% | 63 | 10% | 174 | 27% | 36 | 6% |
| NERFMTTI | 158 | 25% | 0 | 0% | 146 | 23% | 11 | 2% | 0 | 0% | 125 | 20% | 33 | 5% | 149 | 23% | 9 | 1% |
| NRFMTTI | 143 | 22% | 3 | 0% | 103 | 16% | 44 | 7% | 0 | 0% | 137 | 21% | 9 | 1% | 109 | 17% | 37 | 6% |
| CRFMTTI | 127 | 20% | 0 | 0% | 115 | 18% | 12 | 2% | 0 | 0% | 105 | 16% | 22 | 3% | 112 | 17% | 15 | 2% |
| **Overall** | **638** | **100%** | **3** | **0%** | **561** | **88%** | **80** | **12%** | **0** | **0%** | **514** | **80%** | **127** | **20%** | **544** | **85%** | **97** | **15%** |

Similarly, 85% of the trainees indicated that audio visual aids were used during the training course which is a better interactive media contributing to effective training methods. However, 15% revealed non use of any audio visual aid during training. It was however difficult to say which cadre of beneficiaries they belong, but majority of them attended the User Level training.

### 4.4.8 Usefulness and Utilization of Training Program

Out of 641 respondents interviewed, 403 (63%) felt that they have been able to utilize the skills gained from training in some way or the other. The remaining 37% felt that they have not been able to utilize the training skills. The highest percentage of the beneficiary who utilized the skills gained on Farm Machinery were from NRFMTTI (Hissar) followed by 15 in Andhra Pradesh, However, 17% in Andhra Pradesh also felt they have not been able to use the skills gained.

Table 43 Beneficiaries response on use of training skills after attending training course

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Institute** | **Total** | | | | **Farmers & Related Activity** | | | | **Technicians** | | | | **Students** | | | | **Others** | | | |
| **Used** | **%** | **Not Used** | **%** | **Used** | **%** | **Not Used** | **%** | **Used** | **%** | **Not Used** | **%** | **Used** | **%** | **Not Used** | **%** | **Used** | **%** | **Not Used** | **%** |
| SRFMTTI | 103 | 16% | 107 | 17% | 20 | 8% | 47 | 18% | 46 | 62% | 13 | 18% | 10 | 6% | 27 | 17% | 27 | 18% | 20 | 13% |
| NERFMTTI | 82 | 13% | 76 | 12% | 42 | 16% | 41 | 16% | 14 | 19% | 3 | 4% | 10 | 6% | 6 | 4% | 16 | 10% | 26 | 17% |
| NRFMTTI | 108 | 17% | 38 | 6% | 38 | 15% | 0 | 0% | 6 | 8% | 0 | 0% | 44 | 28% | 23 | 15% | 20 | 13% | 15 | 10% |
| CRFMTTI | 104 | 16% | 23 | 4% | 33 | 13% | 10 | 4% | 6 | 8% | 1 | 1% | 40 | 25% | 10 | 6% | 25 | 16% | 3 | 2% |
| **Total** | **397** | 62% | **244** | 38% | **133** | 58% | **98** | 42% | **72** | 81% | **17** | 19% | **104** | 61% | **66** | 39% | **88** | 58% | **64** | 42% |

Among different categories of trainees; Farmers, Technicians, Students and Others, the highest numbers were among the farmers who have utilized their skills in some way or other; the details will be discussed later in this section. 81% of all the technicians and 66% percent of the students who have attended the training courses felt to be more skilled and utilizing gained skills. Hence a larger portion of the trainees from all the categories felt they have benefitted from the training courses.

#### 4.4.8.1 Ex Post Use of Skills by Training beneficiaries

To gain an insight on how the respondents felt they have been using the training inputs after completing the courses, the respondents were interviewed using structured questionnaire on different aspects of utilization of skills gained after completion of courses from the FMTTIs. Table 44 in the next page gives the details of how different categories of trainees used skills gained after training. Of all the responses, 24% of the beneficiaries felt that they are now well equipped with skills of operations and maintenance of equipments. 12% of the respondents purchased equipments/ machinery after attending the training course. Therefore, the institutes have not only played a significant role in dissemination of information, but have also in adoption of new technology for mechanization of farming activity. All the respondents who purchased the machineries were farmers. Twelve percent beneficiaries also gained skills and utilized them in sourcing additional income by providing services for repairs, maintenance and operations. The most significant gainer from the scheme are the farmers who have utilized the skills in multiple forms as evident from the table 44 below. Students have also been benefitted from the training courses as a few of them used the skill and knowledge for imparting training and advising other users, some of them also used it for generating additional income. However, most of the students have used the knowledge gained through training for their ongoing academic activities. 5% of the students have also got a better placement after completing their courses and 8% have successfully completed their Agriculture Engineering course from the university. Hence, the benefits of the training have shown multiple effects.

Table 44 Application of learning by the trainees post training at FMTTIs

| **Sl** | **Ex-post Use by Training Beneficiaries** | **Farmers** | **Technicians** | **Students** | **Other** | **Total** | **%** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | Brought New Machinery for own use | 60 | 0 | 0 | 2 | 62 | 12% |
| 2 | Enhanced skills in operation and maintenance | 78 | 27 | 0 | 15 | 120 | 24% |
| 3 | Used training to improve efficiency of input use on agriculture machinery (Fuel Saving) | 15 | 16 | 0 | 9 | 40 | 8% |
| 4 | Influenced/ change in farm management practice | 16 | 6 | 0 | 9 | 31 | 6% |
| 5 | Lesser frequency in breakdown of machinery | 21 | 4 | 0 | 4 | 29 | 6% |
| 6 | Training/advising/helping other farmers towards effective & efficient use of machinery/equipments and maintenance | 25 | 10 | 4 | 15 | 54 | 11% |
| 7 | Used training to get additional income generation opportunity | 21 | 13 | 12 | 12 | 58 | 12% |
| 8 | Took up additional job as technician/ mechanic | 5 | 0 | 0 | 1 | 6 | 1% |
| 9 | Left Farming and took jobs as technician/operators | 4 | 0 | 0 | 0 | 4 | 1% |
| 10 | Used knowledge & skills to support ongoing academic activities | 0 | 0 | 37 | 0 | 37 | 7% |
| 11 | Better Placement | 0 | 0 | 24 | 0 | 24 | 5% |
|  | Opened new Workshop | 0 | 0 | 0 | 0 | 0 | 0% |
| 12 | Successfully completed the Course credit | 0 | 0 | 38 | 0 | 38 | 8% |
|  | **Total** | **245** | **76** | **115** | **67** | **503[[6]](#footnote-6)** | **100%** |

The training programs have not only helped the trainees to update, increase their knowledge and skills opening up new opportunities to generate additional income from the technical skills gained. Such training among the farmers has resulted in multi fold benefits which are evident from the range of options on which they have responded positively.

A majority of the respondents who have not been able to use the skills indicated constraints of finance for purchasing equipments/ machinery or setting up workshops (43%), lack of opportunities due to insufficient mechanization in the neighbourhoods and adjacent localities (26%). Another 22% indicated stiff competition in the markets of repair and maintenance due to existing influential players as the reason for not utilising the skills gained.

### 4.4.9 Impact of Training Program

Table 45 Impact of Training program on selected parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Institutes/Types of Respondents** | **Purchased of New Technology/Equipment** | | | **Reduction in Hrs of Field Operation** | | | **Reduction in Wastage of Water** | | | **Use of Irrigation Devices** | | | **Change in Production** | | | **Change in Income** | | | **Change in Occupation** | | |
| **Pre Training** | **Post Training** | **Change** | **Pre Training** | **Post Training** | **Change** | **Pre Training** | **Post Training** | **Change** | **Pre Training** | **Post Training** | **Change** | **Pre Training** | **Post Training** | **Change** | **Pre Training** | **Post Training** | **Change** | **Pre Training** | **Post Training** | **Change** |
| **SRFMTTI** | | | | | | | | | | | | | | | | | | | | | |
| *Farmers* | 32 | 49 | 17 | 20 | 23 | 3 | 10 | 12 | 2 | 57 | 62 | 5 | 20 | 28 | 8 | 20 | 28 | 8 | 0 | 0 | 0 |
| *Technician/Operator* | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 |
| *Students* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 4 | 4 |
| *Others* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **NERFMTTI** | | | | | | | | | | | | | | | | | | | | | |
| *Farmers* | 69 | 91 | 22 | 25 | 28 | 3 | 23 | 25 | 2 | 67 | 73 | 6 | 65 | 83 | 18 | 65 | 83 | 18 | 0 | 0 | 0 |
| *Technician/Operator* | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 0 |
| *Students* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 4 | 4 |
| *Others* | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 1 | 1 | 0 | 0 | 0 |
| **NRFMTTI** | | | | | | | | | | | | | | | | | | | | | |
| *Farmers* | 23 | 33 | 10 | 10 | 13 | 3 | 30 | 34 | 4 | 38 | 38 | 0 | 21 | 38 | 17 | 21 | 38 | 17 | 0 | 1 | 1 |
| *Technician/Operator* | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 |
| *Students* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 0 | 6 | 6 |
| *Others* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CRFMTTI** | | | | | | | | | | | | | | | | | | | | | |
| *Farmers* | 54 | 65 | 11 | 13 | 15 | 2 | 15 | 21 | 6 | 43 | 50 | 7 | 25 | 33 | 8 | 25 | 33 | 8 | 1 | 3 | 2 |
| *Technician/Operator* | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 |
| *Students* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 10 | 10 |
| *Others* | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| **Overall** | | | | | | | | | | | | | | | | | | | | | |
| *Farmers* | 178 | 238 | 60 | 68 | 79 | 11 | 78 | 92 | 14 | 205 | 223 | 18 | 131 | 182 | 51 | 131 | 182 | 51 | 0 | 4 | 4 |
| *Technician/Operator* | 0 | 0 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 13 | 0 | 0 | 0 |
| *Students* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 24 | 0 | 24 | 24 |
| *Others* | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 |

From table 45 above, the multiple benefits of training program as responded by the beneficiaries can be seen. The Farm Mechanization training covered varied topics catering to different categories of trainees and therefore the impact of training program also varied at the field level such as increase in productivity, reduction of water usage, reduction in hours of field operations to even change in occupation. However it is difficult to quantify usage of machinery and its impact. However an effort has been made to understand the impact on certain variables in association with different equipments.

Table 45 above presents the details of beneficiary who have responded to different impact parameters. Overall, 178 farmers from all the different centres were using some equipments and machineries even before attending the training program. After attending, 60 farmers purchased the equipments/ machineries which represent an adoption rate of 33%. The highest percentage change in adoption is found to be associated with SRFMTTI at 53% followed by NRFMTTI (44%). 32% of the farmers from NERFMTTI have also adopted new machineries after attending the training program. 20% of the farmers who attended the training programs in CRFMTTI also purchased new equipments subsequent to training.

Apart from adoption, application of training also resulted in other benefits such as reduction in duration of field operations, efficient use of water, use of irrigation devices. Overall there has been a 16% increase in number of farmers after attending the training course who have reported reduction in hours of field operations. Farmers who attended their training course in NRFMTTI, Hissar reported the highest increase followed by SRFMTTI, Anantpur (15%), CRFMTTI, Bundni (15%) and NERFMTTI, Assam (12%). The training also reported reduction in usage of irrigation water after attending the course. On an average 18% more farmers have reported this phenomenon whereas there is an 8% increase in the numbers of farmers adopting irrigation devices.

The most significant of all the impacts is seen in case of change in production and income. There has been a 39% increase in farmers who have reported increase in production and its impact on overall income. Quantifying the change in production, income and reduction in wastage of water was difficult due to adoption of different technologies and application of training inputs of different courses and therefore the evaluation of change in production and income per acre basis and average change in income has been attempted, whereas reduction in wastage of water has been measured on likert scale both for pre and post production scenario.

#### 4.4.9.1 Impact of Training on different Impact Indicators

Impact of training on outcome level variables has been quantified with regard to indicators such as reduction in hours of field preparation, average reduction in water use, and change in production and change in income and skill levels which are presented in table 46 below. It may be noted that indicators such as reduction in field operations, change in production and income may not be appropriate estimations; however it represents the outlook of beneficiaries. As indicators such as reduction in water use and change in skill levels are difficult to quantify therefore and attempt has been made to measure the changes on likert scale based on trainee’s perceptions.

Table 46 Impact of Training program on certain measurable parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Impact parameters** | **SRFMTTI** | | | **NERFMTTI** | | | **NRFMTTI** | | | **CRFMTTI** | | |
| **Pre Training** | **Post Training** | **% Change** | **Pre Training** | **Post Training** | **% Change** | **Pre Training** | **Post Training** | **% Change** | **Pre Training** | **Post Training** | **% Change** |
| Average Reduction in hours of Field preparation. (Hour/Acre) | 12.11 | 10.56 | 13% | 16.59 | 15.22 | 8% | 5.4 | 4.5 | 17% | 6.32 | 5.69 | 10% |
| Average Reduction in Wastage of Water (%age point) | 3.74 | 3.15 | 16% | 5 | 4 | 20% | 3.66 | 2.67 | 27% | 3.81 | 2.27 | 40% |
| Change in production (Qts/Acre) | 10.81 | 13.5 | 25% | 9.7 | 12.76 | 32% | 11.75 | 13.75 | 17% | 11 | 14 | 27% |
| Change in Income in Farming activity (Rs per acre.)[[7]](#footnote-7) | 13100 | 14600 | 11% | 9800 | 10200 | 4% | 10200 | 13000 | 27% | 11200 | 12000 | 7% |
| Change in Income as Technician/operators (Rs. P.a)[[8]](#footnote-8) | NA | NA | NA | 11500 | 13500 | 17% | 25000 | 30000 | 20% | 51000 | 55000 | 8% |
| Change in Skill Level (%age point) | 2.11 | 3.64 | 73% | 2.23 | 3.67 | 65% | 2.06 | 3.93 | 91% | 1.92 | 3.72 | 94% |

It can be observed from the table above that on an average reduction of hours required for field preparation has been in range of 8-17% due to use of machinery and change in skill levels post training. The highest reduction of 17% was reported by farmer/operators having attended the program in NRFMTTI followed by 13% from the respondents who have attended training in SRFMTTI. It was also seen that the farmers from NERFMTTI had the highest operational time compared to farmers at other institutes. The water use on an average decreased from 4.05 percentage points to 3.02 percentage points. The highest reduction of 1.57 points (40%) has been reported by the respondents from CRFMTTI which is a significant 40% less than the ex-ante use of water. The second highest reduction from 3.66 point to 2.67 point which is almost 27% reduction was reported by the respondents from NRFMTTI (Hissar).

The production per acre on an average has increased from 11 quintal to 13 quintal which corresponds to an 18% increase in yield. The immediate impact of this was seen in the income of beneficiaries which has increased by approximately 12% per acre on an average The maximum increase has been reported by the beneficiaries from NERFMTTI while the lowest 17% from NRFMTTI ( Hissar).

The technicians and operators from all the FMTTIs except SRFMTTI reported an increase in income as additional skills have helped them to improve on their productivity. On an average there is an increase of Rs 3667 per annum in the income of every technician who have been either practicing or took up operations and maintenance of farm machineries and equipment as an additional source of income.

The skill level as reported by the beneficiaries from all across the FMTTI increased by 1.66 points from 2.08 points to 3.74 points. The highest increase in skill levels of 1.8 points was observed among the beneficiaries of CRFMTTI and NRFMTTI.

#### 4.4.9.2 Overall Rating of the Training Program

Considering all the parameters for assessing the training courses including the quality, training logistics, infrastructure support for training program and utility of training courses, the respondents were asked to rate the training program organized at FMTTIs on 10 point scale (0-9) where 0 indicates the least and 9 indicates the best. The average rated score for each FMTTI is presented in the table 47 below.

Table 47 Overall rating of training by the respondents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Institutes** | **Average Score** | **Farmers** | **Technician/Operators** | **Students** | **Others** |
| SRFMTTI | 7.3 | 7.31 | 7.4 | 7.77 | 7.01 |
| NERFMTTI | 6.33 | 6.37 | 6.89 | 6.33 | 5.68 |
| NRFMTTI | 7.56 | 7.77 | 7.87 | 6.89 | 7.57 |
| CRFMTTI | 7.57 | 7.59 | 7.44 | 7.45 | 7.4 |
| **Overall** | **6.97** | **6.98** | **7.17** | **7.21** | **6.5** |

On the basis of average score, CRFMTTI (Budni) and NRFMTTI (Hissar) have emerged as the best rated institutes whereas NERFMTTI is the least. The institute runs different courses for different types of participants therefore the average rating was calculated to understand the differential rating across the farmers, technicians, students and others. It is evident from the averages that the score given by students were highest (7.21) followed by the technician/ operators (7.17) and farmers (6.97). The lowest score was given by others who mostly comprise of trainees from service class, unemployed persons, and others whose primary jobs are different from what the course was intended for. On the popularity of institute among the beneficiaries, the highest score was obtained by SRFMTTI whereas in all the other categories i.e. technicians, operators and farmers the highest score was obtained by NRFMTTI. Among the four apex institutes, NERFMTTI has scored the lowest on an average among the different segments of audiences. The institute should revamp its courses and study material to bring out an improvement in future.

#### 4.4.9.3 Dissemination and Sharing of Knowledge

To understand the multiplier effect of training activity, it is important to analyse the respondent’s feedback on how the knowledge and skills gained by them are being utilized for the benefits of the society. It is estimated that almost 58% of the respondents had the opportunity to share their knowledge and skills with other colleagues and fellow farmers, while 9% had demonstrated activities either on their farm or workshops towards better operations and maintenance. It is heartening to find the fact that the knowledge and skills gained has not been limited only to the beneficiaries who primarily attended the training course but was also disseminated to other who did not have the opportunity to attend it. However, due to the constraints faced by small and marginal farmers in the form of capital, investment, and land holding, it was seen that approximately 20% of the beneficiaries felt that their scope of adoption is limited to a very large extent.

## 4.5 Outsourcing of Training and Demonstration

In addition to training and testing program conducted through four designated Farm Mechanization Training and Testing Institutes located at four different regions, the component of Outsourcing of Training and Demonstrations’ was included to supplement the training and demonstration activities being conducted by FMTTIs to increase scale of adoption of the farm machineries. The objectives were not only to increase the adoption rate but also to pass on the benefits to remote areas where mechanizations in farming activities were minimal. Under this component of the program, training needs were identified on specific requirements of farmers primarily through State Agriculture Department, State Agriculture Universities, KVKs and other Government sponsored institutions such as CIAE Bhopal. Apart from the four FMTTIs located in four different states, a total of 9 additional states were covered to assess overall performance of the scheme. The samples covered in the additional 9 states are presented in table 1 of Chapter 2.

While conducting the study, two different stakeholders were interviewed consisting of officials of institutions which have carried on the training and demonstration and the beneficiaries who have been part of training and demonstration. Among the demonstration participants, the host farmers as well as the observant were administered to get their feedback on quality, adequacy and perception on the usefulness of the activities being conducted as a part of program and its impact on the actual users of the equipments and machineries.

Table 48 below gives the details of activities being organized under the PSAMTTD’s outsourcing of training and demonstration component of the scheme. As evident from the table, the prominent activity remains the demonstration of agriculture equipment/ machineries. Over 29000 demonstrations are reported to have been organized in these sample states, of which the highest numbers (30%) were organized during the last year of the XI Five Year Plan (2011-12). No activities were reported to have been conducted by the DoA in Andhra Pradesh during the XI Five Year Plan. Apart from Tamil Nadu, Punjab and Madhya Pradesh, no other states organized the activities in all the years of the XI Five Year Plan. Maharashtra, Rajasthan, Haryana and Uttarakhand conducted the activities only once in the entire XI Five Year Plan. Among all the sample states, Punjab emerged as a leading state which has organized more than 11000 first line demonstrations during the entire XI Five Year Plan followed by Madhya Pradesh with more than 10000 demonstrations. Only 560 training programs are reported to be organized by the State Agriculture Department and around 191 new implements were introduced in the states as a part of the farm mechanization program.

Table 49 gives the details of fund released to the sample states followed by the detailed analysis for each state:

Table 48 No of training, demonstration and introduction of New Implement being conducted by DoA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **2007-08** | | | **2008-09** | | | **2009-10** | | | **2010-11** | | | **2011-12** | | | **Total** | | |
| **Training** | **Demo** | **INI** | **Training** | **Demo** | **INI** | **Training** | **Demo** | **INI** | **Training** | **Demo** | **INI** | **Training** | **Demo** | **INI** | **Training** | **Demo** | **INI** |
| Andhra Pradesh | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | **0** | **0** | **0** |
| Tamil Nadu | 90 | 1002 |  | 60 | 1671 |  | 120 | 587 |  | 118 | 431 | - | 105 | 501 |  | **493** | **4192** | **0** |
| Assam | - | 5 | 21 | - | 225 | 17 | - | - |  | - | - | - | - | - |  | **0** | **230** | **38** |
| Maharashtra | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 153 | **0** | **0** | **153** |
| Rajasthan | - | - | - | - | 170 | - | - | - | - | - | - | - | - | 20 |  | **0** | **190** | **0** |
| Punjab | - | 908 | - | - | 2179 | - | - | 2949 | - | - | 2610 | - | - | 2439 |  | **0** | **11085** | **0** |
| Haryana | - | - | - | - | 1040 | - | - | - | - | - | - | - | - |  |  | **0** | **1040** | **0** |
| Uttarakhand | - | - | - | - |  | - | - | - | - | - | - | - | - | 646 |  | **0** | **646** | **0** |
| Madhya Pradesh | 6 | 873 | - | 61 | 1069 | - | - | 1378 | - | - | 2112 | - | - | 4588 |  | **67** | **10020** | **0** |
| Orissa | - | - | - | - | 160 |  |  |  |  |  | 1060 |  |  | 685 |  | **0** | **1905** | **0** |
| West Bengal[[9]](#footnote-9) | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |  |
| **Total** | **96** | **2788** | **21** | **121** | **6514** | **17** | **120** | **4914** | **0** | **118** | **6213** | **0** | **105** | **8879** | **153** | **560** | **29308** | **191** |

Table 49 Fund allocation to sample states

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Zone** | **State** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** | **Utilization** | **%**  **to total allocation** |
| South Zone | Andhra Pradesh | 0 | 11 | 0 | 0 | 0 | 11 | NR | NA |
| Tamil Nadu | 77 | 65 | 53 | 68 | 50 | 313 | 294.12 | 94% |
| North Eastern Zone | Assam | 22 | 35 | 0 | 0 | 0 | 57 | 22.5 | 39% |
| Western Zone | Maharashtra | 0 | 6 | 0 | 0 | 100 | 106 | Nil | NA |
| Rajasthan | 0 | 0 | 0 | 0 | 19 | 19 | 19 | 100% |
| Northern Zone | Punjab | 0 | 96 | 0 | 0 | 0 | 96 | 11.64 | 12% |
| Uttarakhand | 29 | 82 | 0 | 0 | 0 | 111 | 99.52 | 90% |
|  | Haryana | 45 | 45 | 20 | 138 | 0 | 248 | 248 | 100% |
| Central Zone | Madhya Pradesh | 35 | 36 | 0 | 61 | 100 | 232 | 229.27 | 99% |
| Eastern Zone | Orissa | 44 | 29 | 48 | 109 | 153 | 383 | 230.45 | 60% |
| West Bengal | 0 | 30 | 0 | 13 | 150 | 193 | 43 | 22% |
| **Total** | | **207** | **390** | **101** | **251** | **572** | **1521** |  |  |
| **Percentage** | | **14%** | **26%** | **7%** | **17%** | **38%** | **100%** |  |  |

### 4.5.1 Fund release and utilization pattern

Andhra Pradesh: It may be noted that funds amounting to Rs 11 lakh was released to Andhra Pradesh during the year 2008-09. The fund was released to carry out the demonstration of newly developed agriculture equipment at farmers’ field. Out of Rs 11 lakh, Rs 7.66 lakh remained unspent by the end of the financial year 2012. Hence, only 3.34 lakh was utilized for the purpose of demonstration. During the field survey, the nodal officer of NABCONS tried to gather information on the activities demonstrated however despite repeated efforts, the concerned department did not provide any information on the progress.

Tamil Nadu: During the XI Five Year Plan Rs 313 lakh was released to Tamil Nadu of which 94% (Rs 294.12 lakh) are reported to be utilized. As per the information collected from the Department of Agriculture Engineering, Chennai, and Rs. 137. 11 lakh was utilized under the training component and Rs 96.7 lakh was utilized under the demonstration component. It may also be noted that during the last year (2011-12) against the targeted 503 demonstration activities, 501 were completed during the year 2012-13 and not during the XI Five Year Plan. Among the four states in South Zone, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu; Tamil Nadu is the best performing state in implementation of the schemes. The funding for training has been utilized for payment of stipend, institutional charges, boarding, lodging and travel charges. Under the demonstration component, expenditure was incurred for hiring of prime movers wherever necessary, transporting equipment and attachments and to meet the cost of inputs, publicity, printing handout containing technical information of equipments selected for demonstration. As per the information provided by the DoAE, training and demonstrations are conducted in all the districts, except Chennai.

Both theoretical and practical sessions were organized during the training programs using experienced persons from Agri. Engg Dept and even resource persons from outside the Department. The practical sessions were conducted in AED and in reputed firms. Overall, the program was received well by both the training and demonstration participants, not only in terms of theoretical understanding about the machineries and its benefits but also practical aspects of its operations and maintenance.

Assam: As per the information made available by the Chief Engineer’s Office of Directorate of Agriculture, Govt of Assam, training programs have not been conducted for the farmers under PSAMTTD scheme of GoI. However, the Agriculture Engineering Wing has conducted demonstration of newly developed agriculture equipment/ machineries through demonstrations camps at various locations in the state. A total of 230 demonstration camps were organised during the XI Five Year Plan i.e. 5 demonstrations in the year 2007-08 and 225 demonstrations in the year 2008-09. The main aim was to increase adoption of mechanization resulting in enhanced production, reduce time of operations and encourage multiple cropping. As reported, only 580 farmers participated during the demonstration camps. The demonstrations were organized through Field Management Committees (FMC) which is organized throughout the state encompassing most of the villages of the plains of Assam. Hence, in order to gain feedback on demonstrations, the investigating team also visited three FMC clusters; Bhurbhanha DB in Morigaon, Bengenaati PPs under Pakhimaria DB and Mukundaati under Juria DB of Nagaon district.

It is evident that the activities were undertaken whenever the funds were provided to the state, i.e. during 2007-08 and 2008-09. As no financial assistance was provided from 2009-10 to 2011-12, no activities were organized. A total of Rs 57 lakh were provided during the XI Five Year Plan of which only Rs. 22.5 lakh were utilized accounting for 39% use.

Maharashtra: As per the information provided by Mechanization and Technology Division, a DoAC (MoA) fund to an extent of Rs. 6 lakh was not released. Only Rs 100 lakh was released during the 2011-12 in the month of March 2012. However no progress during the entire XI Five Year Plan was reported. The released amount of Rs 100 lakh was allocated to Maharashtra Agro Industries Development Corporation. It was informally gathered that the Maharashtra Agro Industries Development Corporation had already supplied 80% of the implement to Agriculture Universities within the state in recent past for organizing the activities. Since, the agriculture season was over by the time the Universities received the equipments no progress could be made.

Rajasthan: Only Rs 19 lakh was given to Rajasthan Agriculture Department under PSAMTTD Scheme for implementation of Training and Demonstration. However upon enquiry, it came to light that the department had not carried out any of programs during the XI Five Year Plan. Instead the funds were allocated to the Maharana Pratap University of Agriculture Technology for demonstration activity which has also not implemented any program under training component. The information provided by MPUAT indicates that 20 demonstrations of garlic seed planter and spice seed planters were organized during the year 2011-12 and two new implements were introduced with expenditure of Rs 19 lakh and Rs. 2.00 lakh respectively. This needs to be cross checked with the Department because the information provided by the MoA, Mechanization and Technology Division indicated an unutilized amount of Rs 19 lakh by the end of financial year 2011-12. Along with the demonstration activities, informal training sessions were reportedly organized for the beneficiaries. It is pertinent to note here that project allocation by the Government should be made well in advance as agriculture activities are seasonal in nature and any delay results in a cyclical lag.

Punjab: Under the PSAMTTD an amount of Rs 96 lakh was allocated during the year 2008-09 and with no allocation in later years. The training component was not implemented in the states. However frontline demonstrations were organised. Different farm machineries were demonstrated across 20 districts of Punjab. The Department has revalidated the unspent balance of Rs 28.17 pertaining to the year 2006-07 to be utilized during the year 2007-08 and was utilized for the purchase of machineries and front line demonstrations. A fresh sanction of Rs 96.04 lakh was given during 2008-09, out of which Rs 11.64 lakh was spent for organizing front line demonstrations. The unspent balance of Rs 84.40 lakh was refunded to the Dept of Agriculture and Cooperation, GoI after the XI Five Year Plan.

Out of total funding made available, only 12% was utilized. A total of 11085 demonstrations were organized covering area of 7500 ha. The total hours of demonstration amounted to 21,926 hours with an average time of 3 hours per ha of land which is significant.

The Officials of the Department indicated that the scheme has provided additional funds for purchase of farm machineries/equipment and therefore more demos have become possible. However the paucity of staff such as drivers and operators had resulted in inefficient utilization of machinery and capacity. Also, the machinery once used remains unattended for a long period of time under the direct exposure of sun and rain which leads to higher rate of depreciation. It was also found during the interaction that machineries like Happy Seeder, Paddy Transplanter and Bed Planter were not adopted in adequate numbers either through purchase or custom hiring as they required additional skills to operate and maintain. For increasing the adoption rate of these machineries, intensive training on operations and maintenance will be required.

Uttarakhand: A total of Rs 111 lakh was allocated to the state during the first two years of the XI Five Year Plan with no allocations during the subsequent years. Funds amounting to Rs 29.41 lakh was allocated to Uttarakhand Seed and Tarai Development Corporations for demonstration of Laser Land Leveller during the year 2007-08 and Rs 82.33 lakh were allocated during the year 2008-09 for demonstration of other agriculture equipments such as Power Tiller, Raised Bed Planter, Weeder and Marker, Hauzrill etc. The allocated fund of 2008-09 was utilized for purchasing the machinery during the year 2009-10 and demonstration were mostly organized during the year 2011-12. Total 551 demonstrations were organized during the last year of XI Five Year Plan. The fund was utilized to the extent of 90% while 10% remain unutilized.

Madhya Pradesh:. In terms of physical progress, as reported by the Directorate of Agriculture Engineering, more than 10000 demonstrations were organized in addition to 61 training programs that too during the first two years of XI Five Year Plan. In case of financial allocation to the state, some discrepancies in respect of claims made by Directorate of Agri Engineering and Ministry of Agriculture were observed. As per the information provided by the Directorate of Agri Engineering, total available fund to be utilized during the XI Five Year Plan was Rs 298.47 lakh while the information from the Ministry of Agriculture, Mechanization and Technology Division indicates a total allocation of Rs 232 lakh. This needs to be revalidated. Going by the estimates of DoA, it was observed that out of total available fund amount of Rs 298 lakh, Rs 232.66 lakh was spent for training and demonstration of activities.

Odisha: Funds for demonstration of agriculture equipments were provided during each of the five years of the XI Five Year Plan. The total funds allocated during the period were Rs 383 lakh, out of which 60% (Rs.230.45 lakh) are reported to have been utilized. As per the information provided by the Directorate of Agriculture (Engineering Dept), from the year 2010-11 onwards, funds were utilised for two components i.e. procurement of agriculture machineries and organizing demonstration programs at the field level. As per the report, expenditure incurred in procurement of equipments/machineries during 2010-11 and 2011-12 were Rs.44.58 lakh and Rs.73.96 lakh, respectively, and for organizing demonstration during the same years were Rs.64.51 and Rs.18.14 lakh, respectively. Thus a total amount of Rs.211.12 was used for procurement and demonstration during the last two years of the XI FYP. The data needs to be revalidated at the level of department because of the differences in expenditure statements.

The Directorate has taken good initiatives to popularize newly developed equipments in the State. The Directorate has reported that it organised 2473 and 685 demonstrations during the years 2010-11 and 2011-12, respectively, totalling to 3158 demonstrations. Thirty districts were covered across three zones; North Zone, Central Zone and South Zone of the State.

West Bengal: During the XI FYP Period, the State was allocated Rs.193 lakh for demonstration of agriculture equipments for Promotion and Strengthening of Agriculture Mechanization. The information provided by the Mechanization and Technology Division, MoA, reveals that Rs.43 lakh constituting merely 22% of the allotted funds were utilised during the entire XI Five Year Plan.

Central Institute of Agriculture Engineering (CIAE, Bhopal): Central Institute of Agriculture Engineering located at Bhopal has also conducted training programmes through Krishi Vigyan Kendras. The Institute has conducted 20 courses of agriculture engineering during the entire XI Five Year Plan covering a total of 418 participants. In addition to the specific course on agriculture engineering, the institute has also conducted several training programme covering a range of topics which are presented in table 50 below:

Table 50 Training programs organized by CIAE-Bhopal

|  |  |  |  |
| --- | --- | --- | --- |
| **Content** | **Training (No)** | **Duration (days)** | **Participants (no)** |
| Repair and maintenance of farm machinery | 8 | 29 | 80 |
| Water Management | 8 | 2 | 224 |
| Micro Irrigation System for Orchard | 3 | 2 | 48 |
| Income Generation for rural women | 9 | 6 | 225 |
| Drudgery reduction for women through technology | 19 | 4 | 479 |
| Value Addition | 35 | 6 | 766 |
| Training on improved implements and its matching equipments | 27 | 2 | 536 |
| Electric Motor rewinding | 3 | 25 | 38 |
| **Total** | **112** |  | **2390** |

In all 112 training programs were organised covering 2390 participants during the XI Five Year Plan. Field Level Demonstrations were also organized for different farm implements. The list of equipments under Field Level Demonstrations and their impact may be seen in Annexure- 9

Overall Performance: Overall performance of the scheme implemented by the State Government is found to be satisfactory. Out of 11 sample states, 5 states have utilized more than 90% of the funds for demonstration activities and also made significant progress at the field level for popularising the newly developed machinery and equipments and creating awareness among the primary users of the equipments. Uttarakhand and Haryana in the Northern Region performed exceedingly well during the XI Five Year Plan utilising more than 90% of the allocated fund. However, Punjab, one of the most developed States of the region utilized only 12% of the allocated fund. In terms of physical progress though, the state has done highest number of front line demonstrations when compared to other States in the sample. One of the reasons for low utilisation of the funds in Punjab could be that, being agriculturally developed state, the agriculture equipments used under demonstrations are already well known to farmers and the adoption rate is also higher than other states. The States in the Eastern and North Eastern States need to improve their performance which is indicated by the data presented in table 48 above.

Table 51 below gives the details of equipments purchased, demonstrated and training programs conducted in different sample states covered under the study.

Table 51 State wise types of implements procurement and demonstrated under the PSAMTTD Scheme

| **State** | **Types of Implement Procured** | **Types of Implement Demonstrated** | **Topics of Training Program** | **Remark** |
| --- | --- | --- | --- | --- |
| Andhra Pradesh | Not Reported | Not Reported | Not Reported | Not applicable |
| Tamil Nadu |  | 1. Self Propelled Paddy Transplanter 2. Rotavator 3. Offset Disc Harrow 4. Sub soiler 5. Post Holde digger 6. Raised bed planter 7. Laser land leveller | 1. Package of Agriculture Machinery for paddy cultivation 2. Package of agriculture machinery for sugarcane cultivation 3. Water management through sprinkler and drip irrigation and water saving devices 4. Selection Operations and maintenance of Plant protection equipment | Govt provide 100% assistance for training and demonstration, for procurement of machineries and contingency expenditure, however extra assistance are given for infrastructure development.  Conducting training in all the districts is a laborious activity for section officers as they are handling several projects at a time. Establishment of training centres in every district with staff component who will intensively work on training and promotion of farm machineries.  The contingency expenditure towards demonstration is insufficient because transporting machineries at field level varies from place and approachability. This may be taken into consideration. |
| Assam |  | 1. Potato Planter 2. Tractor drawn rotavator 3. Zero till drill 4. Potato digger 5. Self propelled reaper | Not applicable |  |
| Maharashtra | 1. Paddy Transplanter 2. Paddy Reaper/ harvester 3. Paddy Thresher 4. Weeder/ Brush Cutter 5. Self Propelled Cotton Slasher 6. Power Weeder 7. Cycle operated Pump set 8. Cycle Operated Spray pump | Nil | Not Available. | No demonstrations were conducted during the period. Earlier this program was not implemented however; trainings were organized at SAUs. The equipments such as Zero Till Dril could not get popularised because of its non suitability to soil type of the state. The equipments like Combine harvester and laser land leveller has not been adopted due to its cost factor. |
| Rajasthan | Not Available | 1. Self Propelled Reaper-10 2. Reaper Binder-7 3. Multi crop thresher-22 4. Rotavator-20 5. Roto till drill-9 6. Post hole digger- 19 7. Aero blast sprayer- 2 8. Seed spices planter- 14 9. Garlic Planter- 48 10. Seed spices thresher- 16 11. Air sleeves boom sprayer- 6 | Not Applicable | Timely allotment of funding is necessary to implement the project on time. Any delay results in time lag of at least 1 year. |
| Punjab | Not Available | 1. Raised bed planter 2. Happy seeder 3. Rotavator 4. Forage Chopper Cum loader 5. Forage reaper 6. Zero till drill 7. Paddy transplanter 8. Laser Land leveller 9. Zero Till Drill | Not applicable | The paucity of staff members such as drivers and operators is resulting in inefficient utilization of the capacity.  The adoption of machineries such as happy seeders, paddy transplanter and bed planter due to deep rooted agriculture practices as well as additional skills required in operations and maintenance o f these equipments. |
| Uttarakhand | 1. Laser Land Leveller-3 2. Tractor- 3 3. Plain Leveller-2 4. Harrow-3 5. Power Tiller-6 6. Ragi Thresher-40 7. Seed Drill- 35 8. Weeder and Marker-95 9. Mini Rotary Tiller-11 10. Straw Reaper-10 11. Raised Bed Planter-10 12. Houzrill Irrigator-2 | 1. Power Tiller- 40 2. Ragi Thresher- 160 3. Seed Drill- 140 4. Weeder- 190 5. Straw Reaper- 40 6. Mini Rotary Tiller- 68 7. Haus reed irrigator- 8 | Not Applicable | Performance of demonstration of machinery is better in plain area vis a vis hilly area. In hilly areas, Smaller land holding and only 25% subsidy on the equipment farmers are disinterested in accepting advanced and bigger equipments such as power tiller could not be used. |
| Madhya Pradesh |  | 1. Rotavator 2. Seed Drill 3. Tractor 4. Wheat Seeder 5. Soyabean seeder 6. Cultivator 7. Reaper |  |  |
| Orissa | 1. Seed cum fertilizer drill 2. SRI Weeder 3. Zero Till drill 4. Maize sheller 5. Laser guided leveller 6. Rotavator 7. Self Propelled transplanter 8. Brush cutter 9. Power Weeder 10. SP Rice Transplanter 11. Potato Planter 12. Bund former 13. Sugarcane ridger 14. Cono weeder 15. Paddy Reaper 16. Brush cutter 17. Drum seeder | 1. SP Paddy Transplanter 2. AF Paddy Thresher 3. Power Weeder 4. Potato Planter 5. Seed Cum fertilizer Drill 6. Inclined Plate planter 7. Brush cutter 8. Rotavator 9. S. Flower thresher 10. Laser leveller 11. Cono/ Ragi Weeder 12. Drum Seeder 13. Groundnut thresher 14. SRI Weeder 15. Potato Planter |  |  |

## 4.6 Beneficiary Response on Outsourcing of Training cum Demonstration Component under PSAMTTD

To evaluate the usefulness, effectiveness and adequacy of Training and Demonstration Programs being organized by Directorate of Agriculture through their extension wings, interactions were held with beneficiaries using a structured questionnaire. The states like Tamil Nadu, West Bengal, Odisha and Madhya Pradesh have organized training programs in addition to demonstration activities. The findings are presented separately for both training and demonstration activities in the subsequent paragraphs.

### 4.6.1 Demographic Profile of Respondents

The demographic details of the sample beneficiaries surveyed under Outsourcing of Training Component are presented in table 52 below.

Table 52 Demographic details of training beneficiaries of outsourcing training component

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Tamil Nadu** | | **West Bengal** | | **Madhya Pradesh** | | **Odisha** | | **Total** | |
| **No** | **%** | **No** | **%** | **No** | **%** | **No** | **%** | **No** | **%** |
| Total Samples | 42 | 100% | 42 | 100% | 24 | 100% | 49 | 100% | 157 | 100% |
| Male (No) | 36 | 86% | 20 | 48% | 19 | 79% | 49 | 100% | 124 | 79% |
| Female (No) | 6 | 14% | 22 | 52% | 5 | 21% | 0 | 0% | 33 | 21% |
| **Age (Years)** |  |  |  |  |  |  |  |  |  |  |
| Average[[10]](#footnote-10) | 49 | (12.17) | 36.28 | (10.12) | 27.15 | (13.79) | 44.93 | (10.57) | 40.9 | (13.59) |
| Minimum | 28 | - | 19 | - | 18 | - | 29 | - | 18 | - |
| Maximum | 76 | - | 60 | - | 68 | - | 72 | - | 76 | - |
| **Category** |  |  |  |  |  |  |  |  |  |  |
| SC | 3 | 7% | 18 | 43% | 1 | 4% | 9 | 18% | 31 | 20% |
| ST | 0 | 0% | 0 | 0% | 3 | 13% | 3 | 6% | 6 | 4% |
| OBC | 36 | 86% | 8 | 19% | 13 | 54% | 17 | 35% | 74 | 47% |
| General | 3 | 7% | 16 | 38% | 7 | 29% | 20 | 41% | 46 | 29% |
| **Education** |  |  |  |  |  |  |  |  |  |  |
| Primary | 10 | 24% | 6 | 14% | 5 | 21% | 11 | 22% | 32 | 20% |
| Secondary | 21 | 50% | 22 | 52% | 1 | 4% | 18 | 37% | 62 | 39% |
| Higher Secondary | 9 | 21% | 5 | 12% | 15 | 63% | 3 | 6% | 32 | 20% |
| Graduate & Higher | 2 | 5% | 3 | 7% | 0 | 0% | 10 | 20% | 15 | 10% |
| None | 0 | 0% | 6 | 14% | 3 | 13% | 7 | 14% | 16 | 10% |
| **Land Holding (Acre)** |  |  |  |  |  |  |  |  |  |  |
| Average | 6 | (9.45) | 2.39 | (2.59) | 4.95 | (6.51) | 18.03 | (16.65) | 8.53 | (12.83) |
| Minimum | 1 | - | 1 | - | 1 | - | 1 | - | 1 | - |
| Maximum | 50 | - | 14 | - | 32 | - | 70 | - | 70 | - |
| SC | 3 | - | 1.1 | - | 7 | - | 19.33 | - | 9.46 | - |
| ST | NA | - | NA | - | 2.67 | - | 9.66 | - | 6.16 | - |
| OBC | 5.26 | - | 1.5 | - | 5.93 | - | 13.91 | - | 6.92 | - |
| General | 17.33 | - | 3.25 | - | 3.86 | - | 22.44 | - | 12.38 | - |

In the 4 States covered by the study, 157 beneficiaries were covered under the training programs, of the Outsourcing Training Component. Of the total respondents, 79% were males while 21% were females. The maximum number of responses of female beneficiaries was from West Bengal, with 52% female respondents. No female respondents were found in Odisha.

The average age of the beneficiaries was 41 years, lowest being in Madhya Pradesh and highest being in Tamil Nadu. Out of 157 respondents, 47% belongs to OBC, 29% to General Category, 20% Schedule Castes and only 4% to Scheduled Tribes. The responses from tribal beneficiaries were from West Bengal and Odisha. No tribal beneficiaries were found in Tamil Nadu and West Bengal. With regards to literacy, 60% of the total beneficiaries have education up to primary and secondary level while 10% of the beneficiaries had no formal education at all.

The average land holding of the farmers was 8.54 acres, highest being in case of Odisha (18.03 acre) and the lowest being in West Bengal (2.39 acre). The average holding among the farmers belonging to General Category was the highest at 12.38 acres, for all the states surveyed.

The average duration of training was 4 days ranging from 1 day to 15 days.

### 4.6.2 Sources of Information

The primary sources of information on Training Programs to beneficiaries were friends/ fellows, agriculture institutes/ training institutes and Government Officials of the concerned department. Of the total 157 respondents, 57% got the information of training program from Government Officials, 23% from their friend/ fellows and 17% from institutes such as KVKSs, IITs, Polytechnic Institutes, etc. Figure below presents the sources from which the beneficiaries have received the information under outsourcing component.

Figure 30 Sources of Information under Outsourcing of training component

As evident from the figure 30 above, being a Government Sponsored Program, in all the sampled states, the major source of information was the Government Officials who disseminated the information for training program which in turn was disseminated to other beneficiaries through their relatives and friends. In Odisha, the trainees were selected by the Government officials and the sponsoring institutions.

### 4.6.3 Motivation for attending the training program

The motivation for attending the training/ training cum demonstration program among the beneficiaries has been evaluated on six options and the findings are presented in figure 31 below.

Figure 31 Motivation for attending training program.

From the above figure it can be seen that, most of them being farmers (32%), the most important motivation was to improve on their skill base and subsequently improve production (27%). Interestingly, in case of Madhya Pradesh most of the beneficiary responses (37%) indicated ‘Free Training’ followed by Improving Skills. In Tamil Nadu, Improving Productivity is the most important motivator for joining the training course. Thus, overall, the motivating factor for joining the training courses was Increasing Skill and Awareness which can help increase the farm productivity.

### 4.6.4 Effectiveness of training program

Table 53 and table 54 present the beneficiaries response on relevance, appropriateness, provision of training material, usefulness of course material and Length of training programs.

Table 53 Beneficiary's response relevance of training and appropriateness of Content

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **States** | **Relevance of Training Program** | | | | | | **Appropriateness of Training Content** | | | |
| **Relevant** | **%** | **Partially Relevant** | **%** | **Not Relevant** | **%** | **Yes** | **%** | **No** | **%** |
| West Bengal | 38 | 24% | 4 | 3% | 0 | 0% | 42 | 27% | 0 | 0% |
| Madhya Pradesh | 22 | 14% | 2 | 1% | 0 | 0% | 23 | 15% | 1 | 1% |
| Odisha | 49 | 31% | 0 | 0% | 0 | 0% | 45 | 29% | 4 | 3% |
| Tamil Nadu | 33 | 21% | 9 | 6% | 0 | 0% | 40 | 25% | 2 | 1% |
| **Overall** | **142** | **90%** | **15** | **10%** | **0** | **0%** | **150** | **96%** | **7** | **4%** |

Of the total number of beneficiaries who attended the training programs 90% opined that the Training cum Demonstration Programs conducted were relevant and 10 percent felt it to be partially relevant considering the duration of the training. On an average, the duration of the training was 5 days and the respondents felt that it could be increased to at least 10 to 14 days. None of the participants felt that the training program was not relevant. Therefore, the training programs had met the desired objectives of disseminating the information about new machineries to the farmers and prime operators. With regards to appropriateness of training content, 96% of the beneficiaries felt it to be appropriate and properly designed according to the training program. Only 4% of the beneficiaries felt that the training contents were not appropriate.

Table 54 Beneficiaries response on Course material, usefulness and duration of Training

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **States** | **Provision of Training Material** | | | | **Usefulness of Course Material** | | | | | | **Length of Training Program** | | | |
| **Yes** | **%** | **No** | **%** | **Useful** | **%** | **Partially Useful** | **%** | **Not Useful** | **%** | **Yes** | **%** | **No** | **%** |
| West Bengal | 42 | 27% | 0 | 0% | 41 | 26% | 1 | 1% | 0 | 0% | 36 | 23% | 6 | 4% |
| Madhya Pradesh | 22 | 14% | 2 | 1% | 23 | 15% | 1 | 1% | 0 | 0% | 24 | 15% | 0 | 0% |
| Odisha | 49 | 31% | 0 | 0% | 49 | 31% | 0 | 0% | 0 | 0% | 46 | 29% | 3 | 2% |
| Tamil Nadu | 41 | 26% | 1 | 1% | 40 | 25% | 2 | 1% | 0 | 0% | 35 | 22% | 7 | 4% |
| **Overall** | **154** | **98%** | **3** | **2%** | **153** | **97%** | **4** | **3%** | **0** | **0%** | **141** | **90%** | **16** | **10%** |

As a part of training program, reading materials were also distributed to the trainees. However 2% of the trainees indicated that they did not receive the reading material. Of the total beneficiaries who received the training material, 97% considered it to be useful while 3% considered it to be partially useful. It is possible that they found them difficult to understand, on account of literacy factors as well. Of the total beneficiaries, 90% felt that the length of training programs was adequate while 10% felt that the duration could be extended to ranging from 10 to 30 days. However majority of them opined that the duration could be extended to 2 weeks.

### 4.6.5 Appropriateness of Training Logistic

Beneficiaries perception on appropriateness of training logistics were evaluated on four parameters, viz, adequacy of training material, boarding and lodging facilities provided, equipment/ machineries provided/ demonstrated during the training and presence/use of audio visual aids during training.

Table 55 Beneficiary's response on adequacy and appropriateness of logistic arrangement

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Training Material** | | | | **Boarding/lodging facilities** | | | | | | **Equipment/ machinery provided** | | | | **Audio/Visual Aids** | | | |
| **Adequate** | **%** | **Inadequate** | **%** | **Satisfactory** | **%** | **Partially Satisfactory** | **%** | **Not Satisfactory** | **%** | **Adequate** | **%** | **Inadequate** | **%** | **Yes** | **%** | **No** | **%** |
| West Bengal | 42 | 27% | 0 | 0% | 42 | 27% | 0 | 0% | 0 | 0% | 39 | 25% | 3 | 2% | 36 | 23% | 6 | 4% |
| Madhya Pradesh | 24 | 15% | 0 | 0% | 23 | 15% | 1 | 1% | 0 | 0% | 24 | 15% | 0 | 0% | 24 | 15% | 0 | 0% |
| Odisha | 49 | 31% | 0 | 0% | 35 | 22% | 13 | 8% | 1 | 1% | 47 | 30% | 2 | 1% | 34 | 22% | 15 | 10% |
| Tamil Nadu | 34 | 22% | 8 | 5% | 30 | 19% | 7 | 4% | 5 | 3% | 40 | 25% | 2 | 1% | 31 | 20% | 11 | 7% |
| **Overall** | **149** | **95%** | **8** | **5%** | **130** | **83%** | **21** | **13%** | **6** | **4%** | **150** | **96%** | **7** | **4%** | **125** | **80%** | **32** | **20%** |

As evident from the table 55 above, 95% of the beneficiaries indicated that material provided during the training programs was adequate to help them to understand the process of operations and only 5% indicated it to be inadequate. These 5% were from Tamil Nadu. With respect to boarding and lodging facilities provided during the training and demonstration, 83% were satisfied with the facilities while 13% were partially satisfied and 4% indicated as not satisfied. The basic reasons indicated were quality of food and inappropriate lodging arrangements. The highest percentage of such response was recorded from Tamil Nadu. Highest proportion of partially satisfied beneficiaries belonged to Odisha indicating the need for improvement in facilities.

Of the total beneficiaries, 96% indicated that they got adequate exposure to usage of machinery and equipment during the training/ demonstration session while 4% indicated that exposure was inadequate. This calls for a need for the facilitator of the training program to be attentive observer during demonstration and training to ensure active participation of all during the practical sessions. Eighty percent of the participants opined that they were exposed to audio visual sessions during the training program while 20% indicated that audio visual aids were not used. Hence, the overall perception of the beneficiaries with regards to appropriateness of training is positive and multiple methods where used during the training programs. Care may have to be taken to improve boarding and lodging arrangements in future.

### 4.6.6 Utilization of Training Skills post Attendance of Training Program

Out of 157 respondents from four different States who have undergone training courses organized by State Governments 129 (82%) indicated that they have utilized the skills and knowledge gained from the training in some way or the other. Around 27% of the total sample indicated that they have adopted the technology either by purchasing or custom hiring the equipments/ machineries after attending the training program. The post training adoption rate was highest in Odisha at 63% followed by Tamil Nadu at 19%.

Table 56 A - Post training use of training skills- outsourcing of training component

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Total** | | | | **Adoption of New Equipment/machinery** | | | | **Better Operation and Maintenance** | | | | **Efficient use of Machinery** | | | |
| **Used** | **%** | **Not Used** | **%** | **Yes** | **%** | **No** | **%** | **Yes** | **%** | **No** | **%** | **Yes** | **%** | **No** | **%** |
| West Bengal | 22 | 14% | 20 | 13% | 2 | 1% | 40 | 25% | 13 | 8% | 29 | 18% | 0 | 0% | 42 | 27% |
| Madhya Pradesh | 24 | 15% | 0 | 0% | 2 | 1% | 22 | 14% | 10 | 6% | 14 | 9% | 0 | 0% | 24 | 15% |
| Odisha | 49 | 31% | 0 | 0% | 31 | 20% | 18 | 11% | 35 | 22% | 14 | 9% | 3 | 2% | 46 | 29% |
| Tamil Nadu | 34 | 22% | 8 | 5% | 8 | 5% | 34 | 22% | 13 | 8% | 29 | 18% | 4 | 3% | 38 | 24% |
| **Overall** | **129** | **82%** | **28** | **18%** | **43** | **27%** | **114** | **73%** | **71** | **45%** | **86** | **55%** | **7** | **4%** | **150** | **96%** |

Out of 157 beneficiaries, 71 (45%) stated that they are in a better position to operate and maintain the equipments and machinery after attending the training program. However, 4% of the beneficiaries also indicated that the training inputs have helped them to use equipments more efficiently, reducing fuel consumption. The remaining 96% did not make any observation on this factor. The highest proportion of beneficiaries who adopted the new equipment/machineries belonged to Odisha.

Table 57 B- Post training use of training skills- outsourcing of training component

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Lesser frequency of Breakdown** | | | | **Change in farm management practices** | | | | **Training/ Helping other farmers** | | | | **Additional Employment** | | | |
| **Yes** | **%** | **No** | **%** | **Yes** | **%** | **No** | **%** | **Yes** | **%** | **No** | **%** | **Yes** | **%** | **No** | **%** |
| West Bengal | 1 | 1% | 41 | 26% | 7 | 4% | 35 | 22% | 0 | 0% | 0 | 0% | 1 | 1% | 41 | 26% |
| Madhya Pradesh | 5 | 3% | 19 | 12% | 10 | 6% | 14 | 9% | 14 | 9% | 10 | 6% | 12 | 8% | 12 | 8% |
| Odisha | 10 | 6% | 39 | 25% | 23 | 15% | 26 | 17% | 42 | 27% | 6 | 4% | 8 | 5% | 41 | 26% |
| Tamil Nadu | 6 | 4% | 36 | 23% | 19 | 12% | 23 | 15% | 20 | 13% | 22 | 14% | 4 | 3% | 38 | 24% |
| **Overall** | **22** | **14%** | **135** | **86%** | **59** | **38%** | **98** | **62%** | **76** | **48%** | **38** | **24%** | **25** | **16%** | **132** | **84%** |

Of the total beneficiaries, 14% reported lesser breakdown of the machineries as compared to pre training period. Further, 38% of the beneficiaries reported change in overall farm management practices. Out of the participants claiming change in farm management practices, 15% belonged to Odisha, 12% to Tamil Nadu while the lowest 4% were from West Bengal. The multiplier effect is largely observed in Odisha where 27% of the total 76 respondents said they have helped and trained other farmers followed by Tamil Nadu (13%). None of the samples in West Bengal responded to have shared the leanings with other farmers. Around 16% of the farmers, after attending training courses also reported that they are able to generate additional income, the largest among them being from Madhya Pradesh (8%). Hence the overall achievement in terms of utilization of skill gained after attending the training program organized by DOA is significant with results in Odisha and Tamil Nadu being better than the other two states.

Those who have not adopted farm mechanisation, post training indicated that lower subsidy and lack of finance to procure/ purchase such equipments as the constraints. Equipments such as laser land leveller require longer training duration to improve post training adoption. Since these equipments are expensive and not easily available in adequate numbers in the market, Custom hiring is more prevalent. Increase in subsidy for purchase of equipment/ machinery can be thought of to encourage outright purchase by more service providers which would improve the price competitiveness and improve adoption of farm mechanisation. Another constraint in case of laser land leveller as indicated by the beneficiaries is lack of properly trained operators. In Rohtak during the study period, it was found, that there are four laser levellers available with Agriculture Department which are lying idle for want of repairs and even when these were operational, the Department faced problems in providing services to farmers on time due lack of trained operators. Repairing is also a time consuming process as it involves sanctioning procedure from the Centre and machinery parts have to be carried to Gurgaon as repairingfacilities are not available in the district.

### 4.6.7 Types of Training Program cum demonstration

Table below presents the types of training programs organized by State Governments in sample states. This section will complement the later section on impact of machineries on different variables.

|  |  |
| --- | --- |
| **State** | **Types of training program/demonstration/machineries** |
| West Bengal | * Various Agriculture Implements &Water saving technology using sprinkler and drip * Women Friendly Equipment |
| Madhya Pradesh | * Laser land leveller & Rotavators * Self Propelled Transplanter |
| Odisha | * Laser land leveller * Rotavator |
| Tamil Nadu | * Package of ag. Machine for paddy cultivation * Water management through drip and sprinkler irrigation * Selection Operation and maintenance of plant protection equipment |

### 4.6.8 Impact of training on different Impact variables.

Impact of the training conducted under the component of ‘Outsourcing of Training’ has been quantified on select variables such as change in production, reduction in time spent on field operations, reduction in duration of irrigation, reduction in volume of irrigation, change in income from farm due to increased production, opportunities created for additional income, reduced of time spent in intercultural operations and change in skill levels. Table 58 below presents the beneficiaries’ response who attended the training cum demonstrations on different impact variables.

Table 58 Percentage response on impact indicators by trainees of outsourcing component

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Total** | **Increased Production** | | **Reduction in Time of field preparation (Hrs)** | | **Reduction in Volume of Water for Irrigation** | | **Increased Income from Farm** | | **Reduced Time for Interculture Operations** | | **Change in Skill Level** | |
| **Post Training** | **%** | **Post Training** | **%** | **Post Training** | **%** | **Post Training** | **%** | **Post Training** | **%** | **Post Training** | **%** |
| West Bengal | 42 | 11 | 26% | 15 | 36% | 29 | 69% | 2 | 5% | 2 | 5% | 39 | 93% |
| Madhya Pradesh | 24 | 14 | 58% | 9 | 38% | 21 | 88% | 8 | 33% | 7 | 29% | 22 | 92% |
| Odisha | 49 | 32 | 65% | 43 | 88% | 8 | 16% | 37 | 76% | 45 | 92% | 47 | 96% |
| Tamil Nadu | 42 | 23 | 55% | 25 | 60% | 26 | 62% | 26 | 62% | 9 | 21% | 31 | 74% |
| **Overall** | **157** | **80** | 51% | **92** | 59% | **84** | 54% | **73** | 46% | **63** | 40% | **139** | 89% |

Out of 157 respondents who attended the Training cum Demonstration program organized by the State Departments, 51% claimed increase in production after adoption of technology, 59% indicated reduction in time spent on field operations (preparation of field for cultivation), 54% reported reduction in quantum of water used for irrigation using sprinkler and drip method compared to flood irrigation, 46% reported increase in production, 40% reported reduction in time spent on interculture operations while 69% reported enhanced skills and knowledge after attending the training program. It may be noted that different equipments have been tested in different states and hence the beneficiaries response depends on the type of equipments used. The highest proportion of respondents reporting increase in production are from Odisha (65 %) followed by Madhya Pradesh (58%) and Tamil Nadu (55%).

Similarly 88% of the respondents in Odisha reported reduction in time required for field preparation after adopting farm mechanisation followed by Tamil Nadu (60%).

With regards to increase in farm income, 76 % of the respondents were from Odisha followed by Tamil Nadu (62%). Similarly, with regard to reduction in time required for interculture operations 92% of the respondents were from Odisha.

One of the most important factors is the change in skill level among the participants who attended training cum demonstration programs. Of the total respondents, 89% felt that they have enhanced their skills and awareness about the equipments and machineries after attending the training programs.

An impact analysis has been attempted to quantify the changes in production, time required for field operations, intercultural practices and overall change in income/ skill levels.

Table 59 Impact of training program (outsourcing component) on measurable parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Impact Parameters** | **West Bengal** | | | **Madhya Pradesh** | | | **Odisha** | | | **Tamil Nadu** | | |
| **Pre Training** | **Post Training** | **% Change** | **Pre Training** | **Post Training** | **% Change** | **Pre Training** | **Post Training** | **% Change** | **Pre Training** | **Post Training** | **% Change** |
| Average Time Required for Field Preparation (Hour/ha) | 12.5 | 5.25 | -58% | 14.8 | 7.27 | -51% | 14.1 | 6.76 | -52% | 9.8 | 2.41 | -75% |
| Average Water Use (% point) | 3.92 | 2.47 | -37% | 3.21 | 2.28 | -29% | 3.5 | 2.13 | -39% | 3.32 | 3.07 | -8% |
| Change in Production (Qts/Acre)[[11]](#footnote-11) | 8.2 | 11 | 34% | 8.31 | 10.21 | 23% | 6.68 | 9.51 | 42% | 13.36 | 18.87 | 41% |
| Change in Income from farming (Rs/Acre) | 9391 | 12100 | 29% | 9309 | 11336 | 22% | 7682.2 | 9990 | 30% | 15864 | 24840 | 57% |
| Change in Skill Level (% Point) | 1.32 | 3.39 | 157% | 1.9 | 3.54 | 86% | 2.22 | 4.29 | 93% | 2.29 | 3.83 | 67% |

As observed from table 59 above, there has been positive impact of training cum demonstration of equipments as the beneficiaries have utilized the equipments and technology during their farming operations. On an average, there is reduction in time spent on field preparation ranging from 51% in Madhya Pradesh to 75% in Tamil Nadu. In West Bengal and Odisha, the reduction is reported to be 58% and 52%, respectively. Since equipments like water saving devices were demonstrated and beneficiaries were trained, those who used the devices, post training, reported reduction in water use ranging from 8% to 39%. Productivity of rice in Odisha, West Bengal and Tamil Nadu recorded an increase of 23% to 42%. The maximum increase has been reported by the beneficiaries of Odisha (42%) followed by Tamil Nadu (41%), respectively. In Madhya Pradesh, the productivity of wheat increased by almost 23%.

In terms of skill levels, the respondents reported that they were more aware of the technology after attending the training program, than earlier. The skill levels on an average increased from 1.91 point to 3.7 points on a scale of five points. The maximum change was in the case of beneficiaries from West Bengal (157%) followed by Odisha (93% point), Madhya Pradesh (86%) and Tamil Nadu (67%).

## 4.7 Beneficiaries Response on Demonstration Component under PSAMTTD

Table 60 Demographic details of demonstration participant

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **States** | **Madhya Pradesh** | | **Rajasthan** | | **Uttarakhand** | | **Haryana** | | **Punjab** | | **Assam** | | **West Bengal** | | **Tamil Nadu** | | **Total** | |
| **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| Total Samples | 55 | 100% | 43 | 100% | 23 | 100% | 41 | 100% | 22 | 100% | 22 | 100% | 24 | 100% | 43 | 100% | 273 | 100% |
| Male (No) | 55 | 100% | 43 | 100% | 23 | 100% | 41 | 100% | 22 | 100% | 22 | 100% | 24 | 100% | 42 | 98% | 272 | 100% |
| Female (No) | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |  | 0% | 1 | 2% | 1 | 0% |
| **Age (Years)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Average | 46.94 | (12.68) | 43.16 | (13.75) | 39.52 | (4.71) | 40.36 | (10.64) | 47.85 | (13.86) | 41.38 | (12.11) | 34.33 | (9.04) | 47.79 | (10.9) | 43.45 | (12.21) |
| Minimum | 20 | - |  | - | 30 | - | 25 | - | 25 |  | 21 | - | 19 |  | 29 |  | 19 | - |
| Maximum | 74 | - |  | - | 49 | - | 83 | - | 75 |  | 70 | - | 52 |  | 73 |  | 83 | - |
| **Category** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SC | 2 | 4% | 2 | 5% | 0 | 0% | - | 0% | 6 | 27% | - | - | 8 | 33% | 3 | 7% | 21 | 8% |
| ST | - | 0% | - | 0% | - | 0% | - | 0% | 0 | 0% | - | - | 3 | 13% | 0 | 0% | 3 | 1% |
| OBC | 39 | 71% | 41 | 95% | 12 | 52% | 4 | 10% | 7 | 32% | 2 | 9% | 11 | 46% | 34 | 79% | 150 | 55% |
| General | 14 | 25% | - | 0% | 11 | 48% | 37 | 90% | 9 | 41% | 20 | 91% | 2 | 8% | 6 | 14% | 99 | 36% |
| **Education** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Primary | 28 | 51% | 16 | 37% | 7 | 30% | 10 | 24% | 15 | 68% | 3 | 14% | 9 | 38% | 11 | 26% | 99 | 36% |
| Secondary | 15 | 27% | 17 | 40% | 7 | 30% | 16 | 39% | 3 | 14% | 11 | 50% | 13 | 54% | 14 | 33% | 96 | 35% |
| Higher Secondary | 1 | 2% | 2 | 5% | 9 | 39% | 9 | 22% | 2 | 9% | 5 | 23% | 1 | 4% | 7 | 16% | 36 | 13% |
| Graduate & Higher | 10 | 18% | 4 | 9% | 0 | 0% | 4 | 10% | 2 | 9% | 3 | 14% | 1 | 4% | 9 | 21% | 33 | 12% |
| None | 1 | 2% | 4 | 9% | 0 | 0% | 2 | 5% | 0 | 0% | 0 | 0% | 0 | 0% | 2 | 5% | 9 | 3% |
| **Land Holding (Acre)** | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Average/Median | 10.82 | (12.13) | 15.97 | (14.37) | 3.08 | (1.68) | 11.89 | (16.15) | 12 | (10.12) | 5.17 | (5.43) | 2.48 | (1.3) | 9.95 | (11.03) | 9.87 | (12.10) |
| Minimum | 1 | - | 3.5 | - | 1.5 | - | 1.5 | - | 2 |  | 0.25 | - | .33 |  | 0.65 |  | 0.25 | - |
| Maximum | 60 | - | 70 | - | 10 | - | 100 | - | 40 |  | 20 | - | 5 |  | 56 |  | 100 | - |
| SC | 14 | - | 12.18 | - |  | - | - | - | 5 |  | - | - | 2.78 |  | 1.91 |  | 4.92 | - |
| ST | - | - |  | - |  | - | - | - |  |  | - | - | 1.31 |  | - |  | 3.93 | - |
| OBC | 9.08 | - | 16.15 | - | 3.5 | - | 6.5 | - | 12.71 |  | 5 | - | 2.63 |  | 10.55 |  | 10.85 | - |
| General | 16.15 | - | - | - | 2.63 | - | 9.97 | - | 17.05 |  | 5 | - | 2.25 |  | 10.56 |  | 10.33 | - |

Feedback from 273 respondents including host farmers was obtained on demonstration of agriculture machineries and equipments organized under the PSAMTTD Scheme by the State Departments and ICAR sponsored Institutes such as CIAE. These participants were interviewed across eight States.

One interesting observation from the demographic distribution analysis is that only 9% of the participants were from SC and ST category. This could be attributed to a biased approach while selecting the location for organizing the demonstration activities. Only 1% of the participants belonged to ST category. In Madhya Pradesh and Rajasthan with significant proportion of ST farmers, their participation remained nil.

The average land holding of participants was 9.87 acre, the highest being in Rajasthan (16 acre) and lowest in West Bengal (2.5 acre). Thus most the farmers who participated or carried out the role of host farmers were medium to large category.

### 4.7.1 Area Coverage, Demonstration Time and Participation Rate

Table 61 below presents the important equipments demonstrated, area coverage per demonstration, and average hours of demonstration and participation rate per demonstration across different states.

Table 61 Average size and duration of demonstration

|  |  |  |  |
| --- | --- | --- | --- |
| **State** | **Average Size (acre)** | **Average Time (Hrs)** | **Participation/ demonstration** |
| Assam | 1.15 | 1.78 | 30 |
| Haryana | 4.91 | 7 | 14 |
| Madhya Pradesh | 2.09 | 4.37 | 10 |
| Punjab | 1.79 | 2.88 | 62 |
| Rajasthan | 4.6 | 3.69 | 13 |
| Tamil Nadu | 2.16 | 2.97 | 46 |
| Uttarakhand | 2.87 | 1.12 | 10 |
| West Bengal | 1 | 1 | 30 |

As per the guidelines of PSAMTTD issued by MoA for demonstration of agricultural equipments, each demonstration shall cover a minimum of 0.4 ha (0.98 acre) or one hour depending on the case. For hilly region, the minimum area shall be 0.2 ha (0.5 acre). From table 60, it is evident that average area per demonstration by type of equipment exceeds this cap in most of the cases. The average duration of demonstration conducted has exceeded the limits set in the guidelines in all the states under sample except in West Bengal. The average size of demonstration is found to be maximum in case of Haryana (4.91 acre) followed by Rajasthan (4.6 acre). Even in hilly regions such as Assam and Uttarakhand, the size of demonstration exceeded area specified in the guidelines. The time allocation for demonstration has been found to be in range of minimum 1 hour in West Bengal to maximum 7 hours in Haryana. Hence, it appears that the criteria of average plot size and time duration was not followed and adhered. The participation of farmers per demonstration was lower in Haryana, Madhya Pradesh, Rajasthan and Uttarakhand as compared to Punjab and Tamil Nadu. Hence the very objective of catering large number of users of equipments and raising awareness of modern agriculture equipment has not been met adequately. Table 62 below presents the average area coverage and average time of demonstration based on the equipments demonstrated.

Table 62 Area coverage, time and participation by types of equipment demonstrated

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **State** | **Equipments Demonstrated** | **Average area (acre)** | **Average time**  **(Hrs)** | **Average Time (Hrs/acre)** | **Participation/demo** |
| Assam | Potato Planter | 1.15 | 1.78 | 1.69 | 30 |
| Haryana | Laser Land Leveller | 6.91 | 8.73 | 2.01 | 14 |
| Zero Till Drill | 2.72 | 3.27 | 1.45 | 12 |
| Madhya Pradesh | Seeder/Seed Drill | 1.8 | 2.8 | 1.2 | 8 |
| Cultivator | 1 | 1 | 1 | 19 |
| Grain Grader | 5 | 3 | 0.6 | 15 |
| Harvester/Thresher | 1.2 | 5.1 | 4.8 | 6 |
| Rotavator | 2.08 | 6.7 | 3.7 | 12 |
| Straw Reaper | 3.3 | 4.3 | 1.5 | 16 |
| Pyas Seed Chena | 0.75 | 0.65 | 1.15 | 10 |
| Punjab | Happy Seeder | 1.75 | 3 | 1.8 | 63 |
| Paddy Transplanter | 1.71 | 3.07 | 1.89 | 67 |
| Rajasthan | Garlic Planter | 4.41 | 3.54 | 0.97 | 13 |
| Rotavator | 5.83 | 4.66 | 0.87 | 15 |
| Tamil Nadu | Shredder | 20 | 2 | 0.1 | 27 |
| Disc Plough/Reversible Plough/Harrow etc | 2.96 | 3.12 | 2.61 | 45 |
| Uttarakhand | Power Tiller | 2.87 | 1.13 | 0.39 | 10 |
| Seed Drill | 1.69 | 1.23 | 0.73 | 25 |
| West Bengal |  | 1.39 | 1 | 0.72 | 30 |

The demonstration area in case of equipments such as laser land leveller, rotavator, garlic planter and shredder was found to be much higher than specified in the guidelines. During the interactions with beneficiaries in Haryana, it was also observed that beneficiaries were custom hiring the laser levellers and rotavators at subsidized rates in the name of demonstrations for their personal use. Moreover in Haryana and Punjab with high level of awareness on use of farm equipments and machineries, demonstration of equipments such as rotavators, laser levellers, and zero till drill has become redundant. Interaction with the officials realised that minimum stipulation of 0.4 ha or one hour of demonstration of advanced equipments is not sufficient in field situations due to socio political constraints which arise during the demonstration. It was also gathered that the guidelines with regards to demonstration duration and methodology is not well conceived in view of complexity of equipments and level of awareness of farmers.

During the study, difficulties were faced in obtaining the information on progress made by the implementing agencies due to absence of standard practices in maintaining records and monitoring mechanism. Although many different forms of equipments were demonstrated on the field, the focus was more on achieving the targets without much emphasis on advance planning, ensuring publicity and organizing the demonstration at appropriate time. None of the agencies made any efforts in documenting the progress in structured formats and capturing feedback from the farmers.

### 4.7.2 Beneficiaries Response on Organization of Demonstration

To evaluate the quality of demonstration being organized by the Directorate of Agriculture, the participants and host farmers on whose field demonstrations were conducted, were interviewed, the results of which are presented in table 63 below.

Table 63 Beneficiaries response on demonstration of Agriculture Equipments

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Total Sample** | **Size of Demonstration** | | | | **Duration of Demonstration** | | | | **Organization of Demonstration** | | | | | |
| **Adequate** | **%** | **Inadequate** | **%** | **Adequate** | **%** | **Inadequate** | **%** | **Very well Organized** | **%** | **Well Organized** | **%** | **Not so well Organized** | **%** |
| Assam | 22 | 21 | 8% | 1 | 0% | 21 | 8% | 1 | 0% | 11 | 4% | 10 | 4% | 1 | 0% |
| Haryana | 41 | 41 | 15% | 0 | 0% | 41 | 15% | 0 | 0% | 29 | 11% | 12 | 4% | 0 | 0% |
| Madhya Pradesh | 55 | 55 | 20% | 0 | 0% | 55 | 20% | 0 | 0% | 13 | 5% | 42 | 15% | 0 | 0% |
| Punjab | 22 | 22 | 8% | 0 | 0% | 21 | 8% | 1 | 0% | 15 | 5% | 7 | 3% | 0 | 0% |
| Rajasthan | 43 | 42 | 15% | 1 | 0% | 43 | 16% | 0 | 0% | 41 | 15% | 1 | 0% | 1 | 0% |
| Tamil Nadu | 43 | 39 | 14% | 4 | 1% | 38 | 14% | 5 | 2% | 37 | 14% | 6 | 2% | 0 | 0% |
| Uttarakhand | 23 | 16 | 6% | 7 | 3% | 12 | 4% | 11 | 4% | 10 | 4% | 2 | 1% | 11 | 4% |
| West Bengal | 24 | 24 | 9% | 0 | 0% | 24 | 9% | 0 | 0% | 18 | 7% | 6 | 2% | 0 | 0% |
| **Total** | **273** | **260** | **95%** | **13** | **5%** | **255** | **93%** | **18** | **7%** | **174** | **64%** | **86** | **32%** | **13** | **5%** |

As evident from the above, 95% of the participants indicated that the size of demonstration was adequate which is also corroborated by the information in tables 61 and 62 that the average acreage was higher than stipulated in the guidelines. Only 5% percent felt the size of demonstration was inadequate. Similarly, with regards to the hours of demonstration, 93% of the participants opined that the duration was adequate and the remaining 7% felt it to be inadequate and that the duration may be increased. This opinion does not appear to hold ground as in most of the cases the duration exceeded the stipulated time of 1 hour in all states except in West Bengal. The highest proportion of participants who wanted the duration of demonstration time to be increased belonged to the hilly state of Uttarakhand.

Majority of the total participants (96%), were satisfied with the logistic arrangements of demonstrations. However 4% of the participants belonging to Uttarakhand felt that there is scope of improving the logistic arrangements while organizing the demonstrations.

### 4.7.3 Relative Preference of Equipments Demonstrated

Table 64 below presents the relative preference of the equipments demonstrated on the field. The relative preferences have been calculated based on the total response rate obtained from the sample respondents.

In Assam, out of total 24 responses, 67% opined that the potato planter was a useful implement because of its capability to reduce the drudgery associated with potato planting. It also helped solving the problem of labour shortage during the potato sowing period. However 8% of the responses were not in favour of potato planter because of the high cost of the machinery.

Table 64 Relative Preference of Equipments demonstrated

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **State** | **Equipments Demonstrated** | **Very Useful** | **%** | **Not so useful** | **%** |
| Assam | Potato Planter | 16 | 67% | 2 | 8% |
|  | Rotavator | 6 | 25% | 0 | 0% |
| Sub Total |  | 22 | 92% | 2 | 8% |
| Haryana | Laser Land Leveller | 41 | 100% | 0 | 0% |
|  | Zero Till Drill | 41 | 100% | 0 | 0% |
| Sub Total |  | 82 | 100% | 0 | 0% |
| Madhya Pradesh | Cultivator | 10 | 8% | 0 | 0% |
|  | Grain Grader | 1 | 1% | 0 | 0% |
|  | Harvester | 2 | 2% | 0 | 0% |
|  | Rotavator | 29 | 25% | 1 | 1% |
|  | Seed Drill | 34 | 29% | 0 | 0% |
|  | Straw Combine Reaper cum binder | 12 | 10% | 4 | 3% |
|  | Thresher | 19 | 16% | 0 | 0% |
|  | Tractor | 4 | 3% | 0 | 0% |
|  | Raised Bed Planter | 1 | 1% | 0 | 0% |
|  | Zero Till Drill | 1 | 1% | 0 | 0% |
| Sub Total |  | 113 | 96% | 5 | 4% |
| Punjab | Happy Seeder | 6 | 21% | 3 | 10% |
|  | Paddy Transplanter | 15 | 52% | 5 | 17% |
| Sub Total |  | 21 | 72% | 8 | 28% |
| Rajasthan | Garlic Planter | 37 | 76% | 4 | 8% |
|  | Rotavator | 6 | 12% | 2 | 4% |
| Sub Total |  | 43 | 88% | 6 | 12% |
| Tamil Nadu | Laser Land Leveller | 9 |  |  |  |
|  | Plough/Reversible Plough/Harrow etc | 12 | 32% | 0 | 0% |
|  | Paddy Transplanter | 9 | 24% | 0 | 0% |
|  | Power Weeder | 3 | 8% | 0 | 0% |
|  | Post Hole Digger | 2 | 5% | 0 | 0% |
|  | Rotavator | 3 | 8% | 0 | 0% |
| Sub Total |  | 38 | 100% | 0 | 0% |
| Uttarakhand | Not reported | | | | |
| West Bengal | Power Reaper | 21 | 26% | 3 | 4% |
|  | Rotavator | 18 | 22% | 5 | 6% |
|  | Paddy Transplanter | 11 | 14% | 7 | 9% |
|  | seed Grader | 8 | 10% | 8 | 10% |
| Sub Total |  | 58 | 72% | 23 | 28% |

In Haryana, the machineries, laser land leveller and zero till drill have become very popular as they helped to reduce the water use time required for irrigating the land and also ensured uniformity in irrigation, helping the crop to attain uniform growth. The zero till drill has become popular in the region because of the intensive cropping pattern. Farmers have become aware of the advantage of zero till drill as it not only reduces the labour and cost for ploughing but also helps in increasing the organic matters in the soil and growing crop in the residual moisture of the land. However, the cost of machineries is high and farmers are less reluctant to invest on these machineries. It was observed that the Agriculture Department is providing these machineries on custom hiring basis to farmers though at subsidized rates.

In Punjab, out of 29 responses, the paddy transplanter is more preferred than Happy Seeder. However, nearly 17% of the total respondents felt that the transplanters were not as useful as it is viable only in case of large land holding. The host farmers also opined that it does not have any significant effect on yield.

In Rajasthan, the garlic planter was found to be very useful by the farmers. Similarly, in Tamil Nadu, almost all equipment demonstrated was found useful. Plough, disc harrow, reversible plough and harrow were more preferred followed by laser land leveller and paddy transplanter.

In West Bengal, the power reaper and rotavator were found to be more preferred than paddy tranplanter and grain grader. Overall, a large percentage of participants and host farmers were convinced about the usefulness of agriculture machinery and equipments demonstrated by the Directorate of Agriculture.

### 4.7.4 Technology Use, Adoption, Availability of Equipments

Table 65 presents the technology use, adoption and future prospects of purchasing the equipments demonstrated by the Directorate of Agriculture.

Technology use on own Field: Of the total respondents, 68% used the technology/ equipments in their own field, while 32% did not. Of the total 273 samples who have used the technology in their field, the highest proportion is from Madhya Pradesh (18%) followed by Haryana (14%)

Adoption of Technology: Out of 273 participants surveyed under demonstration component, nearly 42% have adopted the technology fully while 58% have adopted the technology partially. The highest adoption rate is observed in Haryana followed by Tamil Nadu. 78% of the sample from Haryana reported to have adopted the technology fully while the remaining 22% adopted it partially. In Tamil Nadu, 70% of the respondents adopted the demonstrated technology fully while 30% have adopted them partially. Similarly, in Rajasthan, where a good number of demonstrations on garlic transplanters were organized, 51% of the respondents had adopted the technology fully while the remaining 49% adopted it partially. The data for other states can be seen in the table 65.

Purchased the Machinery: Purchase of the farm machines depend on the type, its usability and capital investment. The equipments such as laser land leveller, rotavator, combine straw reaper, etc., require significant investment and hence, unless the returns from the equipments purchased are assured, the farmers are reluctant to purchase those equipments. The respondents from Haryana, Rajasthan, Madhya Pradesh and Tamil Nadu constituting 14% of total respondents purchased the equipments for their own use or for giving it on custom hiring basis in their areas of operation. Of all the participants from Tamil Nadu, Haryana, Madhya Pradesh and Rajasthan, 37%, 17%, 9% and 19%, respectively had purchased the equipments.

Future Prospects of Purchase of Machinery demonstrated: Nearly 62% of the participants were found to be reluctant in purchasing the machinery while 38% showed inclination to purchase. The maximum number of respondents inclined to purchase the equipments were from Assam, Madhya Pradesh, Rajasthan and Haryana ranging from 2-6%. Hence it is expected that 25% of persons who attended the demonstration programs and realized the usability and importance of the equipments may purchase the equipments in the near future, depending upon availability of equipments, availability of subsidy and information on the place from where to purchase the equipments. Of the total respondents, 68% were unaware of the place from where to purchase the equipments and nearly 71% felt that the machines demonstrated are not readily available in the market.

Another significant fact that emerged during the survey was that the farmers desired to have subsidy for the newly developed equipments and machineries. However, most of the farmers found to be unaware of the availability of subsidy. Most of the participants were unaware of the cost the equipments demonstrated.

### 4.7.5 Benefits of Equipments demonstrated as explained by the respondents

In order to understand the benefits of equipments demonstrated and adopted in actual field conditions on responses from 185 beneficiaries were analysed different variables such as reduction in drudgery level, overcome labour shortage, reduction in time of operations, reduction in wastage, and change in production.

Reduction in Drudgery: Out of 185 beneficiaries who used the demonstrated machinery in their own field accepted that the machinery was helpful in reduction of drudgery. Overall, 52% indicated full reduction of drudgery level while 48% indicated partial reduction. All the beneficiaries from Assam who used and tested the potato planter and rotavator opined that potato planting was completely tireless activity when machines were used.

Resolve Labour Problem: Overall 45% of the beneficiaries felt that machinery and equipment demonstrated and subsequently used in field could be helpful in sorting out labour problems fully. However, 45% felt that labour problems could be sorted only partially as many other tasks require labour and hence it is not possible to do away with labour completely from agriculture.

Reduction in Time of Operations: One significant factor which has been impacted is the reduction in duration of time of agricultural operations which is very critical in high intensity agriculture on account of short interval between harvesting and sowing the crop. Almost 88% of the beneficiaries believed that equipments demonstrated and used reduced the time of operations significantly while only 12% felt that the reduction was not so significant.

Table 65 Use, adoption, future prospects of beneficiary on equipments purchase

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Use of Demonstrated Equipments on own Field** | | | | **Adoption of Technology** | | | | **Bought the Machine** | | | | **Plan to buy the machine** | | | | **Machines Readily available in Market** | | | | **Aware where to get the machinery** | | | |
| **Yes** | **%** | **No** | **%** | **Full Adoption** | **%** | **Partial Adoption** | **%** | **Yes** | **%** | **No** | **%** | **Yes** | **%** | **No** | **%** | **Yes** | **%** | **No** | **%** | **Yes** | **%** | **No** | **%** |
| Assam | 16 | 6% | 6 | 2% | 3 | 1% | 19 | 7% | 0 | 0% | 22 | 8% | 16 | 6% | 6 | 2% | 2 | 1% | 19 | 7% | 0 | 0% | 22 | 8% |
| Haryana | 38 | 14% | 3 | 1% | 32 | 12% | 9 | 3% | 7 | 3% | 34 | 12% | 12 | 4% | 29 | 11% | 14 | 5% | 27 | 10% | 23 | 8% | 18 | 7% |
| Madhya Pradesh | 50 | 18% | 5 | 2% | 15 | 5% | 40 | 15% | 5 | 2% | 50 | 18% | 21 | 8% | 34 | 12% | 18 | 7% | 37 | 14% | 5 | 2% | 50 | 18% |
| Punjab | 13 | 5% | 9 | 3% | 2 | 1% | 20 | 7% | 0 | 0% | 22 | 8% | 4 | 1% | 18 | 7% | 8 | 3% | 15 | 5% | 4 | 1% | 18 | 7% |
| Rajasthan | 36 | 13% | 7 | 3% | 22 | 8% | 21 | 8% | 8 | 3% | 35 | 13% | 24 | 9% | 19 | 7% | 15 | 5% | 28 | 10% | 31 | 11% | 12 | 4% |
| Tamil Nadu | 19 | 7% | 24 | 9% | 30 | 11% | 13 | 5% | 16 | 6% | 27 | 10% | 18 | 7% | 25 | 9% | 18 | 7% | 25 | 9% | 15 | 5% | 28 | 10% |
| Uttarakhand | 5 | 2% | 18 | 7% | 3 | 1% | 20 | 7% | 1 | 0% | 22 | 8% | 0 | 0% | 23 | 8% | 1 | 0% | 22 | 8% | 0 | 0% | 23 | 8% |
| West Bengal | 8 | 3% | 16 | 6% | 8 | 3% | 16 | 6% | 0 | 0% | 24 | 9% | 10 | 4% | 14 | 5% | 2 | 1% | 22 | 8% | 10 | 4% | 14 | 5% |
| **Total** | **185** | **68%** | **88** | **32%** | **115** | **42%** | **158** | **58%** | **37** | **14%** | **236** | **86%** | **105** | **38%** | **168** | **62%** | **78** | **29%** | **195** | **71%** | **88** | **32%** | **185** | **68%** |

As quite a significant number of trainee and participants of demonstrations have adopted the technology either through purchase and custom hiring, it has ultimately resulted in significant increase in the farm power availability at the individual farm level

Table 66 Benefits of equipments demonstrated and used by the beneficiaries.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Total** | **Reduction in drudgery** | | | | **Help sort Labour problems** | | | | **Reduction in Time of Operation** | | | | **Improve Production** | | | |
| **Fully** | **%** | **Partially** | **%** | **Fully** | **%** | **Partially** | **%** | **Significantly** | **%** | **Not significantly** | **%** | **Yes** | **%** | **No** | **%** |
| Assam | 16 | 16 | 100% | 0 | 0% | 16 | 100% | 0 | 0% | 16 | 100% | 0 | 0% | 4 | 25% | 12 | 75% |
| Haryana | 38 | 19 | 50% | 19 | 50% | 19 | 50% | 19 | 50% | 38 | 100% | 0 | 0% | 21 | 55% | 17 | 45% |
| Madhya Pradesh | 50 | 29 | 58% | 2 | 4% | 30 | 60% | 15 | 30% | 45 | 90% | 5 | 10% | 29 | 58% | 21 | 42% |
| Punjab | 13 | 2 | 15% | 11 | 85% | 0 | 0% | 0 | 0% | 2 | 15% | 11 | 85% | 0 | 0% | 13 | 100% |
| Rajasthan | 36 | 14 | 39% | 22 | 61% | 11 | 31% | 25 | 69% | 34 | 94% | 2 | 6% | 2 | 6% | 34 | 94% |
| Tamil Nadu | 19 | 11 | 58% | 8 | 42% | 3 | 16% | 16 | 84% | 15 | 79% | 4 | 21% | 12 | 63% | 8 | 42% |
| Uttarakhand | 5 | 1 | 20% | 4 | 80% | 1 | 20% | 4 | 80% | 5 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| West Bengal | 8 | 5 | 63% | 3 | 38% | 3 | 38% | 5 | 63% | 8 | 100% | 0 | 0% | 6 | 75% | 2 | 25% |
| **Total** | **185** | **97** | **52%** | **69** | **37%** | **83** | **45%** | **84** | **45%** | **163** | **88%** | **22** | **12%** | **74** | **40%** | **107** | **58%** |

Improve Production: Forty percent of the beneficiaries who used the equipments and machineries felt that they observed overall improvement in production. The highest proportion of beneficiaries responding positively were from West Bengal (75%), followed by Tamil Nadu (63%), Madhya Pradesh (58%) and Haryana (55%).

## 4.7.6 Regional wise specific requirement of machines for demonstration

Table 67 Regional wise specific requirement of machines for demonstration

|  |  |  |
| --- | --- | --- |
| **S.No** | **States** | **List of Equipments** |
| 1 | Assam | Light Weight Power Triller, Animal Drawn 3 Tyne Cultivator, Low Cost Weeder, Bund Former, Power Sprayer, Sprinkler, Fruit Grader, Tabular Maize Sheller, Foot Pump, Horticulture Tools. |
| 2 | Haryana | Raised Bed Planter, Power Weeder, Rice Transplantor, Vegetable Transplantor, Sprayer With Long Boom, Fodder Harvester. |
| 3 | Madhya Pradesh | Soyabean Reaper, Rice Transplanter, Zero Till Fertilizer Drill, Raised Bed Planter, Power Weeder, Garlic/Onion Harvester, Straw Reaper And Shedder, Inclined Plate Planter. |
| 4 | Punjab | Pneumatic Seed Drill, Sub Soiler, Aero Blast Sprayer, Fodder Harvester, Vegetable transplanter, Sprayer with Long Boom. |
| 5 | Rajasthan | Cotton Picker, Cotton Planter, Seasamum Planter, Groundnut Digger, Groundnut Harvester, Groundnut Decorticator. |
| 6 | Tamil Nadu | Electromagnetic Sprayer, Groundnut Thresher, Sub Soiler, Auger, Long Handle Weeder, Groundnut Planter, Sugarcane Planter |
| 7 | Uttrakhand | Light Weight Power Tiller, Post Hole Digger, Long Handle Weeder, Power Weeder, Aero Blast Sprayer. |
| 8 | West Bengal | Drum Seeder, Zero Till Seed Cum Fertilizer Drill, Subsoiler, Vegetable Transplanter, Wet Land Weeder, Dry Land Weeder, Vertical Conveyor Reaper, Groundnut Planter. |

## 4.8 Post Demonstration use of Machinery Purchased for Demonstration

The post demonstration use of machinery usually purchased by the concerned departments varied from state to state. Summary of post demonstration use of machinery purchased for each State is provided in the following section.

1. The equipments purchased by the FMTTIs for training and demonstration for training courses were used optimally as a number of in house training programs are organized regularly by these institutions. In addition, these equipments are also used for carrying out field operations in their own farm. The older and used machines are utilized for practicing by the trainees.
2. In Maharashtra, although no progress was made during the XI Five Year Plan under the said scheme, as per the information provided by the Department of Agriculture, the equipments purchased were placed at the Govt. owned Taluk Seed Farms and used for farm operations. These equipments were also shared with farmers’ groups for their use and understand their operations.
3. In Haryana, the post demonstration use of implements depended on the type of equipments demonstrated. Special crop implements usually remained idle while multipurpose implements such as laser land leveller, zero till drill, etc., were used in field operations on farmers demand. In Sirsa and Fatehabad, as per the information provided by the Agriculture Department, the equipments usually remained idle after conducting the demonstration. However in Rohtak, the equipments such as laser land leveller were reported to have been provided to farmers on custom hiring basis. Though the laser land leveller has become very popular in the region, the department has not been able to meet the demand due to lack of operators and repairing facilities locally.
4. In Uttarakhand, as per the information provided by the Directorate of Agriculture, the machines are provided to the farmers for their use on their demand. However, the costs of operating the machines are to be met by the farmers themselves. The Directorate, however, does not charge the farmers for the usage.
5. Similarly, in Rajasthan, the MPUAT has organized the demonstration program. Post demonstration, MPUT provided the equipments to farmers for their use without levying any charges, though the operational cost has to be met by farmers themselves.
6. In Madhya Pradesh, CIAE usually conducted the demonstration of equipments through KVKs and subsequently the equipments remained with KVKs for future demonstration activities. As per the information provided by the DoA, there is no system of follow up on demonstration and post demonstration use of equipment. It either remained idle or used by farmers as and when required at their own cost.
7. In Tamil Nadu, the machineries are used for demonstration at farmers field every year. Post demonstration, the equipments are hired out to the farmers along with tractors and the income is transferred to the Government.

# Chapter 5: Insights and Recommendations

Based on the findings of both primary and secondary research, interactions and feedback received from the stakeholders comprising, officials of the institutions such as; FMTTIs, CIAE, SAUs from sample states, Directorate of Agriculture and participants of training, testing and demonstration activities, the recommendation with objectives to strengthen the scheme by appropriate policy changes are enlisted below under three broad categories.

## 5.1 Recommendations for Effective and Efficient Implementation of Training at FMTTIs

5.1.1 Although, the FMTTIs have consistently achieved the annual targets of training it was observed in case of SRFMTTI (Anantpur, AP) and NERFMTTI (Biswanath Chariali, Assam), that a significant number of candidates were covered under Awareness Level , Technology Transfer Camps and Need Based Training programs which are short duration courses ranging from 1-2 days. It appears that participants were covered under shorter duration courses, mainly to achieve the targets. Hence, FMTTIs may review the annual targets under various courses periodically and accordingly strategise the coverage with minimum overlapping across courses.

5.1.2 Technology Transfer Camps have significant impact on actual use of technology at the field level. It was observed that Technology transfer Camps were not organized by NRFMTTI (Hissar) during the XI Five Year Plan and very few were organized by CRFMTTI (Budni). These camps could act as an important vector for adoption of technology at the field level. Therefore, separate targets may be stipulated for each FMTTI to organize such camps in addition to the usual courses which is now being done now. Progress may be reviewed periodically. The results of such camps should also be documented.

5.1.3 The participation of trainees remained concentrated in a few States with their shares ranging between 48% and 68%, while neighbouring states accounted for 16% to 29% of the total. In case of states not sharing boundary with state where FMTTIs are located, the participation ranged between 10-31% (see table 11, 18, 26). Convenient location and logistic arrangements for reaching appeared to be a major factor contributing to larger participation in some FMTTIs like NRFMTTI (Hissar). Since, a large proportion of participants were from the same state where the FMTTI is located, the impact was more localized to the State. In addition to the logistic arrangements, language appeared to be a major constraint for the beneficiaries. In order to broaden impact area of the training and improve the adoption rate, extension centres may be set up by the FMTTIs in the neighbouring States. Such extension centres could function under the administrative control of existing FMTTIs.

Increasing the number of these institutes from the present four and opening up Extension Centres will also enhance their intake capacity facilitating coverage of larger area of the State.

5.1.4 Interaction with participants of User Level Courses indicated the need for a refresher course of shorter duration. It was found that many trainees were already aware of the major portion of the course curriculum and therefore a refresher course or a crash course may be more appropriate and beneficial for many of the trainees.

5.1.5 It was also found while interacting with the participants of the training program being organized at the FMTTIs, that many of the equipment and machineries were old and not in good condition. This is due to poor maintenance and machineries being kept in open space under direct exposure of sun and rain. It is therefore recommended that old machineries should be either repaired or new machines should be purchased to make them worthwhile for training.

5.1.6 Most of the trainees who attended the User Level programs felt that the course was incomplete as they did not impart adequate technical skills. There is a need for introducing T1 and T2 level course thereafter to be technically honed. The beneficiaries indicated that these programs may be merged into a new program, which will optimize the resources use and maximize value addition.

Despite the fact that User Level course does not impart all the required skills and a trainee is required to go through the T1 and T2 level courses subsequently, it was seen that only a few of the trainees only opted for the other two courses. One key reason for this seems to be lack of assured employment on completion of the course. Trainees expect placement assistance after the program. This may popularize the T1 and T2 level courses and increase the number of people taking up these courses.

5.1.7 There is a need for starting a separate new course for ITI (tractor mechanic) on the lines of A1 course. There is also a greater need to increase the training capacity under the course as more and more number of students are interested in taking up these specialized training programs.

5.1.8 Training programmes lacked practical inputs to a certain extent. The trainees opined that there is a need for increase in duration for hands-on experience for training in repair/ maintenance and field operations. Practical sessions, therefore, may be increased.

5.1.9 Representation of women in structured courses other than off campus training programs of one or two days' duration was very low. Lack of appropriate hostel facilities suitable to women appears to be the reason for low level of participation by women. FMTTIs, therefore may create separate hostel facilities suitable for women to encourage their participation.

5.1.10 Technology Transfer Camps assumes to have a significant role in increasing the adoption rate of agriculture machineries. However, NRFMTTI has not conducted a single Technology Transfer Camp during the entire XI Five Year Plan. NERFMTTI and CRFMTTI too have not conducted such programs in adequate numbers. Shortage of adequate staff due to ongoing on campus training and testing activities was quoted as the reason for non conduct of the Camps. Hence, provision of adequate staff and infrastructure support may be ensured to enable these institutes to conduct the Camps.

5.1.11 There was absence of a system of maintaining information relating to coverage of beneficiaries under various training programs. In the absence of such information, it was not only difficult to identify beneficiaries to solicit their opinion or obtain feedback but also prevented the Institutes from assessing post training impact and adoption. Such valuable feedback may be useful to analyse the replication of training, adoption of technology and assessing the need for incorporating midterm course correction in the training modules. It is therefore suggested that a system of maintaining information of trainees may be instituted.

5.1.12 A significant number trainees (30-40%) failed to use the skills acquired during the training either due to smaller land holding, lack of resources to purchase equipments or limited scope for custom hiring in the region. Under such circumstances, Government support by way of provision of tool kits and assistance through placement services will be necessary. The FMTTIs may explore the possibilities of networking with the private sector to provide placement services to the needy trainees.

## 5.2 Recommendations for Effective and Efficient Implementation of Testing At FMTTIs

5.2.1 Though the institutions have been meeting the annual targets regularly, there was no system of internal assessment in any of the FMTTIs with respect to testing of various equipments. It may be indicated here that the time required for testing equipments/ machineries vary according to their type. It is recommended that the annual testing capacity of each testing centre of FMTTI based on the types of equipments/ machineries to be tested should be assessed and targets to be fixed accordingly. The staff strength and infrastructure needed by the Institutes may also be determined based on the types of equipments/ machineries tested.

5.2.2 The number of confidential tests conducted by the FMTTIs were negligible as compared to commercial tests. Information on the number of machines tested under commercial sub categories (ICT, BT and OECD) was not easily available from NRFMTTI, SRFMTTI and NERFMTTI. As per the information available from the CRFMTTI, under commercial category, most of the tests were done under Initial Commercial Test. Only 7% of the tests were conducted under Batch Test and OECD sub categories. Therefore, it is recommended that separate targets for testing of tractors for ICT, BT and OECD should be fixed.

5.2.3 The reports being after testing of the equipments are too technical in nature for easy understanding/ comprehension by the local/ small scale industries. Hence, it is suggested that the formats of the report format may be simplified to make them easy to understand.

5.2.4 Income earned from testing of equipment goes to revenue account of the Government of India and is not allowed to be utilized by the Institute. The institution desire to use certain percentage of revenue generated in case of contingencies.

5.2.5 The institute also facing staff shortage for undertaking testing activities, particularly in view of increase in numbers of machines to be tested, 20% reduction in direct recruitment of technical staffs which was invoked earlier may be removed.

5.2.6 The technical staff and engineers imparting training lacked the technical expertise in light of new advancement in technological innovation in the field of agriculture that has been made in the recent past. No efforts have been made towards upgrading their skill and knowledge. Keeping in view the requirements of the changing scenario with the technology becoming more sophisticated day by day, it is recommended that the staff and engineers involved in testing of equipment and training should also be given adequate opportunity to enhance their skills through advanced training courses both within and outside the country.

5.2.6 The equipments being manufactured at the local level lack standardization in specification, quality material, and durability of parts besides being inferior in performance compared to the standard and branded equipments. Efforts therefore should be made to improve the quality of locally manufactured equipments by creating awareness among the local manufacturers and also providing them necessary training. Exposure to new technological development and constant interface with the local manufacturers may bring in desired change in quality of equipments.

5.2.7 Organizing conferences and workshops involving local manufacturers and large brand manufacturers will provide a platform for cross learning and create conducive environment to bring in the desired improvement in quality of the equipments. Such conferences and workshops could also become an important tool for FMTTIs to get feedback from the manufacturers on the prevailing market demand ford different farm equipments and their performance.

5.2.8 The test equipments and test rigs used under different labs are brought and customized at FMTTI which are too sophisticated for the local mechanics. These machines are prone to frequent breakdown and due to non availability of adequate and trained technical staff, machines are not repaired in time resulting in delay and time lag. Thus a permanent cadre of quality mechanic needs to be created at each FMTTI.

5.2.9 The replacement of old and obsolete test equipments and computers at the FMTTI will improve the overall efficiency of testing and record keeping.

## 5.3 Recommendations for Effective and Efficient Implementation of Outsourcing of Training

5.3.1 Under the outsourcing of training, the guidelines of PSAMTTD envisage organizing training programs with the help of State Agriculture Universities, Engineering Colleges, Polytechnics, etc., but it was found that in most of the cases the training programs were organized through the district units of State Agriculture Departments. These programmes appeared to be more in the nature of awareness campaigns rather than training programs due to lack of appropriate infrastructure and technical manpower support. It is therefore recommended that, proper advance planning may be made by the Department of Agriculture/ Agriculture Engineering for collaborating with SAUs and other eligible institutions who could conduct the training programs effectively. Also, the training facilities available with the existing KVKs at the district level and other such institutions with appropriate infrastructure may be identified well in advance and used for organising training activities rather than making them mere demonstration and awareness camps.

5.3.2 During interaction with the district level functionaries of the State Agriculture Department it was observed that the instructions/guidelines governing the Centrally Sponsored Schemes are generally not adhered to in view of the fact that the State functionaries are more conversant and comfortable with the guidelines issued by the State Agriculture Departments for implementation of similar schemes implemented by the State Government. For example, the financial targets given for various demonstrations of agri-implements for the benefit of large section of farmers are met by way of release of subsidy for purchase of agri-implements by the select identified farmers at the village level with the presumption that through them the other farmers would come to know about the implements. This was more in tune with the similar scheme implemented by the State Governments. Hence there is a need for ensuring uniformity in the guidelines of the Central and State Government in respect of similar schemes, keeping in view the overall objectives of the schemes.

5.3.3 A proportion of training participants were not satisfied with the duration of the training programs organized by the State Agriculture Departments, which, on an average worked out to 2.5 days. Therefore, the State Governments may consider increasing the duration of training programs to at least a week, depending on the type of courses designed.

5.3.4 The course curriculum prescribed at present pertained to various user level courses organized at FMTTIs. Since, the nature of training depends on the local environment and types of equipments used; the states should have the autonomy to develop course modules in accordance with the mechanization requirement of the local area.

## 5.4 Recommendations for Effective and Efficient Implementation of Demonstration of Equipments

5.4.1 The pattern of fund allocation indicated not only regional and interstate disparity but also disparity among states. For example, during the entire XI Five Year Plan, the North Eastern Zone (Arunachal Pradesh, Assam, Manipur, Mizoram, Meghalaya, Nagaland, Tripura & Sikkim) had received 30% of the total allocations, as compared to Western (Gujarat, Maharashtra and Rajasthan) and Southern Zone (Andhra Pradesh, Karnataka, Kerala and Tamil Nadu) at 7% and 9% of the total allocation, respectively. The Central Zone (Chhattisgarh and Madhya Pradesh) received 12% of the total allocations. Rajasthan and Maharashtra received the allocation only during the last year of XI Five Year Plan while Gujarat received the allocation only in the first year with no further allocations during the remaining years. The maximum utilization of the funds allocated was observed in Central Zone at 95% whereas the lowest utilization was in Western Region (26%). Even the North Eastern Zone consisting of 8 states which received the largest allocation was able to utilize only 68% of the total allocations. This indicates lack of proper assessment of the requirements both at the state and central level. It is therefore, recommended that fund allocations should be based on proper assessment of the requirements of various states taking into consideration the previous performance and also the requirement of region/ states.

5.4.2 The total allocation made to institutions such as ICAR and SFCI during the XI Five Year Plan was Rs. 482 lakh. As per the information provided by the Farm Mechanization and Technology Division, FMTTI, the utilization made by ICAR remained low at 3%, which is a matter of serious concern. The Mechanization and Technology Division, Doan (MoA) may put in place an effective monitoring mechanism to ensure that the allocations are utilised properly by the Institutions.

5.4.3 Demonstration alone is not a sufficient tool to promote mechanization in agriculture. The beneficiaries suggested that financial incentives by way of subsidy may also be provided to incentivize them to adopt the machinery.

5.4.4 Provision towards contingency expenditure for hiring of prime movers to undertake demonstration of equipments/machineries is inadequate and becomes a constraining factor, particularly for the hilly states. Hence, it is felt by the officials that provision for contingency should be enhanced suitably to meet the expenditure for hiring prime movers, travel of staff undertaking and monitoring the demonstration. For hilly states the contingency should accordingly be revised from the current level of 1.5 times of the limit for non hilly areas. For demonstration of heavy equipments, provision of prime movers along with loading and unloading devices would help carrying the equipments to distant places of demonstration as well as organizing the demonstration on large scale.

5.4.5 In most of the states, one common constraint reported was the lack of technical manpower/ operators required for conducting demonstrations. It is suggested that competent technical manpower/ operators could also be hired on contract basis. These contractual staff could also be used for providing services to farmers on custom hiring of equipment/ machineries.

5.4.6 The machineries in most of the states after demonstration either remained idle or lent to farmers free of cost for their use due to lack of operators in the Department. The machineries such as laser land levellers zero till drills and combine straw reapers which have become popular in states like Haryana and Punjab can be lent to farmers on custom hiring basis to generate additional revenue for the Government. It was also found that advanced machineries such as laser land leveller were required to be sent to distant places (e.g Gurgaon in Haryana) for repairs due to non availability of trained technical manpower and workshops in the district. Therefore course on repair and maintenance of laser land leveller and similar sophisticated machinery/ equipments may be designed and incorporated under the training course programs of both FMTTIs as well as by the State Governments. This provides not only the entrepreneurial skills but also faster local solutions. State Governments may also explore the possibilities of establishing 2-3 workshops at the district level for instant repair maintenance of such machineries.

5.4.7 Maharashtra, Haryana and Rajasthan received funding at the fag end of the financial year. This defeats the very purpose of demonstration as agriculture is a seasonal activity and the implementing agencies are left with little time to plan the activities and actually carrying out training or demonstration in time. Therefore, it is necessary that funds are released at the beginning of financial year after obtaining information on the unspent funds of the previous years to facilitate proper planning and implementation of activities in time.

5.4.8 The scale of demonstrations could be increased more effectively through the Farmers’ Producer Organizations (FPOs) under the FPO Initiative Project (FPO-IP) of Small Farmer’s Agribusiness Consortium (SFAC). These FPOs can act as important medium for popularising farm mechanization among the small and medium scale farmers. These FPOs can be provided equipments at subsidized rates to enable them to undertake custom hiring. This would enable them to reach large number of small and medium farmers through common cost sharing. Hence, a collaborative effort may be initiated between the M&T Division of MoA and SFAC.

5.4.9 Government should encourage financial institutions to extend credit for setting up of centres for custom hiring of agriculture machneries. Such financing may be covered under the Credit Guarantee Scheme of the Credit Guarantee Fund Trust for Micro and Small Enterprises. MoA may evolve a Venture Capital Assistance Scheme to fund the shortfall in margin to be brought in by borrowers for availing such loans.

# Chapter 6 Conclusion

All the three component of the schemes were able to showcase a satisfactory performance in terms of physical and financial achievements. Although certain skewness in pattern of funding is also observed and needs to be rectified. All the implementing agencies, FMTTI, DoA, the Government sponsored institutions have contributed significantly in the achieving the objectives of the scheme. The adoption of technology due to satisfactory implementation of Scheme component has resulted in the significant increase in farm power availability at the individual farm level. The most significant are beneficiaries who have responded positively with regards to program and its outcome which further support the effectiveness of the scheme.

It is thus recommended that the scheme should continue in the next fiscal years for greater coverage and betterment of larger number of farmers through mechanization of farm level operation suitably incorporating the recommendations as suggested in chapter 5.

# Annexure

Annexure 1 Year wise and State wise fund allocation in PSAMTTD Scheme

**(Rs. Lakh)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No.** | **States** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** | **Percentage** |
| 1 | Manipur | 0 | 49 | 7 | 210 | 174 | 440 | 12% |
| 2 | Orissa | 44 | 29 | 48 | 109 | 153 | 383 | 10% |
| 3 | Tamil Nadu | 77 | 65 | 53 | 68 | 50 | 313 | 9% |
| 4 | Haryana | 45 | 45 | 20 | 138 | 0 | 248 | 7% |
| 5 | Madhya Pradesh | 35 | 36 | 0 | 61 | 100 | 232 | 6% |
| 6 | West Bengal | 0 | 30 | 0 | 13 | 150 | 193 | 5% |
| 7 | Chhattisgarh | 95 | 56 | 0 | 22 | 16 | 189 | 5% |
| 8 | Himachal Pradesh | 10 | 22 | 12 | 27 | 70 | 141 | 4% |
| 9 | Arunachal Pradesh | 32 | 33 | 26 | 49 | 0 | 140 | 4% |
| 10 | Sikkim | 2 | 0 | 21 | 0 | 114 | 137 | 4% |
| 11 | Gujarat | 135 | 0 | 0 | 0 | 0 | 135 | 4% |
| 12 | Mizoram | 47 | 0 | 0 | 0 | 85 | 132 | 4% |
| 13 | Bihar | 0 | 37 | 0 | 75 | 16 | 128 | 4% |
| 14 | Uttar Pradesh | 17 | 44 | 42 | 19 | 0 | 122 | 3% |
| 15 | Tripura | 0 | 0 | 0 | 116 | 0 | 116 | 3% |
| 16 | Uttarakhand | 29 | 82 | 0 | 0 | 0 | 111 | 3% |
| 17 | Jharkhand | 0 | 0 | 8 | 0 | 100 | 108 | 3% |
| 18 | Maharashtra | 0 | 6 | 0 | 0 | 100 | 106 | 3% |
| 19 | Punjab | 0 | 96 | 0 | 0 | 0 | 96 | 3% |
| 20 | Nagaland | 21 | 13 | 13 | 3 | 13 | 63 | 2% |
| 21 | Assam | 22 | 35 | 0 | 0 | 0 | 57 | 2% |
| 22 | Meghalaya | 3 | 16 | 0 | 0 | 0 | 19 | 1% |
| 23 | Rajasthan | 0 | 0 | 0 | 0 | 19 | 19 | 1% |
| 24 | Kerala | 0 | 9 | 9 | 0 | 0 | 18 | 0% |
| 25 | Andhra Pradesh | 0 | 11 | 0 | 0 | 0 | 11 | 0% |
| 26 | Karnataka | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| 27 | Jammu & Kashmir | 0 | 0 | 0 | 0 | 0 | 0 | 0% |

Annexure 2 Zone wise fund allocation in PSAMTTD Scheme

**(Rs. Lakh)**

| **Zone** | **States** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** | **Percentage** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **South Zone** | Andhra Pradesh | 0 | 11 | 0 | 0 | 0 | 11 | 0.27% |
|  | Karnataka | 0 | 0 | 0 | 0 | 0 | 0 | 0.00% |
|  | Kerala | 0 | 9 | 9 | 0 | 0 | 18 | 0.43% |
|  | Tamil Nadu | 77 | 65 | 53 | 68 | 50 | 313 | 7.56% |
| ***Sub Total*** |  | ***77*** | ***85*** | ***62*** | ***68*** | ***50*** | ***342*** | **8.26%** |
| **North Eastern Zone** | Arunachal Pradesh | 32 | 33 | 26 | 49 | 0 | 140 | 3.38% |
|  | Assam | 22 | 35 | 0 | 0 | 0 | 57 | 1.38% |
|  | Manipur | 0 | 49 | 7 | 210 | 174 | 440 | 10.63% |
|  | Mizoram | 47 | 0 | 0 | 0 | 85 | 132 | 3.19% |
|  | Meghalaya | 3 | 16 | 0 | 0 | 0 | 19 | 0.46% |
|  | Nagaland | 21 | 13 | 13 | 3 | 13 | 63 | 1.52% |
|  | Tripura | 0 | 0 | 0 | 116 | 0 | 116 | 2.80% |
|  | Sikkim | 2 | 0 | 21 | 0 | 114 | 137 | 3.31% |
| ***Sub Total*** |  | ***127*** | ***146*** | ***67*** | ***378*** | ***386*** | ***1104*** | **26.67%** |
| **Eastern Zone** | Bihar | 0 | 37 | 0 | 75 | 16 | 128 | 3.09% |
|  | Jharkhand | 0 | 0 | 8 | 0 | 100 | 108 | 2.61% |
|  | Orissa | 44 | 29 | 48 | 109 | 153 | 383 | 9.25% |
|  | West Bengal | 0 | 30 | 0 | 13 | 150 | 193 | 4.66% |
| ***Sub Total*** |  | ***44*** | ***96*** | ***56*** | ***197*** | ***419*** | ***812*** | **19.62%** |
| **Central Zone** | Chhattisgarh | 95 | 56 | 0 | 22 | 16 | 189 | 4.57% |
|  | Madhya Pradesh | 35 | 36 | 0 | 61 | 100 | 232 | 5.61% |
| ***Sub Total*** |  | ***130*** | ***92*** | ***0*** | ***83*** | ***116*** | ***421*** | **10.17%** |
| **Western Zone** | Gujarat | 135 | 0 | 0 | 0 | 0 | 135 | 3.26% |
|  | Maharashtra | 0 | 6 | 0 | 0 | 100 | 106 | 2.56% |
|  | Rajasthan | 0 | 0 | 0 | 0 | 19 | 19 | 0.46% |
| ***Sub Total*** |  | ***135*** | ***6*** | ***0*** | ***0*** | ***119*** | ***260*** | **6.28%** |
| **Northern Zone** | Haryana | 45 | 45 | 20 | 138 | 0 | 248 | 5.99% |
|  | Himachal Pradesh | 10 | 22 | 12 | 27 | 70 | 141 | 3.41% |
|  | Jammu & Kashmir | 0 | 0 | 0 | 0 | 0 | 0 | 0.00% |
|  | Punjab | 0 | 96 | 0 | 0 | 0 | 96 | 2.32% |
|  | Uttar Pradesh | 17 | 44 | 42 | 19 | 0 | 122 | 2.95% |
|  | Uttarakhand | 29 | 82 | 0 | 0 | 0 | 111 | 2.68% |
| ***Sub Total*** |  | ***101*** | ***289*** | ***74*** | ***184*** | ***70*** | ***718*** | **17.35%** |
| **Institutions** | ICAR | 0 | 14 | 0 | 370 | 0 | 384 | 9.28% |
|  | SFCI | 12 | 86 | 0 | 0 | 0 | 98 | 2.37% |
| ***Sub Total*** |  | ***12*** | ***100*** | ***0*** | ***370*** | ***0*** | ***482*** | **11.65%** |
| **Grand Total** |  | **626** | **814** | **259** | **1280** | **1160** | **4139** | **100%** |

Annexure 3 State wise/ Institution wise allocation of fund and utilization in PSAMTTD Scheme during XI FYP

**(Rs. Lakh)**

|  |  |  |  |
| --- | --- | --- | --- |
| **States** | **Total Allocation (*Rs in Lakh*)** | **Utilization**  **(*Rs. in Lakh*)** | **% utilization** |
| Andhra Pradesh | 11 | 3.34 | 30% |
| Karnataka# | 0 | -22.12 | 0% |
| Kerala | 18 | 15.89 | 88% |
| Tamil Nadu | 313 | 294.12 | 94% |
| Arunachal Pradesh | 140 | 140 | 100% |
| Assam | 57 | 22.48 | 39% |
| Manipur | 440 | 440 | 100% |
| Mizoram | 132 | 46.95 | 36% |
| Meghalaya | 19 | 19 | 100% |
| Nagaland | 63 | 63 | 100% |
| Tripura | 116 | 59.8 | 52% |
| Sikkim | 137 | 23.37 | 17% |
| Bihar | 128 | 112 | 88% |
| Jharkhand | 108 | 8 | 7% |
| Orissa | 383 | 230.45 | 60% |
| West Bengal | 193 | 43 | 22% |
| Chhattisgarh | 189 | 173 | 92% |
| Madhya Pradesh | 232 | 229.27 | 99% |
| Gujarat | 135 | 98.73 | 73% |
| Maharashtra | 106 | 6 | 6% |
| Rajasthan | 19 | 0 | 0% |
| Haryana | 248 | 248 | 100% |
| Himachal Pradesh | 141 | 71 | 50% |
| Jammu & Kashmir | 0 | -0.02 | 0% |
| Punjab | 96 | 11.6 | 12% |
| Uttar Pradesh | 122 | 119.33 | 98% |
| Uttarakhand | 111 | 99.52 | 90% |
| ICAR | 384 | 13.4 | 3% |
| SFCI | 98 | 98 | 100% |

**#**No allocations were made to Karnataka during the XI-FYP. The negative figure indicates available balance of X FYP.

Annexure 4 State wise course wise participation of trainees in CRFMTTI during XI FYP

| **States** | **ALC** | **%** | **Tech Level** | **Percent** | **User Level** | **Percent** | **Manag. Level** | **Percent** | **Need Based** | **Percent** | **Total** | **Percent** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Andhra Pradesh | 33 | 0.99% | 0 | 0 | 1 | 0.05% | 33 | 3.60% | 2 | 0.38% | 69 | 0.73% |
| Arunachal Pradesh | 3 | 0.09% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 3 | 0.03% |
| Andman | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 1 | 0.11% | 0 | 0.00% | 1 | 0.01% |
| Assam | 10 | 0.30% | 0 | 0.00% | 0 | 0.00% | 10 | 1.09% | 0 | 0.00% | 20 | 0.21% |
| Bihar | 50 | 1.50% | 70 | 2.57% | 19 | 0.95% | 19 | 2.07% | 5 | 0.94% | 163 | 1.71% |
| Chhattisgarh | 120 | 3.60% | 57 | 2.09% | 20 | 1.00% | 22 | 2.40% | 14 | 2.63% | 233 | 2.45% |
| Delhi | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 7 | 0.76% | 0 | 0.00% | 7 | 0.07% |
| Gujarat | 81 | 2.43% | 45 | 1.65% | 5 | 0.25% | 76 | 8.29% | 12 | 2.26% | 219 | 2.30% |
| Haryana | 129 | 3.87% | 4 | 0.15% | 2 | 0.10% | 16 | 1.74% | 4 | 0.75% | 155 | 1.63% |
| Himachal | 1 | 0.03% | 0 | 0.00% | 0 | 0.00% | 4 | 0.44% | 0 | 0.00% | 5 | 0.05% |
| Jharkhand | 141 | 4.23% | 19 | 0.70% | 19 | 0.95% | 9 | 0.98% | 0 | 0.00% | 188 | 1.98% |
| J&K | 4 | 0.12% | 0 | 0.00% | 0 | 0.00% | 3 | 0.33% | 0 | 0.00% | 7 | 0.07% |
| Karnatak | 72 | 2.16% | 0 | 0.00% | 0 | 0.00% | 25 | 2.73% | 0 | 0.00% | 97 | 1.02% |
| Kerala | 1 | 0.03% | 0 | 0.00% | 0 | 0.00% | 16 | 1.74% | 0 | 0.00% | 17 | 0.18% |
| Madhya Pradesh | 1300 | 38.99% | 2175 | 79.70% | 1678 | 83.86% | 122 | 13.30% | 247 | 46.43% | 5522 | 58.05% |
| Maharashtra | 596 | 17.88% | 254 | 9.31% | 134 | 6.70% | 349 | 38.06% | 222 | 41.73% | 1555 | 16.35% |
| Manipur | 2 | 0.06% | 0 | 0.00% | 0 | 0.00% | 2 | 0.22% | 0 | 0.00% | 4 | 0.04% |
| Orissa | 56 | 1.68% | 5 | 0.18% | 3 | 0.15% | 19 | 2.07% | 2 | 0.38% | 85 | 0.89% |
| Punjab | 58 | 1.74% | 2 | 0.07% | 0 | 0.00% | 38 | 4.14% | 0 | 0.00% | 98 | 1.03% |
| Pandicherry | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 1 | 0.11% | 0 | 0.00% | 1 | 0.01% |
| Rajasthan | 94 | 2.82% | 5 | 0.18% | 46 | 2.30% | 23 | 2.51% | 8 | 1.50% | 176 | 1.85% |
| Tamil Nadu | 28 | 0.84% | 0 | 0.00% | 0 | 0.00% | 56 | 6.11% | 9 | 1.69% | 93 | 0.98% |
| Tripura | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 2 | 0.22% | 0 | 0.00% | 2 | 0.02% |
| Uttar Pradesh | 377 | 11.31% | 90 | 3.30% | 74 | 3.70% | 43 | 4.69% | 6 | 1.13% | 590 | 6.20% |
| Uttarakhand | 107 | 3.21% | 1 | 0.04% | 0 | 0.00% | 5 | 0.55% | 1 | 0.19% | 114 | 1.20% |
| West Bengal | 71 | 2.13% | 2 | 0.07% | 0 | 0.00% | 16 | 1.74% | 0 | 0.00% | 89 | 0.94% |
| **Grand Total** | **3334** | **100.00%** | **2729** | **100.00%** | **2001** | **100.00%** | **917** | **100.00%** | **532** | **100.00%** | **9513** | **100.00%** |

Annexure 5 List of machines tested in CRFMTTI during XI FYP

**Machines tested in the Financial Year 2007-08**

| **Sl. No.** | **Make & Model of Machines/ Implements** | **Nature of Test Report** | **Month & Year of release** |
| --- | --- | --- | --- |
| 1 | Powertrac 445 XL Tractor | Comm. (ICT) | 03/2007 |
| 2 | Shrachi Kubota DF 12L PT | Comm. (ICT) | 03/2007 |
| 3 | Same 603 Euro-W | Comm. (Variant) | 03/2007 |
| 4 | Powertrac 455 XL tractor | Comm.(ICT) | 04/2007 |
| 5 | Preet 4049 tractor | Comm.. (ICT) | 04/2007 |
| 6 | Indo Farm 3040 DI tractor | Comm.. (ICT) | 04/2007 |
| 7 | Indo Farm 3035 DI tractor | Comm.. (ICT) | 05/2007 |
| 8 | Balwan 450 tractor | Comm (BT) (Incomp.) | 05/2007 |
| 9 | Agni 18 DI Power tiller | Confidential (Converted to Commercial) | 05/2007 |
| 10 | Sun GN-151 DI Power Tiller | Confidential (Converted to Commercial) | 05/2007 |
| 11 | Indo Farm 3050 DI tractor | Comm. (ICT) | 05/2007 |
| 12 | Indo Farm 3065 DI tractor | Comm. (ICT) | 05/2007 |
| 13 | Preet 3549 tractor | Comm. (ICT) | 06/2007 |
| 14 | Sonalika International DI-60 CM Series tractor | Comm. (ICT) | 06/2007 |
| 15 | Sonalika International DI 60(4 WD) tractor | Comm. (OECD) | 06/2007 |
| 16 | Sonalika International DI 75(4 WD) tractor | Comm. (OECD) | 06/2007 |
| 17 | MF 1035 DI J Mahashakti tractor | Comm. (Variant) | 06/2007 |
| 18 | Same 503-W tractor | Comm. (Variant) | 06/2007 |
| 19 | Powertrac 4455 tractor | Comm. (ICT) | 06/2007 |
| 20 | Kavi GN 15L PT | Confidential (Converted to Commercial) | 07/2007 |
| 21 | Farmtrac-50 EPI Shakti Rotary | Comm. (Variant) | 08/2007 |
| 22 | Sonalika International DI-35 CM Series tractor | Comm. (Incomplete) | 08/2007 |
| 23 | Sonalika International DI 75 tractor turbo CM Series | Comm. (ICT) | 08/2007 |
| 24 | Mahindra 265 DI tractor | Comm. (BT) | 08/2007 |
| 25 | Mahindra Arjun 605 DI Ultra-1 tractor | Comm. (ICT) | 08/2007 |
| 26 | Angad 240 D tractor | Comm. (BT) | 09/2007 |
| 27 | Sonalika International DI 75 CM Series Tractor | Comm. (ICT) | 09/2007 |
| 28 | Samrat power tiller | Confidential | 09/2007 |
| 29 | Mahindra Gujarat Shaktimaan 353 tractor | Comm. (ICT) | 09/2007 |
| 30 | Escort Jawan Plus MPT | Comm. (Variant) | 10/2007 |
| 31 | Sonalika International DI-740 Super CM Series | Comm.(ICT) | 11/2007 |
| 32 | Sonalika International DI-745 III CM Series | Comm.(ICT) | 11/2007 |
| 33 | Mahindra Gujarat Shaktimaan 35 tractor | Confidential | 11/2007 |
| 34 | KAVI DF 15L PT | Confidential (Converted to Commercial) | 12/2007 |
| 35 | Apollo agricultural tractor tyres 14.9-28, 12PR | Confidential (Incomplete) | 12/2007 |
| 36 | Mahindra 475 DI MKM Tractor | Comm. (Variant) | 01/2008 |
| 37 | Sonalika International DI 730 II Tractor | Comm. (ICT) | 01/2008 |
| 38 | Swaraj 843 FE Tractor | Comm.(ICT) | 01/2008 |
| 39 | Swaraj 724 FE Orchard tractor | Comm. (ICT) | 01/2008 |
| 40 | SAME 40 tractor | Comm. (ICT) | 01/2008 |
| 41 | Preet 5049-I tractor | Comm. (ICT) Incompl. | 01/2008 |
| 42 | HMT 2522 Edi tractor | Comm. (BT) | 01/2008 |
| 43 | Mahindra Gujarat Shaktimaan 30 tractor | Conf. (Incompl) | 01/2008 |
| 44 | Shifeng Angad 150 PT | Suppl. (Comm.) | 03/2008 |
| 45 | Mahindra B-275 High speed tractor | Comm.(ICT) | 03/2008 |
| 46 | Standard 335 tractor | Comm. (BT) | 03/2008 |

**Machines tested in the Financial Year 2008-09**

| **Sl. No.** | **Make & Model of Machines/ Implements** | **Nature of Test Report** | **Month & Year of release** |
| --- | --- | --- | --- |
| 1 | Indo farm 3055 DI tractor | Comm.. (ICT) | 04/2008 |
| 2 | Preet 6049-I tractor | Comm.(ICT (Incomplete.) | 04/2008 |
| 3 | John Deere 5104 tractor | Conf. | 04/2008 |
| 4 | John Deere 5204 tractor | Conf. | 04/2008 |
| 5 | Green Field 35 tractor | Comm. (Variant) Incomplete. | 04/2008 |
| 6 | ACE – DI – 350 tractor | Comm. (ICT) Incomplete. | 04/2008 |
| 7 | SAME 50 tractor | Comm. (ICT) | 04/2008 |
| 8 | Mahindra China Yuvraj 225 tractor | Comm. (ICT) | 05/2008 |
| 9 | John Deere 5410 tractor | Comm. (ICT) | 05/2008 |
| 10 | SAME 70 tractor | Comm. (ICT) | 05/2008 |
| 11 | Zimidara Bharat trac 3035 tractor | Comm. (ICT) | 06/2008 |
| 12 | Zimidara Bharat trac 3045 tractor | Comm. (ICT) | 06/2008 |
| 13 | Preet 3549-I tractor | Comm. (ICT) | 06/08 |
| 14 | Standard 345 tractor | Comm. (ICT) | 06/08 |
| 15 | Captain DI 2600 tractor | Comm. (BT) | 07/08 |
| 16 | MF 5245 DI Planetary drive tractor | Comm. (Variant) | 07/08 |
| 17 | Mahindra 295 DI Super Turbo tractor | Comm. (ICT) | 07/08 |
| 18 | Farmtrac champion tractor | Comm. (ICT) | 07/08 |
| 19 | Balwan 450 tractor | Comm. (ICT) | 08/08 |
| 20 | TAFE MF 7245 tractor | Comm. (ICT) | 09/08 |
| 21 | Powertrac 4455 tractor | Comm. (Suppl) | 09/08 |
| 22 | Mahindra Shaktimaan 30 Tractor | Comm. Variant | 09/08 |
| 23 | International DI-30 Baagban Tractor | Comm. (ICT) | 09/08 |
| 24 | Mahindra 6500 4WD tractor | Comm. OECD | 09/08 |
| 25 | Farmtrac 60XT tractor | Comm. (ICT) | 09/08 |
| 26 | Preet 4049-I tractor | Comm. (ICT) | 09/08 |
| 27 | TAFE MF 7250 tractor | Comm. (ICT) | 10/08 |
| 28 | Panther 350 tractor | Comm. (Conf) | 10/08 |
| 29 | ACE DI 450 tractor | Comm. (ICT) | 10/08 |
| 30 | Escorts Farmtrac 45XT tractor | Comm. (ICT) | 10/08 |
| 31 | Sonalika International DI-60 III tractor | Comm. (ICT) | 10/08 |
| 32 | New Holland 4510 tractor | Comm. (ICT) | 11/08 |
| 33 | New Holland 3037 tractor | Comm. (Variant) | 11/08 |
| 34 | Standard 460 tractor | Comm. (BT) | 11/08 |
| 35 | Standard 450 tractor | Comm. (BT) Incompl. | 11/08 |
| 36 | Indofarm 2042 DI tractor | Comm. (ICT) | 11/08 |
| 37 | TAFE, MF 4410 tractor | Comm. Variant | 01/09 |
| 38 | Sonalika International DI-734 tractor | Comm. Variant | 01/09 |
| 39 | Mahindra 295 DI Super Turbo LT tractor | Comm. Variant | 01/09 |
| 40 | Mahindra Gujarat Shaktimaan-40 tractor | Comm.(ICT) | 02/09 |
| 41 | EICHER 5150 tractor | Comm.(Suppl) | 02/09 |
| 42 | Sonalika International DI-35 II DS tractor | Comm. (Variant) | 03/09 |
| 43 | Farmer DI 1200 tractor | Conf, | 03/09 |
| 44 | Shaktimaan-45 tractor | Comm.(ICT) | 03/09 |

**Machines tested in the Financial Year 2009-10**

| **Sl. No.** | **Make & Model of Machines/ Implements** | **Nature of Test Report** | **Month & Year of release** |
| --- | --- | --- | --- |
| 1 | Mahindra 295 DI super turbo DLX tractor | Comm.(ICT) | 04/09 |
| 2 | New Holland 4710 tractor | Comm.(ICT) | 04/09 |
| 3 | New Holland 3510 tractor | Comm.(ICT) | 04/09 |
| 4 | Balwan 330 tractor | Comm.(ICT) | 04/09 |
| 5 | ACE DI 350 tractor | Comm.(ICT) | 04/09 |
| 6 | Deutz-Fahr Agrolux 70E tractor | Comm.(ICT) | 04/09 |
| 7 | Deutz-Fahr Agrolux 60E tractor | Comm.(ICT) | 04/09 |
| 8 | Standard 124 DO tractor | Comm.(ICT) | 04/09 |
| 9 | TAFE, MF 5245 DI Mahamahaan Tractor | Comm.(ICT) | 04/09 |
| 10 | Preet 5049-I tractor | Comm.(ICT) | 05/09 |
| 11 | Preet 6049-I tractor | Comm.(ICT) | 05/09 |
| 12 | Mahindra Gujarat, Shaktimaan-35 | Commercial (Initial) | 05/09 |
| 13 | Mahindra –B-275 DI (High Torque) | Commercial (B.T.) | 05/09 |
| 14 | John Deere – 5038 D | Commercial (Initial) | 06/09 |
| 15 | Kubota B-2420 | Commercial (Initial) | 06/09 |
| 16 | Powertrac-439 DX | Commercial (Variant) | 06/09 |
| 17 | Agrolux -50 E | Commercial (Initial) | 06/09 |
| 18 | Swaraj 735 XM | Commercial (Variant) | 06/09 |
| 19 | Kubota L-3408 DD | Commercial (Initial) | 06/09 |
| 20 | Swaraj 843 XM | Commercial (Initial) | 06/09 |
| 21 | TAFE, MF 241 DI Planetary Drive Tractor | Commercial (Variant) | 07/09 |
| 22 | Deutz-Fahr, Agrolux 40E Tractor | Commercial (Initial) | 07/09 |
| 23 | Swaraj 834 XM tractor | Commercial (Variant) | 07/09 |
| 24 | TAFE, MF 241 DI ‘J’ Mahashakti tractor | Commercial (Variant) | 07/09 |
| 25 | Sonalika International DI-39 RX tractor | Commercial (Initial) | 08/2009 |
| 26 | New Holland 4010 tractor | Commercial (Initial) | 08/2009 |
| 27 | Swaraj 724 XM tractor | Commercial (Variant) | 08/2009 |
| 28 | John Deere 5036 C tractor | Confidential | 08/2009 |
| 29 | Powertrac -4455 DX tractor | Commercial (Initial) | 09/2009 |
| 30 | Standard 335-I tractor | Commercial (Initial) | 09/2009 |
| 31 | New Holland 6500 tractor | Commercial (Initial) | 09/2009 |
| 32 | Mahindra 475 DI MKM Total tractor | Commercial (Initial) | 10/2009 |
| 33 | Sonalika International DI-35 RX tractor | Commercial (Variant) - Incomplet | 10/2009 |
| 34 | TAFE, MF 1035 DI V1 tractor | Commercial (Variant) | 10/2009 |
| 35 | TAFE, MF 1035 DI Mahashakti-V1 tractor | Commercial (Initial) | 10/2009 |
| 36 | Sonalika International DI-47 RX tractor | Commercial (Initial) | 10/2009 |
| 37 | John Deere 5041 C Tractor | Confidential | 11/2009 |
| 38 | Preet- 4549 Tractor | Commercial (Initial) | 11/2009 |
| 39 | TAFE, ME 9000 ID Planetary Drive Tractor | Commercial (Variant) | 11/2009 |
| 40 | Sonalika International DI-745 III Power plus Tractor | Commercial (Variant) | 11/2009 |
| 41 | ACE DI-450 Tractor | Confidential | 12/2009 |
| 42 | ACE DI-350 Tractor | Commercial (Suppli.) | 12/2009 |
| 43 | Sonalika International DI-42 RX Tractor | Commercial (Variant) | 12/2009 |
| 44 | New Holland 3032 MU Tractor | Commercial (Variant) | 01/2010 |
| 45 | New Holland 3032 Tractor | Commercial (Variant) | 01/2010 |
| 46 | New Holland 3600-2 Tractor | Commercial (Variant) | 01/2010 |
| 47 | New Holland 3710 Tractor | Commercial (Variant) | 02/2010 |
| 48 | John Deere 5041C Tractor | Commercial (ICT) | 02/2010 |
| 49 | Agri King 20-55 Tractor | Conf. | 03/2010 |
| 50 | Sonalika International DI-750 II 2WD Tractor | OECD | 03/2010 |
| 51 | Sealing components of front axle assembly | Conf. | 03/2010 |

**Machines tested in the Financial Year 2010-11**

| **Sl No.** | **Make & Model of Machines / Implements** | **Nature of Test Report** | **Month & Year of release** |
| --- | --- | --- | --- |
| 1 | **John Deere 5036 C Tractor** | **Commercial (Initial)** | **04/2010** |
| 2 | Mahindra 475 MKM TOTAL LT Tractor | Commercial (Variant) | 04/2010 |
| 3 | Kubota L-4508 DD Tractor | Commercial (Initial) | 04/2010 |
| 4 | Sonalika International DI-55 RX Turbo Tractor | Commercial (Initial) | 04/2010 |
| 5 | Indo Farm, 3052 DI Tractor | Commercial (Initial) | 04/2010 |
| 6 | Sonalika International DI-60 2WD Tractor | OECD Code-2 | 04/2010 |
| 7 | Deutz-Fahr, Agrolux-50 E 2WD Tractor | Commercial (Variant) | 04/2010 |
| 8 | Deutz-Fahr, Agrolux-70 E 2WD Tractor | Commercial (Variant) | 04/2010 |
| 9 | Deutz-Fahr, Agrolux-60 E 2WD Tractor | Commercial (Variant) | 05/2010 |
| 10 | ACE DI 450 Tractor | Comm. (Suppl.) | 05/2010 |
| 11 | Indo farm 2030 DI HS Tractor | Comm. (Initial) | 05/2010 |
| 12 | Mahindra, 215 (Brand Name : Yuvraj 215 ) Tractor | Conf. **Converted to ICT** | 05/2010 |
| 13 | Sonalika International DI -90 (4 WD) Tractor | OECD | 06/2010 |
| 14 | Indo farm 2035 DI DX Tractor | Comm. (Variant) | 06/2010 |
| 15 | HMT 4922 Tractor | Comm. (BT) | 06/2010 |
| 16 | John Deere 5075 E Tractor | Conf. | 06/2010 |
| 17 | Harig, Panther 335 Tractor | Comm. (ICT) | 07/2010 |
| 18 | Mahindra, B 275 DI MKM (Brand Name: Bhoomiputra) Tractor | Comm. (ICT) | 07/2010 |
| 19 | Harig, Panther345 Tractor | Comm. (ICT) | 07/2010 |
| 20 | Sonalika International DI 60 RX Turbo | Comm. (Variant) | 07/2010 |
| 21 | Mahindra, 575 DI (Brand Name: Bhoomiputra) Tractor | Comm. ( ICT) | 08/2010 |
| 22 | Mahindra, 475 DI Tractor ( Brand Name: Bhoomiputra) | Comm. ( ICT) | 08/2010 |
| 23 | Indo Farm, 3048 Tractor | Comm. (Variant) | 08/2010 |
| 24 | HMT, 5022 RX Tractor | Comm. (Variant) | 08/2010 |
| 25 | Sonalika International DI 750 III Super Tractor | Comm. (ICT) – Incomplete | 08/2010 |
| 26 | Thrishul MT 625 DI Tractor | Comm. (BT) (incomplete) | 08/2010 |
| 27 | Standard 235 DI Tractor | Comm. (ICT) (Incomaplete) | 08/2010 |
| 28 | Mahindra 265 DI Tractor (Brand Name: Bhoomiputra) | Comm. (ICT) | 08/2010 |
| 29 | Sealing Components of Front Axle Assembly | Confidential | 09/2010 |
| 30 | Mahindra, B-275 DI TU Tractor (Brand Name: Bhoomiputra) | Comm. (ICT) | 09/2010 |
| 31 | New Holland 3030 Tractor | Comm. (BT) | 09/2010 |
| 32 | Powertrac – 429 Tractor | Comm. (ICT) | 09/2010 |
| 33 | New Holland 3630 Tractor | Comm. (BT) | 09/2010 |
| 34 | Escort Powertrac 455 XL PS Tractor (Noise Level Test only) | Confidential | 10/2010 |
| 35 | Field Marshal FM 625 DI Tractor | Comm. (BT) | 10/2010 |
| 36 | New Holland 3630 Tx Plus 12+3 UG Tractor | Comm. (ICT) | 10/2010 |
| 37 | Eicher, 5150 Rotary Tractor | Comm. (ICT) | 10/2010 |
| 38 | Mahindra Gujrat, Shaktiman – 60 Tractor | Comm. (ICT) | 10/2010 |
| 39 | TAFE, MF 1030 Mahashakti Tractor | Comm.(ICT) | 11/2010 |
| 40 | Captain DI 2600 4WD Tractor | Comm. (ICT) | 11/2010 |
| 41 | Mahindra, 475 DI MKM Tractor (Brand Name: Sarpanch) | Comm. (Variant) | 12/2010 |
| 42 | Mahindra, 575 DI MKM Tractor (Brand Name: Sarpanch) | Comm. (Variant) | 12/2010 |
| 43 | Mahindra, 255 DI MKM Tractor | Comm. (ICT) | 12/2010 |
| 44 | New Holland 5500 12+3 UG Tractor | Comm. (Variant) | 01/2011 |
| 45 | Mahindra, 575 DI MKM Tractor (Brand Name: Sarpanch) | Comm. (Variant) | February, 2011 |
| 46 | Sonalika International DI-90, 2WD (8 speeds, 40kmph, ZM) | OECD Code-2 | February, 2011 |
| 47 | Escorts, Power track-455 XL PS | Comm. (intial) | February, 2011 |
| 48 | Mahindra, 475 DI MKM DLX (Brand Name: Sarpanch) | Comm. (Variant) | February, 2011 |
| 49 | DEUTZ –FAHAR , Agrolux 55 E(4 WD) | Comm. (intial) | February, 2011 |
| 50 | Trishul MT-9.5 | Comm. (intial) | March,2011 |
| 51 | Mahindra Gujrat Saktiman-31 | Comm. (intial) | March,2011 |
| 52 | TAFE LIMITED, TAFE 30DI Orchard Plus | Comm. (Variant) | March,2011 |
| 53 | Sonalika International DI-60 CM Series 2WD | Comm. (Variant) | March,2011 |

**Machines tested in the Financial Year 2011-12**

| **Sl. No.** | **Make & Model of Machines / Implements** | **Nature of Test Report** | **Month & Year of release** |
| --- | --- | --- | --- |
| 1 | Mahindra 575 DI MKM (Brand Name: Bhoomiputra) | Comm. (Variant) | April,2011 |
| 2 | Mahindra 475 DI MKM (Brand Name: Bhoomiputra) | Comm. (Variant) | April,2011 |
| 3 | Mahindra 265 DI MKM (Brand Name: Bhoomiputra) | Comm. (Variant) | April,2011 |
| 4 | Indo Farm 3055 NV | Comm. (Variant) | April,2011 |
| 5 | Indo Farm 3055 NV DX | Comm. (Variant) | April,2011 |
| 6 | Royal Tractor | Comm. (intial) | May, 2011 |
| 7 | Swaraj 735 FE Tractor | Comm. (intial) | May, 2011 |
| 8 | Sonalika International DI – 75(2WD) | OECD Code -2 | May, 2011 |
| 9 | Mahindra Gujrat, Shaktiman-55 | Comm. (Variant) | May, 2011 |
| 10 | Mahindra,B-275 DI TU MKM (Brand Name : Bhoomiputra) | Comm. (Variant) | May, 2011 |
| 11 | Sonalika International DI -730 III FE | Comm. (Intial) | June,2011 |
| 12 | New Holland 3210 | Comm. (Variant) | June,2011 |
| 13 | Standard 450 | Comm. (Batch) | June,2011 |
| 14 | John Deer 5104 | Confidentiel (Limited Test) | June,2011 |
| 15 | john Deer 5310 | Confidentiel (Limited Test) | June,2011 |
| 16 | Swaraj 735 XM | Comm. (Variant) | July,2011 |
| 17 | Swaraj 724 XM Orchard | Comm. (Intial) | July,2011 |
| 18 | Barieri, Tera Track 4WD | Confidentiel | July,2011 |
| 19 | Kubota 2420, 4WD | Commercial (Supplimentary) | July,2011 |
| 20 | White Wagon, Vaibhav Tractor | Confidentiel Converted to Commercial | July,2011 |
| 21 | Force Moters,Balwan 450 | Commercial (Supplimentary) | July,2011 |
| 22 | Mahindra,575 DI MKM Rotary (Brand Name : Sarpanch) | Comm. (Variant) | July,2011 |
| 23 | Mahindra, Shaktimaan – 30 (Brand Name: Shaktimaan) | Comm. (Variant) | August, 2011 |
| 24 | John Deere 5055 E | Commercial (Initial) | August, 2011 |
| 25 | John Deere 5055 E Version-2 | Commercial (Initial) | August, 2011 |
| 26 | Eicher 312 P | Confidential (Limited test) | August, 2011 |
| 27 | Eicher 485 H | Confidential (Limited test) | August, 2011 |
| 28 | Eicher 242 XTRAC | Commercial (Initial) | August, 2011 |
| 29 | TAFE, MF 9500 | Commercial (Initial) | August, 2011 |
| 30 | Force Motors, OX-25 Orchard DLX | Commercial (Initial) | August, 2011 |
| 31 | Escorts, Powertrac- 434 | Commercial (Batch) | September, 2011 |
| 32 | Escorts, Powertrac- 439 | Commercial (Batch) | September, 2011 |
| 33 | Indo Farm 3055 NV VX | Commercial (Variant) | September, 2011 |
| 34 | DEUTZ-FAHR, AGROLUX – 55 e (12+3 ) 2WD | Commercial (Variant) | September, 2011 |
| 35 | DEUTZ-FAHR, AGROLUX – 55 e 2WD | Commercial (Variant) | September, 2011 |
| 36 | Indo Farm 3035 DI | Commercial (Initial) | September, 2011 |
| 37 | John Deere 5042 D | Commercial (Initial) | September, 2011 |
| 38 | Mahindra B-275 DI TU MKM DLX (Brand Name: Bhoomiputra) | Commercial (Variant) | September, 2011 |
| 39 | Mahindra B-265 DI MKM DLX (Brand Name: Bhoomiputra) | Incomplete Commercial (Variant) | October, 2011 |
| 40 | Farmtrac 60 (2WD) | OECD Code-2 | October, 2011 |
| 41 | John Deere 5060 E | Commercial (Initial) | October, 2011 |
| 42 | Sonalika International RX MM Super | Commercial (Initial) | October, 2011 |
| 43 | Eicher 242 XTRC PREMIUM | Commercial (Variant) | November, 2011 |
| 44 | New Holland 5500 Turbo Super 12+3 UG | Incomplete Commercial (Initial) | November,11 |
| 45 | Sonalika International DI-60 RX | Commercial (Variant) | December, 2011 |
| 46 | John Deere 5045 D | Commercial (Variant) | December, 2011 |
| 47 | Mahindra, 475 DI MKM DLX (Brand Name: Bhoomiputra) | Commercial (Variant) | December, 2011 |
| 48 | Mahindra, 575 DI MKM DLX (Brand Name:Bhoomiputra) | Commercial (Variant) | December, 2011 |
| 49 | Sonalika International DI-35 DS CM Series | Commercial (Variant) | December, 2011 |
| 50 | Sonalika International DI-740 CM Series | Commercial (Variant) | December, 2011 |
| 51 | Sonalika International DI-734 FE | Commercial (Variant) | January, 2012 |
| 52 | Escorts, Farmtrac 6060 | Commercial (Initial) | February, 2012 |
| 53 | Indo power 48 DI (2WD) Tractor | OECD | 02/12 |
| 54 | Mahindra 8000-4WD Tractor | OECD | 02/12 |
| 55 | Mahindra 7030-4WD Tractor | OECD | 02/12 |
| 56 | Mahindra, 265, DI MKM DLX Tractor | Variant | 02/12 |
| 57 | MF, 245 DI J Mahashakti Rotary Pump | Variant | 02/12 |
| 58 | Bull Crop AV-20 Combine Harvester | Combine | 03/2012 |
| 59 | Sonalika International 90 RX 4WD Tractor | OECD | 03/12 |
| 60 | Sonalika International Worldtrac 75 RX 4 WD Tractor | OECD | 03/12 |
| 61 | Eicher 241 Xtrac Tractor | Commercial (Initial) | 03/12 |
| 62 | TAFE, MF 5245 DI Planetary Drive Power Steering Tractor | Commercial | 03/12 |

Annexure 6 List of machine tested under CMVR in CRFMTTI (Budni, MP) during XI FYP

**Machine tested during 2010-11**

|  |  |  |
| --- | --- | --- |
| **SNo** | **Name of machine** | **Date of Certificate** |
| 1 | Mahindra Sactor (Brand Shaan) Tractor | 07.04.2010 |
| 2 | Vaibhav Tractor | 12.04.2010 |
| 3 | Eicher 368 Tractor | 13.04.2010 |
| 4 | Eicher 380 Tractor | 15.04.2010 |
| 5 | Eicher 242 NC Tractor (Variant: Eicher 242XTRAC &Eicher 242 XTRAC Premium Tractor) | 15.04.2010 |
| 6 | Eicher 241 NC Tractor (Variant : Eicher 241 XTRAC Tractor) | 15.04.2010 |
| 7 | Eicher 312 Tractor (Variant: Eicher 312P Tractor) | 15.04.2010 |
| 8 | Eicher 333 Tractor | 16.04.2010 |
| 9 | Eicher 480 Tractor | 16.04.2010 |
| 10 | John deere 5310Cr tractor | 16.04.2010 |
| 11 | John deere 5410 creeper tractor | 16.04.2010 |
| 12 | John deere 5204 tractor | 16.04.2010 |
| 13 | John deere 5104 tractor | 16.04.2010 |
| 14 | John deere 5038D tractor | 16.04.2010 |
| 15 | John deere 5103s version 2 tractor | 16.04.2010 |
| 16 | John deere 5310 version 2 tractor | 16.04.2010 |
| 17 | John deere 5103 version 2 tractor | 16.04.2010 |
| 18 | John deere 5203 version 2 tractor | 16.04.2010 |
| 19 | John deere 5203s tractor | 16.04.2010 |
| 20 | John deere 5103 economy tractor | 16.04.2010 |
| 21 | John deere 5036c tractor | 16.04.2010 |
| 22 | John deere 5041c tractor | 16.04.2010 |
| 23 | John deere 5610 tractor | 16.04.2010 |
| 24 | John deere 5310 4WD tractor | 16.04.2010 |
| 25 | Kubota L3408DD Tractor | 20.04.2010 |
| 26 | Kubota B2420 Tractor | 20.04.2010 |
| 27 | Kubota L4508DD Tractor | 20.04.2010 |
| 28 | Mahindra Sactor Shaan (Brand name: Shaan) Tractor | 20.04.2010 |
| 29 | Mahindra 235 DI Airflow Tractor | 20.04.2010 |
| 30 | Indo Farm 3052 DI Tractor | 21.04.2010 |
| 31 | Mahindra 265 DI MKM DLX (Brand: Bhoomiputra) Tractor | 22-04-2010 |
| 32 | Mahindra 255 DI MKM Tractor | 26-04-2010 |
| 33 | Kubota L 3609 DD Tractor | 03.05.2010 |
| 34 | Dragon Shakti 150 DI Power Tiller | 03.05.2010 |
| 35 | Swaraj 855 FE Tractor | 10.05.2010 |
| 36 | Swaraj 855 FE GX Tractor | 10.05.2010 |
| 37 | John Deere 5725 Tractor | 10.05.2010 |
| 38 | GS 14 DIL Power Tiller | 19.05.2010 |
| 39 | Mahindra Shaktimaan 30 Tractor | 21.05.2010 |
| 40 | Swaraj 744 FE tractor (Amendment No.2) | 02.06.2010 |
| 41 | Sonalika International DI-732 III Deluxe tractor | 03.06.2010 |
| 42 | Field Marshal FM 625 DI Tractor | 14.06.2010 |
| 43 | Captain DI 2600 4WD tractor (Amendment No.1) | 18.06.2010 |
| 44 | John Deere 5310 RS tractor | 21.06.2010 |
| 45 | Balwan 450 tractor | 06.07.2010 |
| 46 | Balwan 500 tractor | 06.07.2010 |
| 47 | Balwan 330 tractor | 06.07.2010 |
| 48 | Balwan 400 tractor | 06.07.2010 |
| 49 | Powertrac 455 XL PS tractor | 06.07.2010 |
| 50 | Escort Jawan Plus MPT tractor | 09.07.2010 |
| 51 | Indo Farm 3035 DI tractor | 12.07.2010 |
| 52 | Indo Farm 3040 DI tractor | 12.07.2010 |
| 53 | Eicher 485 tractor | 16.07.2010 |
| 54 | Kubota-RT140DI-RP80 Power Tiller | 22.07.2010 |
| 55 | New Holland 3230 tractor | 05.08.2010 |
| 56 | New Holland 3130 tractor | 05.08.2010 |
| 57 | New Holland 3037 tractor | 05.08.2010 |
| 58 | John Deere 5036 C tractor | 06.08.2010 |
| 59 | John Deere 5041 C tractor | 06.08.2010 |
| 60 | John Deere 5041 PS tractor | 12.08.2010 |
| 61 | John Deere 5036 PS tractor | 12.08.2010 |
| 62 | Indofarm 2030 DI HS tractor | 16.08.2010 |
| 63 | Indofarm 2035 DI DX tractor | 16.08.2010 |
| 64 | Indofarm 2042 DI tractor | 16.08.2010 |
| 65 | Balram 950 DI tractor | 17.08.2010 |
| 66 | OX 25 Orchard DLX tractor | 25.08.2010 |
| 67 | Angad 150 D tractor | 26.08.2010 |
| 68 | TAFE 30 DI Orchard Plus tractor | 27.08.2010 |
| 69 | Indofarm 3048 DI tractor | 09.09.2010 |
| 70 | MF 1035 DI Mahashakti V1 tractor | 10.09.2010 |
| 71 | MF 1035 DI J Mahashakti Power Steering tractor | 10.09.2010 |
| 72 | Eicher 5150 Rotary Tractor | 13.09.2010 |
| 73 | Captain DI 2600 Mini Tractor | 15.09.2010 |
| 74 | Captain DI 2600 4 WD Tractor | 23.09.2010 |
| 75 | Powertrac – 445 Tractor (Variants: Powertrac – 445 XLT & Powertrac – 445 XL DC ) | 27.09.2010 |
| 76 | Powertrac – 429 Tractor | 27.09.2010 |
| 77 | HMT 3522 DX Tractor | 27.09.2010 |
| 78 | HMT 3522 Tractor | 27.09.2010 |
| 79 | Mahindra Gujarat Shaktimaan-55 tractor | 27.09.2010 |
| 80 | Sonalika International DI-740 III CM Series Tractor | 29.09.2010 |
| 81 | Sonalika International DI-30 Baagban Tractor | 29.09.2010 |
| 82 | Swaraj 735 FE Tractor | 01.10.2010 |
| 83 | Farmtrac 50 EPI (Shakti) Tractor | 05.10.2010 |
| 84 | Sunrise DI Power Tiller | 05.10.2010 |
| 85 | Panther 345 Tractor | 07.10.2010 |
| 86 | Swaraj 724 XM Orchard Tractor | 13.10.2010 |
| 87 | Preet 4549 Tractor | 18.10.2010 |
| 88 | Mitsubishi Shakti 180 D Tractor | 28.10.2010 |
| 89 | Stallion 17 DI tractor | 28.10.2010 |
| 90 | ACE DI 450 tractor | 29.10.2010 |
| 91 | ACE DI 350 tractor | 29.10.2010 |
| 92 | Sigma Plus V2 EM Power Tiller | 15.11.2010 |
| 93 | ACE DI 550 DC Tractor | 25.11.2010 |
| 94 | Trishul MT 9.5 DI Tractor | 31.12.2010 |
| 95 | Indo Farm 3055 NV Tractor | 31.12.2010 |
| 96 | Bull LD V2 1000 EX Front end loader mounted on Agrolux 60 e (12+3) 2 WD tractor | 04.01.2011 |
| 97 | John Deere 5204 V2 tractor | 21.01.2011 |
| 98 | Farmer DI 1200 tractor | 21.01.2011 |
| 99 | HMT 5022 RX Tractor | 25.01.2011 |
| 100 | HMT 4922 Tractor | 25.01.2011 |
| 101 | John Deere 5310 Cr. Tractor | 25.01.2011 |
| 102 | Mahindra 8085 – 4 WD (Brand name – Arjun International)Tractor | 24.02.2011 |
| 103 | John Deere 5055E V2 Tractor | 28.02.2011 |
| 104 | John Deere 5055E Tractor | 28.02.2011 |
| 105 | Sonalika International DI 60 RX Turbo Tractor | 09.03.2011 |
| 106 | Indo Farm 4175 DI Tractor | 14.03.2011 |
| 107 | Preet 3549 Challenger tractor | 16.03.2011 |
| 108 | Preet 3049 Challenger tractor | 16.03.2011 |
| 109 | John Deere 5060 E tractor | 16.03.2011 |
| 110 | Panther 335 Tractor | 29.03.2011 |
| 111 | John Deere 5060 E V2 Tractor | 30.03.2011 |
| 112 | John Deere 5065 E Tractor | 31.03.2011 |

**Machines tested during 2011-12**

|  |  |  |
| --- | --- | --- |
| **SNo** | **Name of machine** | **Date of Certificate** |
| 113 | Sonalika International DI 35 RX Tractor | 05.04.2011 |
| 114 | John Deere 5075 E Tractor | 07.04.2011 |
| 115 | MF 9000 DI Planetary Drive Tractor | 08.04.2011 |
| 116 | Sonalika International DI-60 4WD CM Series Tractor | 08.04.2011 |
| 117 | Sonalika International DI-60 CM Series 2 WD Tractor | 08.04.2011 |
| 118 | Garuda 3 PT 1200 D Power Tiller | 11.04.2011 |
| 119 | MF 5245 DI Mahamahaan Tractor | 13.04.2011 |
| 120 | Powertrac 4455 DX Tractor | 27.04.2011 |
| 121 | John Deere 5055E V3 Tractor | 27.04.2011 |
| 122 | Sonalika International DI-75 Turbo CM Series | 11.05.2011 |
| 123 | John Deere 5038 D V2 Tractor | 11.05.2011 |
| 124 | John Deere 5103S V2 PS Tractor | 11.05.2011 |
| 125 | Mahindra Shaktimaan 35 MX (Brand name - Shaktimaan) Tractor | 13.05.2011 |
| 126 | Swaraj 855 XM Tractor | 20.05.2011 |
| 127 | Indofarm 3055 NV DX Tractor | 20.05.2011 |
| 128 | Mahindra Gujarat Shaktimaan - 614 Tractor | 01.06.2011 |
| 129 | SEC RJMT S 2212 Loader and SEC RJMT S 2216 Backhoe mounted on Swaraj 855 FE GX Tractor. | 06.06.2011 |
| 130 | MF 9500 Tractor | 07.06.2011 |
| 131 | VT Balaji Compressor mounted on Farmtrac 60 Tractor. | 14.06.2011 |
| 132 | VT Balaji Compressor mounted on Farmtrac 45 XT Tractor. | 14.06.2011 |
| 133 | John Deere 5041 C V2 PS Tractor | 29.06.2011 |
| 134 | Mahindra Gujarat Shaktimaan 31 Tractor | 06.07.2011 |
| 135 | John Deere 5042 D Tractor | 08.07.2011 |
| 136 | New Holland 3630 TX Tractor and its variant New Holland 3600-2 Tractor | 14.07.2011 |
| 137 | Swaraj 744 XM Tractor | 20.07.2011 |
| 138 | MF 7250 DI Power Drive Tractor | 02.08.2011 |
| 139 | Mahindra Gujarat Shaktimaan 50 Tractor | 29.08.2011 |
| 140 | Eicher 5660 Tractor | 28.09.2011 |
| 141 | MF 2635 – 2WD Tractor | 28.09.2011 |
| 142 | John Deere 5050 D Tractor | 29.09.2011 |
| 143 | Indo Farm 3055 NV VX Tractor | 05.10.2011 |
| 144 | John Deere 5045 D Tractor | 10.10.2011 |
| 145 | Sonalika International DI 35 RX CM Series tractor | 14.10.2011 |
| 146 | Royal Tractor | 20.10.2011 |
| 147 | HMT 6522 Tractor | 21.10.2011 |
| 148 | John Deere 5065E 4WD Tractor | 21.10.2011 |
| 149 | John Deere 5042D PS Tractor | 21.10.2011 |
| 150 | Standard 340 tractor | 25.10.2011 |
| 151 | Standard 345 tractor | 25.10.2011 |
| 152 | John Deere 5055 E 4WD Tractor | 02.11.2011 |
| 153 | Mahindra 8065 4WD (Brand name – Arjun International) Tractor | 11.11.2011 |
| 154 | TAFE MF 2635 4WD Tractor | 28.11.2011 |
| 155 | SHB DI Power Tiller | 05.12.2011 |
| 156 | Sonalika International DI-745 III RX Tractor | 14.12.2011 |
| 157 | John Deere 5038 D Tractor | 19.12.2011 |
| 158 | John Deere 5038 D V2 Tractor | 19.12.2011 |
| 159 | Tafe MF 7250 DI Power Drive Power Steering Tractor | 11.01.2012 |
| 160 | Divya Shakti Power Tiller | 12.01.2012 |
| 161 | Standard TSC 513, Tractor Driven, Combine Harvester(John Deere 5310 tractor) | 12.01.2012 |
| 162 | Standard TSC 513, Tractor Driven, Combine Harvester(New Holland 3630 TX Tractor) | 12.01.2012 |
| 163 | Standard TSC 513, Tractor Driven, Combine Harvester(Same 603 DX Euro Tractor) | 12.01.2012 |
| 164 | Standard TSC 513, Tractor Driven, Combine Harvester (Mahindra 605 DI SS Tractor) | 12.01.2012 |
| 165 | Standard TSC 513, Tractor Driven, Combine Harvester (Swaraj 855 Tractor) | 12.01.2012 |
| 166 | Mahindra Gujarat Shaktimaan 55 ELX Tractor | 16.01.2012 |
| 167 | Standard TSC 513, Tractor Driven, Combine Harvester | 20.01.2012 |
| 168 | Indo Farm 3035 DI Tractor | 02.02.2012 |
| 169 | John Deere 5055E CR Tractor | 06.02.2012 |
| 170 | PM Diesels FM 900 DI Tractor | 09.02.2012 |
| 171 | John Deere 5055E V3 Tractor | 10.02.2012 |
| 172 | John Deere 5075E V2 Tractor | 16.02.2012 |
| 173 | John Deere 5055E 4WD Tractor | 17.02.2012 |
| 174 | John Deere 5055E Tractor | 17.02.2012 |
| 175 | Mahindra Gujarat Shaktimaan 614 ELX Tractor | 22.02.2012 |
| 176 | John Deere 5055E V2 Tractor | 29.02.2012 |
| 177 | Swaraj 825 XM Tractor | 16.03.2012 |

**Annexure-VII**

Annexure 7 State wise coverage of trainees in NRFMTTI (Hissar, Haryana) during XI FYP

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **State** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** |
| Arunachal Pradesh | 15 | -- | -- | -- | -- | 15 |
| Andhra Pradesh | -- | 2 | -- | -- | -- | 2 |
| Assam | -- | -- | 4 | 7 | 1 | 12 |
| A & N Islands | -- | -- | -- | -- | -- | 0 |
| Bihar | 13 | 285 | 71 | 280 | 237 | 886 |
| Chandigarh | 3 | 4 | -- | -- | -- | 7 |
| Chhattisgarh | 1 | 15 | 8 | 1 | -- | 25 |
| Delhi | 2 | 8 | 65 | 3 | 10 | 88 |
| Gujarat | 12 | -- | 10 | 6 | 27 | 55 |
| Goa | -- | 1303 | -- | -- | -- | 1303 |
| Haryana | 1435 | 3 | 1460 | 1116 | 1150 | 5164 |
| Himachal Pradesh | -- | -- | 1 | -- | 1 | 2 |
| Jammu & Kashmir | -- | 1 | 7 | 6 | 1 | 15 |
| Jharkhand | 1 | -- | 8 | 2 | 1 | 12 |
| Kerala | -- | 10 | -- | -- | 1 | 11 |
| Karnataka | 2 | 104 |  | -- | -- | 106 |
| Madhya Pradesh | 15 | -- | 7 | 52 | 40 | 114 |
| Maharashtra | 145 | -- | 46 | 88 | 114 | 393 |
| Manipur | -- | -- | -- | -- | -- | 0 |
| Mizoram | -- | -- | -- | -- | -- | 0 |
| Meghalaya | -- | -- | -- | -- | -- | 0 |
| Nagaland | -- | -- | -- | -- | -- | 0 |
| Orissa | 15 | 27 | 15 | 13 | 18 | 88 |
| Punjab | 7 | 41 | 13 | 1 | 3 | 65 |
| Pondicherri | -- | -- | -- | -- | -- | 0 |
| Rajasthan | 14 | 130 | 53 | 34 | 24 | 255 |
| Tripura | -- | -- | -- | -- | 3 | 3 |
| Tamil Nadu | -- | -- | -- | -- | 3 | 3 |
| Uttar Pradesh | 282 | 103 | 177 | 244 | 241 | 1047 |
| West Bengal | 4 | 4 | 3 | 7 | 10 | 28 |
| Sikkim | -- | -- | -- | -- | -- | 0 |
| Uttarakhand | 15 | 7 | 10 | 26 | 1 | 59 |
| Foreigner | -- | -- | -- | -- | -- | 0 |
| **Total** | **1981** | **2047** | **1958** | **1886** | **1886** | 9758 |

# 

Annexure 8 State wise coverage of trainees in SRFMTTI (Anantpur, AP) during XI FYP

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **STATE** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12** | **Total** |
| Andhra Pradesh | 424 | 441 | 826 | 900 | 919 | 3510 |
| Tamil Nadu | 62 | 366 | 167 | 165 | 194 | 954 |
| Karnataka | 563 | 192 | 256 | 316 | 264 | 1591 |
| Maharashtra | 46 | 66 | 48 | 84 | 102 | 346 |
| Orissa | 10 | 33 | 23 | 11 | -- | 77 |
| Bihar | 5 | 13 | 14 | 14 | 17 | 63 |
| Uttar Pradesh | 36 | 23 | 31 | 25 | 69 | 184 |
| West Bengal | 6 | 19 | 6 | 6 | 1 | 38 |
| Rajasthan | 6 | -- | 2 | 5 | 7 | 20 |
| Kerala | 77 | 98 | 61 | 62 | 25 | 323 |
| Madhya Pradesh | 7 | 20 | 3 | 1 | 1 | 32 |
| Uttarakhand | 6 | -- | 3 | 5 | 11 | 25 |
| Gujarat | 11 | 9 | 5 | -- | 19 | 44 |
| Punjab | 4 | -- | -- | 1 | 15 | 20 |
| Assam | 1 | -- | 1 | -- | -- | 2 |
| Chhattisgarh | 32 | 17 | 1 | 10 | -- | 60 |
| Delhi | 1 | 1 | -- | -- | 1 | 3 |
| Jammu & Kashmir | 1 | -- | -- | -- | -- | 1 |
| Jharkhand | 1 | 1 | 1 | 1 | 4 | 8 |
| Arunachal Pradesh | -- | 1 | -- | -- | -- | 1 |
| Goa | -- | -- | 2 | -- | -- | 2 |
| Haryana | -- | -- | 1 | -- | 13 | 14 |
| **TOTAL** | **1299** | **1300** | **1451** | **1606** | **1662** | **7318** |

Annexure 9 List of equipment demonstrated by CIAE, Bhopal during XI FYP

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Equipment** | **No. of trail** | **Area Covered** | **Crop** | **Net Profit (Rs./Ha)** | | |
| **FP** | **RP** | **Profit (%)** |
| Surface Drainage (V- Shape) | 22 | 36 | Soyabean Pigeon pea | 12300 | 13750 | 11.7 |
| Till Plant machine | 4 | 6 | Soyabean  Gram | 8925  10800 | 12550  13200 | 40.6  22.2 |
| Roto-till drill | 10 | 11.5 | Wheat | 12430 | 14253 | 14.6 |
| Package of practise  (Duck foot cultivator+ clod crusher + compaction unit with rotary) | 3 | 9 | Wheat | 20250 | 21250 | 4.9 |
| Plastic Culture | 2.0 | 2.0 | Guava Orchard | 32500 | 34300 | 5.5 |
| T.O Ridger | 15 | 25 | Sugarcane, Vegetable | 117900 | 121400 | 2.9 |
| Aero-blast sprayer in orchard | 5 | 5 | Orchard | 94100 | 114830 | 2.2 |
| Zero till drill | 46 | 225 | Wheat | 15640 | 17080 | 9.2 |
| Serrated sickle | 151 | 79.8 | Soybean & Wheat | 3250 |  |  |
| Rotavator | 17 | 23.5 | Tillage Operation | 3200 | 2300 |  |
| Walk behind reaper | 5 | 5 | Harvesting of Paddy and Wheat | 2600 | 1250 |  |
| Laser guided land leveller | 5 | 2.5 | Levelling | -- | -- |  |
| M.B Plough | 49 | 176 | Summer Tillage | -- | 3500 |  |
| Other Equipments | | | | | | |
| Seed treatment drum | | | | | | |
| Wheel hoe | | | | | | |
| Maize Sheller | | | | | | |
| Peg type puddler | | | | | | |
| Cage wheel type puddler | | | | | | |
| Sprinkler system | | | | | | |
| Drip System | | | | | | |

Source: CIAE, Bhopal

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Name**  **of**  **implement**  **/Machine** | | | **Crop** | | **No. of**  **Farmers** | Area  ***(ha)1*** | **Performance Parameters/indicators/Data on parameters** | | | | | | | |
| **Capacity**  **(ha/h)** | **Output** | **Labour Man(hrs/ha)** | | **Time**  **Taken (hr/ha)** | | **Cost of Operation**  **(Rs/ha)** | |
| **Demo** | **Local**  **Check** | **Demo** | **Local**  **Check** | **Demo** | **Local**  **Check** | **Demo** | **Local**  **Check** |
| Improved |  | seed | Soybean |  | 94 | 225,6 | 0,58 | 0.50 | 4.0 | 4.0 | 2.0 | 2,0 | 800 | 800 |
| cum - fert. Drill | | | Wheat | Gram, |  |  |  |  |  |  |  |  |  |  |
|  |  |  | Lenti. |  |  |  |  |  |  |  |  |  |  |  |
| Inclined |  | plate | Soybean |  | 36 | 46 | *OA* | *OAO* | 5.0 | 5.0 | 2.0 | 2,0 | 880 | 1100 |
| planter |  |  | Pigeon pea | |  |  |  |  |  |  |  |  |  |  |
| Power weeder | | | Soybean, | | 57 | 65.0 | 0.16 | 0,008 | 06 | 125 | 06 | 125 | 560 | 1250 |
|  |  |  | pigeon pea | |  |  |  |  |  |  |  |  |  |  |
| Groundnut | |  | Groundnut | | 198 | 342 q | 35 | 2 kg/h | 3 h/q | 50 h/q | 3 h/q | 50 h/q | *30 Iq* | *480 Iq* |
| Decorticator | |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Self propelled vert. | | | Soybean |  | 39 | 126 ha | 0.2 | 0.005 | 05 | 200 | 05 | 200 | 850 | 1500 |
| con, reaper | |  | Wheat |  |  |  |  |  |  |  |  |  |  |  |
| High capacity multi | | | Soybean |  | 48 | 1065 q | 8 q/h | 8 q/h | *1,O/q* | *1/q* | *10/q* | *1/q* | *50 Iq* | *50/q* |
| crop thresher (TD) | | | Wheat |  |  |  | 14q/h | 14 q/h | *O,5/q* | *0.5/q* | *0.5/q* | *0.5/q* | *25/q* | *25/q* |
|  |  |  | Gram |  |  |  |  |  |  |  |  |  |  |  |
| Power | operated | | Soybean |  | 175 | 4620 q | 6 q/h | 1 q/h | *OA/q* | *3/q* | *OA/q* | *3/q* | *4,O/q* | *30/q* |
| grain cleaner | |  | Wheat |  |  |  | 6 q/h | 1\_glh | *O.4/q* | *3/q* | *O.4/q* | *3/q* | *4,O/q* | *30/q* |
|  |  |  | Gram |  |  |  | 6 q/h | 1 q/h | *O.4/q* | *3/q* | *OA/q* | *3/q* | *4,O/q* | *30/q* |
| Ditcher (TD) | |  | Soybean |  | 27 | 25,5 | t.Oha/h | - | 2 | - | 1 | - | 700 | - |
|  |  |  | Pigeon Rea | |  |  |  |  |  |  |  |  |  |  |
| Rotavator | |  | Wheat |  | 28 | .0 | 0,5 | 0.5 | 2.0 | 4.0 | 2,0 | 4,0 | 1000 | 1600 |
|  |  |  | Soy bean |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | Gram |  |  |  |  |  |  |  |  |  |  |  |
| Sickle | Maize | | Wheat |  | 76 | 14 |  |  |  |  |  |  |  |  |
| Sheller |  |  | maize |  |  |  |  |  |  |  |  |  |  |  |
| Aero blast sprayer | | | Citrus |  | 04 | 6.5 | 15 | 0,5 | 0.066 | 4.0 | 0.066 | 4.0 | 26 | 50 |

Source: CIAE, Bhopal

**Impact of machines demonstrated**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name of Implement/Machine** | **Crop** | **No. of farmers** | **Area (Ha)** | **% Change in parameters/Techno-Economic advantage** | | | |
| **Labour Saving (%)** | **Time Saving (%)** | **Cost Saving (%)** | **Remarks** |
| Improved seed cum-fert. Drill | Soybean Wheat | 17 | 35.2 | 10 | 10-15 | 5-10 | About 10% yield difference due to better germination |
| Inclined Plate Planter | Pigeon Pea Groundnut | 10 | 10 | 5-10 | 10-12 | 25 | Cost of seed is reduced by 30% |
| Power weeder | Soybean Arhar | 10 | 12 | 95 | 95 | 55 |  |
| Pigeon pea | 11 | 14 | 95 | 95 | 55 |
| Groundnut Decorticator | Groundnut | 38 | 32.5 | 94 | 94 | 94 | Local Check = Hand Shelling |
| Self propelled vertical con. reaper | Wheat | 42 | 48 | 97 | 97 | 43 | Local Check = Harvesting by sickle |
| High capacity multi crop thresher | Soybean Wheat | 12 | 520 | Nil  Nil | Nil  Nil | Nil  Nil | Grain damage is reduced from 7.5 to 2.5% |
| Power operated grader | Soybean Wheat  Gram | 46 | 2280 | 89 | 83 | 86 |  |
| Rotavator | Wheat | 4 | 28 | 50 | 50 | 37.5 | Local Check=Duck Foot cultivation |
| Aero Blast Sprayer | Citrus,  Sugarcane,  Pigeon Pea | 8 | 5 | 98 | 98 | 50 | Local Check=Knapsack Sprayer |

Source: CIAE Bhopal

Annexure 10 List of machines tested in SRFMTTI (Anantpur, AP) during XI FYP

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl** | **Machines Tested** | **Type of Test** | **Date of Release** |
|  | Manam Power Tiller  MCF-121 | Confidential | 05/2007 |
|  | Bharat Groundnut Thresher  B-9 (Power Operated) | Commercial | 05/2007 |
|  | Jaihind Multicrop Thresher  Jumbo (Tractor Operated) | Commercial | 07/2007 |
|  | Jayant Multicrop Thresher  (Tractor Operated) | Commercial | 07/2007 |
|  | Dharti Automatic Seed  Planter(Drill) (Tractor  Mounted) | Commercial | 09/2007 |
|  | Vinayaka Nine Tyne Spring  Loaded Cultivator (Tractor  Mounted) | Commercial | 09/2007 |
|  | Vinayaka Two Bottom Disc  Plough (Tractor Mounted) | Commercial | 09/2007 |
|  | Dharanee Nine Tyne Spring  Loaded Cultivator (Tractor  Mounted) | Commercial | 09/2007 |
|  | Dharanee Five Tyne Rigid  Cultivator (Tractor Mounted) | Commercial | 09/2007 |
|  | Lakshmi Five Tyne Rigid  Cultivator (Tractor Mounted) | Commercial | 09/2007 |
|  | Vinayaka Two Bottom Fixed  MB Plough (Tractor Mounted) | Commercial | 09/2007 |
|  | Lakshmi Nine Tyne Spring  Loaded Cultivator (Tractor  Mounted) | Commercial | 09/2007 |
|  | Lakshmi Rotavator LR-36  (Chain Drive)(Tractor  Operated) | Commercial | 10/2007 |
|  | Dharanee Rotavator DA/42  MSG (Chain Drive)(Tractor  Operated) | Commercial | 10/2007 |
|  | Users’ Survey Report Angad  240D Tractor | Confidential | 10/2007 |
|  | Lakshmi Rotavator LR-42  (Chain Drive)(Tractor  Operated) | Commercial | 10/2007 |
|  | Dharanee Rotavator DA/36  SS(Chain Drive)(Tractor  Operated) | Commercial | 10/2007 |
|  | Dharti Automatic Planter  (Drill) Animal Drawn | Commercial | 11/2007 |
|  | LCT SH Power Tiller  SH-151 DI | Confidential | 12/2007 |
|  | KAMCO Power Tiller  KMB-200 | Commercial | 12/2007 |
|  | Sonalika Rotavator  SL-150 (Gear Drive) (Tractor  Operated) | Commercial | 12/2007 |
|  | Sonalika Rotavator  SL-175 (Gear Drive)(Tractor  Operated) | Commercial | 12/2007 |
|  | Soharr Power Tiller  GN-121 DI | Commercial | 01/2008 |
|  | Chakra Rotavator  CAT-369 (Chain  Drive)(Tractor Operated) | Commercial | 03/2008 |
|  | Chakra Rotavator  CAT-424 (Chain  Drive)(Tractor Operated) | Commercial | 03/2008 |
|  | Chakra Five Tyne Rigid  Arrow Type Cultivator  CAT-0500(Tractor Drawn) | Commercial | 04/2008 |
|  | Chakra Nine Tyne Spring  Loaded Cultivator  CAT-0900 Tractor Drawn) | Commercial | 04/2008 |
|  | VIJAY Power Tiller  VR-15L | Commercial | 05/2008 |
|  | SHAKTI Two Bottom  Mechanically Reversible MB  Plough (Tractor Operated) | Commercial | 05/2008 |
|  | SHAKTI Rotavator  SH-7 (Gear Drive) (Tractor  Operated) | Commercial | 05/2008 |
|  | SHAKTI Rotavator  SH-9 (Gear Drive) (Tractor  Operated) | Commercial | 05/2008 |
|  | SANTKRUPA Two Bottom  Mechanically Reversible  Plough (Tractor Operated) | Commercial | 05/2008 |
|  | SANTKRUPA Nine Tyne Rigid  Cultivator (Tractor Operated) | Commercial | 05/2008 |
|  | DHEV Rotavator  DK-36 (Chain  Drive) (Tractor Operated) | Commercial | 06/2008 |
|  | DHEV Rotavator  DK-42 (Chain Drive) (Tractor  Operated) | Commercial | 06/2008 |
|  | BIRLA Power Tiller  Birla Harit | Commercial | 07/2008 |
|  | SHREENATH Trash Cutting  Machine 540 rpm | Commercial | 9/2008 |
|  | SHRI RAM Nine Tyne Rigid  Type Cultivator SR-9R | Commercial | 09/2008 |
|  | LAKSHMI Multicrop Thresher  (Tractor Operated) | Commercial | 9/2008 |
|  | KUMAR Multicrop Thresher  (Tractor Operated) | Commercial | 09/2008 |
|  | RHINO Power Tiller  15 DI | Commercial | 10/2008 |
|  | GREAVES Power Tiller  GS-15 DIL | Commercial | 10/2008 |
|  | RI Agri Rice Transplanter 2Z  445 | Commercial | 03/2009 |
|  | Valasumani Modern Multi  Crop Thresher  VMMT Standard | Commercial | 3/2009 |
|  | Sai Offset Disc Harrow 14  Discs (Tractor Mounted) | Commercial | 03/2009 |
|  | Sai two Bottom Fixed Mould  Board Plough  Aryan (Tractor Mounted) | Commercial | 3/200 |
|  | Devakane Five Tyne Rigid  Arrow Type Cultivator  (Tractor Mounted) 5 TR | Commercial | 03/2009 |
|  | Devekane Spring Loaded  Nine Tyne /cultivator  (Tractor Mounted) 9TS | Commercial | 03/2009 |
|  | Sai Two Bottom Fixed M B  Plough  Mayur | Commercial | 03/2009 |
|  | Sai Two Bottom fixed Mound  Board Plough  (Tractor Mounted) Prince | Commercial | 03/2009 |
|  | Kumar Roravator (Tractor  Operated) | Commercial | 05/2009 |
|  | Shaktiman Semi Champion  Standard Rotavator (Tractor  Operated) SRT-8/1000 | Commercial | 05/2009 |
|  | Shaktiman Semi Champion  Standard Rotavator (Tractor  Operated) SRT-6/540 | Commercial | 5/2009 |
|  | Shaktiman Semi Champion  Standard Rotavator (Tractor  Operated) SRT-5/540 | Commercial | 05/2009 |
|  | Kumara Groundnut  Decorticator  (Power Operated) | Commercial | 06/2009 |
|  | Shaktiman Rotavator  SRT-5/550  Standard (Chain Drive),  (Tractor Operated) | Commercial | 06/2009 |
|  | Shaktiman Rotavator  SRT-6/540  Standard (Chain Drive),  (Tractor Operated) | Commercial | 06/2009 |
|  | Shaktiman Rotavator  SRT-7/1000  Semi Champion (Gear  Drive), (Tractor Operated) | Commercial | 06/2009 |
|  | Vijay Urea Briquetting  Machine (Power Operated)  Kranti Vijay | Commercial | 09/2009 |
|  | Bhaktraj Urea Briquetting  Machine (Power Operated)  Kranti Bhaktraj | Commercial | 09/2009 |
|  | Shriram Urea Briquetting  Machine (Power Operated)  Kranthi Shriram | Commercial | 09/2009 |
|  | Valasamani five type rigid  arm type Cultivater | Commercial | 10/2009 |
|  | Valsamani spring leveler  nine type cultivator | Commercial | 10/2009 |
|  | Star Rotavator FL-165 Single  Speed, Chain Drive (Tractor  Drive) | Commercial | 11/2009 |
|  | Star Rotavator FLM-185,  Multi Speed, Chain Drive  (Tractor Drive) | Commercial | 11/2009 |
|  | Star Rotavator FHM-185,  Multi Speed, Chain Drive  (Tractor Drive) | Commercial | 11/2009 |
|  | Star Rotavator FH-165 Single  Speed, Chain Drive (Tractor  Drive) | Commercial | 11/2009 |
|  | Divya Shakti Power Tiller  Divya Shakti | Commercial | 12/2009 |
|  | 9 Tyne Spring Loaded  Cultivator  9 tyne -HD | Commercial | 12/2009 |
|  | 9 Tyne Rigid Cultivator,  9 tyne With Shovel Heavy  Duty | Commercial | 12/2009 |
|  | Greaves Reaper  MY4G-120 Self Propelled | Commercial | 12/2009 |
|  | Kuhn Rotavator  EL-42-155 | Commercial | 12/2009 |
|  | SAI Single Bottom  Mechanically Reversible M.  B. Plough (Tractor Mounted),  Royal – 25 | Commercial | 01/10 |
|  | Aum Sai Chaff Cutter  1 HP Forward Gear (power  Operated) | Commercial | 03/2010 |
|  | Greaves Power Tiller  GS 14 DIL | Commercial | 03/2010 |
|  | Dragon Shakti Power Tiller  150 DI | Commercial | 04/2010 |
|  | Aum Sai Chaff Cutter  3 HP Rervese Forward Gear  (Power Operated) | Commercial | 05/2010 |
|  | Omkar Chaff Cutter  1 HP RF Tiger Safety (Power  Operated) | Commercial | 05/2010 |
|  | Omkar Chaff Cutter  3 HP RF Tiger Safety (Power  Operated) | Commercial | 05/2010 |
|  | Dashmesh Chaff Cutter  PHV 8 B Payal (Power  Operated) | Commercial | 05/2010 |
|  | Raina Rotavator  RAPL / GR – 180 (Gear  Drive) | Commercial | 05/2010 |
|  | Raina Rotavator  RAPL / CH – 180 ( Chain  Drive) | Commercial | 05/2010 |
|  | Raina Rotavator  RAPL / GR – 150 (Gear  Drive) | Commercial | 05/2010 |
|  | Mahindra Rice Transplanter  PF 455 (Walk behind Type)  (Incomplete) | Commercial | 06/2010 |
|  | Raina 9 Tyne Rigid  Cultivator | Commercial | 08/2010 |
|  | Raina 9 Tyne Spring loaded  Cultivator | Commercial | 08/2010 |
|  | Popular make two furrow  reversible MB plough,  Popular Bhoomi DLX, 50 to  60 HP | Commercial | 08/2010 |
|  | Popular make two furrow  reversible MB plough,  Popular Bhoomi DLX, 40 to  47 HP | Commercial | 8/2010 |
|  | Greaves Power Tiller  GS 14 DIL (Supplementary  Test) – Commercial | Commercial | 09/2010 |
|  | Krushivator (Rotavator)  1.25 Mtr. | Commercial | 09/2010 |
|  | Krushivator (Rotavator)  1.50 Mtr. | Commercial | 09/2010 |
|  | Krushivator (Rotavator)  1.75 Mtr. | Commercial | 09/2010 |
|  | Shaktiman Rotavator  SRT-5/540 Regular Delta  (CD) (45 to 47 HP) | Commercial | 09/2010 |
|  | Shaktiman Rotavator  SRT-6/1000(GD)  CHAMPION | Commercial | 10/2010 |
|  | Shaktiman Rotavator  SRT-5/1000  SEMICHAMPION (GD) | Commercial | 11/2010 |
|  | Shaktiman Rotavator  SRT-6/540 Regular  Delta(CD) | Commercial | 11/2010 |
|  | Shaktiman Rotavator  SRT-7/1000(CD) Champion  /multispeed | Commercial | 11/2010 |
|  | Shaktiman Rotavator  SRT-6/1000(GD) SEMI  CHAMPION | Commercial | 11/2010 |
|  | Pushpak Rotavator  PB-MS-G 1.25(G ear Drive) | Commercial | 12/2010 |
|  | Pushpak Rotavator  PB-MS-G 1.5 (G ear Drive) | Commercial | 12/2010 |
|  | Pushpak Rotavator  PB-MS-G1.8 (G ear Drive ) | Commercial | 12/2010 |
|  | Pushpak Rotavator  PB-MS-G 2.1 (G ear Drive) | Commercial | 12/2010 |
|  | Pushpak Rotavator  RB 1.5(Chain Drive) | Commercial | 12/2010 |
|  | Macson (Power Tiller)  MS 15L | Confidential | 03/2011 |
|  | Yanmar Shakti 121 DI  (Power Tiller) | Commercial | 03/2011 |
|  | Roto Tiller 320 F  (Weeder) [Incomplete] | Commercial | 03/2011 |
|  | Roto Tiller  I 216-C  (Weeder) [Incomplete] | Commercial | 03/2011 |
|  | Greaves Paddy  Transplanter  2Z-CZ8  (Machine) | Commercial | 03/2011 |
|  | Feeding Hopper G1 | Commercial | 03/2011 |
|  | Feeding Chute G2 | Commercial | 03/2011 |
|  | Greaves Power Tiller  GS-14 DLX(variant) | Commercial | 03/2011 |
|  | Feeding Chute Guatam  Divella Thresher  G-3 (Tractor Operated) | Commercial | 04/2011 |
|  | Feeding Hopper Seema  Devela Mekka Thresher,  S1 (Tractor Operated) | Commercial | 04/2011 |
|  | Feeding Hopper Jai Kishan  Groundnut Muticrop  Thresher,  J1 (Tractor Operated) | Commercial | 04/2011 |
|  | Feeding Hopper Untti devela  Mekka Thresher,  U1 (Tractor Operated) | Commercial | 04/2011 |
|  | Feeding Hopper Bharat  Super Devela Mekka  Thresher,  Model BS1(Tractor  Operated) | Commercial | 04/2011 |
|  | Feeding Hopper Shakti  Devela Mekka Thresher,  S1(Tractor Operrated) | Commercial | 04/2011 |
|  | Feeding Chute Apollo  Multicrop Thresher,  A1 (Tractor Operated) | Commercial | 04/2011 |
|  | Pragati Nine Tyne Rigid Type  Cultivator (Tractor Mounted) | Commercial | 06/2011 |
|  | Pragati Two Bottom Fixed  Mould Board Plough,  PAI (TractorMounted) | Commercial | 08/2011 |
|  | Yanmar Rice Transplanter,  VP8D (Riding Type) | Commercial | 08/2011 |
|  | Sai (Mayur)Two Bottom  Mechanically Reversible  M.B.Plough (Tractor  Mounted) | Commercial | 08/2011 |
|  | Sai (Mayur) Single Bottom  Mechanically Reversible  M.B.Plough (Tractor  Mounted) | Commercial | 08/2011 |
|  | Sri Manju Five Tyne Rigid  Arrow Tyne Cultivator  (Tractor Mounted) | Commercial | 08/2011 |
|  | Sri Manju Spring Loaded  Nine Tyne Cultivator  (Tractor Mounted) | Commercial | 09/2011 |
|  | Siam Kubota Power Tiller  RT140DI-RP-80 | Commercial | 09/2011 |
|  | Sai (Mayur) Rotavator  Sai Rotavator Original  Deluxe (Chain Drive)  (Tractor Operated) | Commercial | 09/2011 |
|  | Raina Rotavator  RAPL/GR-1.25 (Gear Drive)  (Tractor Operated) | Commercial | 09/2011 |
|  | Sunrise Power Tiller  SUNRISE DI | Commercial | 10/2011 |
|  | Yanmar Shakti Power Tiller  121 DI | Commercial | 10/2011 |
|  | Ganga Power Tiller  GM-16 | Commercial | 10/2011 |
|  | Ganga Power Tiller  ARJUN-GM-15 | Commercial | 10/2011 |
|  | Diamond Rotavator DA 27  (Tractor Operated) | Commercial | 10/2011 |
|  | Diamond Rotavator DA225  (Tractor Operated) | Commercial | 10/2011 |
|  | Mahindra Rice Transplanter,  MP46  (Walking type) | Commercial | 11/2011 |
|  | Greaves Power Tiller,  GS 12 DLX (Incomplete) | Commercial | 12/2011 |
|  | Redlands Rice Transplanter,  Champion RP 824 (Self  Propelled) (Riding Type)  (INCOMPLETE) | Commercial | 12/2011 |
|  | NIPHA Groundnut Digger  Shaker Windrower  2R DSW 1 (Tractor  Operated) | Commercial | 12/2011 |
|  | Sigma Power Tiller  SIGMA PLUS V2 EM | Confidential | 01/2012 |
|  | LANDKING Rotavator,  LRT-4 (GearDrive) (Tractor  Operated) | Commercial | 02/2012 |
|  | LANDKING Rotavator,  LRT-6 (Gear Drive) (Tractor  Operated) | Commercial | 02/2012 |
|  | Ganga Sifang Power Tiller  BHIM | Commercial | 02/2012 |
|  | Balaji Two Bottom  Reversible M.B.Plough  (45HP) (Tractor Mounted) | Commercial | 03/2012 |
|  | Dhartiputra Rotavator  DRT-7 feet (Gear Drive)  (Tractor Operated) | Commercial | 03/2012 |
|  | Premier Rice Transplanter  GARUDA 3PT350 (Walk  behind type) | Commercial | 03/2012 |
|  | Fortune Rice Transplanter  FAI-2ZT-4  (Walk behind type) | Commercial | 03/2012 |

Annexure 11 List of machineries tested by NERFMTTI (Biswanath Chariali, Assam) during XI FYP

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 2007-2008 | | | | |
| 1 | Paras Seed cum  Fertilizer Drill | Imp.25/52/2007 | April, 2007 | M/s Bothara Foundary and Machine Works,  Nagar-Pune Road, Ahmednagar-414005(M.S.) |
| 2 | Paras Two Bottom  Mechanically Reversible MB Plough | Imp.26/53/2007 | May, 2007 | M/s Bothara Foundary and Machine Works,  Nagar-Pune Road, Ahmednagar-414005(M.S.) |
| 3 | Khedut Seed cum  Fertilizer Drill  (Tractor Drawn) | Imp.27/54/2007 | June, 2007 | M/s R.K. Agro Industries, Junagadh (Gujarat)-  362003 |
| 4 | Paras Single Bottom  Reversible MB Plough | Imp.28/55/2007 | Aug, 2007 | M/s Bothara Foundary and Machine Works,  Nagar-Pune Road, Ahmednagar-414005(M.S.) |
| 5 | Greenfield Rotavator | Imp.29/56/2007 | Aug, 2007 | M/s Nabha Agro Works, Patiala Road, Nabha,  Distt.- Patiala (Punjab) Pin-147201 |
| 6 | Golden Punjab  Rotavator | Imp.30/57/2007 | Sept, 2007 | M/s Punjab Engineering Works, G.T. Road,  Talwandi Bhai (Ferzepur) Punjab-142050 |
| 7 | Khedut Seed Drill  (Bullock Operated) | Imp.31/58/2007 | October,  2007 | M/s R.K. Agro Industries, Junagadh (Gujarat)-  362003 |
| 8 | Sahu Rotavator | Imp.32/59/2007 | Oct, 2007 | M/s Sahu Agrotech, Nagar Parishad Road,  Vardha-442001 |
| 9 | Sahu Post Hole  Digger | Imp.33/60/2007 | Nov, 2007 | M/s Sahu Agrotech, Nagar Parishad Road,  Vardha-442001 |
| 10 | Sahu 2-Bottom  Reversible Plough | Imp.34/61/2008 | Jan, 2008 | M/s Sahu Agrotech, Nagar Parishad Road,  Vardha-442001 |
| 11 | Feeding Chute of  Khodiyar Multicrop  Thresher | C-1/62 | March, 2008 | Khodiyar Agro Industries, Visnagar, Mehsana  (North Gujarat) Pin – 384315 |
| 2008-2009 | | | | |
| 1 | Feeding Chute of Best  Multicrop Thresher | C-2/63 | April, 2008 | Best Engineering Works,At post – Elol, Ta:-  Himatnagar, Dist.-Sabarkantha (Gujarat) |
| 2 | Feeding Chute of  Shakti Multicro  Thresher | C-3/64 | May, 2008 | Shakti Agrl. Industries, Khenalu Road, Nr.  Span Mega Mall, Visnagar (North Gujarat) |
| 3 | Feeding Chute of  Marshal Multicrop  Thresher | C-4/65 | May, 2008 | M/s Marshal Agro, Urja - Siddhampur  Highway Centre, Mehsana (Gujarat) |
| 4 | Feeding Chute of  Vinod Multicrop  Thresher | C-5/66 | June, 2008 | M/s Vinod Engineering Works, At: Urjha,  Dist.- Mehsana (Gujarat) |
| 5 | ‘Baba’ Rotavator | Imp.35/67 | June, 2008 | M/s Baba Farm Equipments, J-1, Industrial  Area, Behind Parag Diary, Begrajpur, Muzaffarnagar (UP) |
| 6 | S. Kumar Rotavator | Imp.36/68 | July, 2008 | M/s Gobind Industries Pvt. Ltd., Near  Safejabad Railway Crossing, Lucknow Road, Barabanki (UP) -225001 |
| 7 | Hoque Paddy  Thresher | TH-1/69 | July, 2008 | M/s Madina Engineering Workshop, Vill + PO  – Moirabari, Dist.- Morigaon (Assam) |
| 8 | Sikhar Paddy  winnowing fan | Equip-7/70 | Aug, 2008 | M/s Jyoti Industries, New Gory Mandi Road,  Pandri, Tarai, Raipur (CG)-492004 |
| 9 | Dashmesh-642  Rotavattor | Imp.37/71 | Sept, 2008 | M/s Dashmesh Agricultural Industries, Raikot  Road, Malerkotla, Dist.- Sangrur (Punjab)-  148023 |
| 10 | Avtar-513 | Imp.38/72 | Oct, 2008 | M/s Avtar Singh & Sons, Bus Stand Road,  Ahmedgarh, Dist.- Sangrur (Punjab)-148021 |
| 11 | Maxtill F-38 Rotary  Tiller | RT-1/73 | Nov, 2008 | M/s Maxtone Petrochemicals, 1A, Merlin  Basera, 13B, Ramesh Mitra Road, Kolkata-  700025 |
| 12 | Feeding Chute of  ‘Devarshi’ Multicrop  Thresher | C-6/74 | Jan, 2009 | M/s Devarshi Agro Industries, At & Ta –  Visnagar, Dist.- Mehsana (North Gujarat) |
| 13 | Feeding Chute of  ‘Supertech’ Multicrop Thresher | C-7/75 | Feb, 2009 | M/s Supertech Agro Industries, Ahmedabad  (Gujarat) |
| 14 | S. Kumar Disc harrow | Imp.39/76 | March, 2009 | M/s Gobind Industries Pvt. Ltd., Near  Safedabad Raiway Crossing, Lucknow Road,  Barabanki (UP)-225001 |
| 15 | Ganesh Cultivator | Imp.40/77 | March, 2009 | M/s Ganesh Agro Equipments, At Post- Vadpura, Kalol – Mehsana Highway, Ta.-  Kadi, Dist.- Mehsana (Gujarat) |
| 16 | Bhumi Cultivator | Imp.41/78 | March, 2009 | M/s Bhumi Agriculture, NearBij Nigam  Office, B/h. Vaishali Cinema, Himmatnagar  (Gujarat) |
| 17 | Jagatjit Rotavator | Imp.42/79 | March, 2009 | M/s Modern Engineering Company,Mansa  Road,Cheema Mandi,Dist: Sangrur (Punjab), |
| 2009-2010 | | | | |
| 1 | Dharti Seed Drill | Imp.43/80 | May, 2009 | M/s Dharti Agro Industries, Motipura,  Himmatnagar, (North Gujarat) – 383001 |
| 2 | Dharti Seed cum  Fertilizer Drill | Imp.44/81 | May, 2009 | M/s Dharti Agro Industries, Motipura,  Himmatnagar, (North Gujarat) – 383001 |
| 3 | S. Kumar Cultivator | Imp.45/82 | June, 2009 | M/s Gobind Industries Pvt. Ltd., Near  Safedabad Raiway Crossing, Lucknow Road, Barabanki (UP)-225001 |
| 4 | S. Kumar 2 bottom  MB Plough | Imp.46/83 | July, 2009 | M/s Gobind Industries Pvt. Ltd., Near  Safedabad Raiway Crossing, Lucknow Road, Barabanki (UP)-225001 |
| 5 | MB RT -61 Rotavator  (Tractor Drawn) | Imp.47/84 | July, 2009 | M/s MB Exports Ltd., 2224 Dashmeshnagar,  Street No. 16, Gill Road, Ludhiana (Punjab) -  141003 |
| 6 | Oleo-Mac Paddy-  cum- Weeds Cutter  Model- Sparta- 44 | Equip.-8/85 | Nov, 09 | Ratnagiri Impex Pvt. Ltd., New Guddadahalli,  Mysore Road, Banlore- 560026 |
| 7 | OM Rotavator | Imp.48/86 | Nov, 09 | Shri Venkateshwara Industries Kalmana  Market Road, NAGPUR-440035 |
| 8 | OM 9 Tyne Cultivator | Imp.49/87 | Nov, 09 | -do- |
| 9 | Chetak Rotavator | Imp. 50/88 | Nov, 09 | Chetak Agro Industries, S-17-18, Industrial  Area, Site No.-1 (U.P) |
| 10 | Bharat BRB 1.50  rotavator | Imp. 51/89 | Nov, 09 | Trans-Mech Systems, C-13,14 MIDC,  Bhigwan Road, Baramati- 413113 |
| 11 | OM Two Bottom  Reversible Plough | Imp. 52/90 | Nov, 09 | Shri Venkateshwara Industries Kalmana  Market Road, NAGPUR-440035 |
| 12 | Bharat BRB-C-1.25  rotavator | Imp. 53/91 | Nov, 09 | Trans-Mech Systems, C-13,14 MIDC,  Bhigwan Road, Baramati- 413113 |
| 13 | Ganesh Potato Planter  (automatic) | Imp. 54/92 | Dec, 09 | M/s Ganesh Agro Equipment, At Post-  Vadpura, Kalol- Mehsana Highway, Ta. Kadi, Distt Mehsana (Gujarat) |
| 14 | Vijeta Rotavator  GRT-155 | Imp. 55/93 | January, 10 | Farm Tek Implements, Continental Industry  Complex, Pune- (M.S) |
| 15 | Vijeta Rotavator  GRT-180 | Imp. 56/94 | January, 10 | Farm Tek Implements, Continental Industry  Complex, Pune- (M.S) |
| 16 | Oleomac Rotary  Tiller MT-180 GT | RT-2/95 | March, 10 | Ratnagiri Impex Pvt. Ltd., New Guddadahalli,  Mysore Road, Banlore- 560026 |
| 17 | Popular  PRB-5  Rotavator | Imp. 57/96 | March, 10 | Popular Steel Works & Agriculture  Implements Pvt.Ltd., Kolhapur – 416008 (Maharashtra) |
| 18 | Popular  PRB-6  Rotavator | Imp. 58/97 | March, 10 | Popular Steel Works & Agriculture  Implements Pvt.Ltd., Kolhapur – 416008 (Maharashtra) |
| 19 | Shrachi Reaper | RP-1/100 | March, 10 | Bengol Tools Ltd. (Agro Divn.). 2, Jessore  Road, Dumdum, KOLKATA- 700028 |
| 20 | Raina RAPL/ CH-150  Rotavator | Imp. 59/99 | March, 10 | Raina Agri.Co.Pvt. Ltd.,Agricultural  Implements Farm Machinery, U-  155,MIDC,Nagpur. |
| 21 | Paras Two bottom hydraulic reversible | Imp. 60/100 | March, 10 | M/s Bothara Foundary and Machine Works, Nagar-Pune Road, Ahmednagar-414005(M.S.) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | plough |  |  |  |
| 22 | Varsha 2009 M. B.  Plough | Imp. 61/101 | March, 10 | Shree Bharat Electric Welding Works, Budha,  Dist- Mandsur (M.P) |
| 23 | Varsha 2009 9- tyne  rigid cultivator | Imp. 62/102 | March, 10 | Shree Bharat Electric Welding Works, Budha,  Dist- Mandsur (M.P) |
| 24 | MB RT-4 Rotavator | Imp. 32/103 | March, 10 | M.B Exports Ltd.,2224- Deshmeshnagar Street  No.-16, Gill Road,Ludhiana- 141003 Punjab. |
| 25 | MB RT-5 Rotavator | Imp. 63/104 | March, 10 | -do- |
| 2010-2011 | | | | |
| 1 | ‘Jagatjit JR-  424’Rotavator  (Tractor Operated) | Imp. 65/105 | April,2010 | M/s Saron Mechanical Works, Mansa Road,  Cheema Mandi,Dist: Sangrur (Punjab) 148 029 |
| 2 | ‘Jagatjit JR-530’  Rotavator  (Tractor operated) | Imp. 66/106 | April,2010 | -do- |
| 3 | ‘Mousam Model: T-1  Seed cum fertilizer  drill’ (Tractor Drawn) | Imp. 67/107 | June, 2010 | M/s Mausam Agro Pvt. Ltd., Dist- Rajkot  (Gujrat) - 360 024 |
| 4 | ‘Paras 14” Two  Bottom Mechanically  Reversible Plough’  (Tractor operated) | Imp. 68/108 | June, 2010 | M/s Bothara Foundary and Machine Works, Nagar-Pune Road, Ahmednagar-414005(M.S.) |
| 5 | ‘SWAN NSE– RT  200’ Rotavator  (Tractor operated) | Imp. 69/109 | June, 2010 | M/s New Swan Enterprises (Agro Tech  Division), C-213, Phase VIII Focal Point, Ludhiana (Punjab) 141 010 |
| 6 | ‘Paras P.R.V. 1.25 ’  Rotavator (Tractor operated) | Imp. 70/110 | June, 2010 | M/s Bothara Foundary and Machine Works,  Nagar-Pune Road, Ahmednagar-414005(M.S.) |
| 7 | ‘Ankita Pradhan Two  Bottom Mechanically. Reversible M.B. Plough’(Tractor operated) | Imp. 71/111 | June, 2010 | M/s Ankita Agro Engg., K-37, M.I.D.C.,  Waluj, Aurangabad, Maharashtra 431 136 |
| 8 | ‘Farmking Model: FKRT-17542  Rotavator’ | Imp. 72/112 | June, 2010 | Shri Kanhaiyal Ramratan krishi Yantra Laghu  Udyog, Rampura, Dabari,Jaipur(Rajasthan)  303 704 |
| 9 | ‘Om Urea Briquetting  Machine’ | Imp. 73/113 | July, 2010 | Shri Venkateshwara Industries Kalmana  Market Road, NAGPUR-440035 |
| 10 | ‘Farmking FKRT  12530’ Rotavator | Imp. 74/114 | Oct., 2010 | Shri Kanhaiyal Ramratan krishi Yantra Laghu  Udyog, Rampura, Dabari,Jaipur(Rajasthan)  303 704 |
| 11 | ‘Farmking FKRT  15036’ Rotavator | Imp. 75/115 | Oct., 2010 | -do- |
| 12 | ‘Farmking FKRT  20048’ Rotavator | Imp. 76/116 | Oct., 2010 | -do- |
| 13 | ‘New Swan Rotavator  Model:6 ft’ | Imp. 77/117 | Dec., 2010 | M/s New Swan Enterprises (Agro Tech  Division), C-213, Phase VIII Focal Point, Ludhiana (Punjab) 141 010 |
| 14 | ‘Swan Rotavator 5 ft’ | Imp. 78/118 | Dec., 2010 | -do- |
| 15 | ‘Swan Rotavator 4 ft’ | Imp. 79/119 | Dec., 2010 | -do- |
| 16 | ‘Paras Automatic  Seed cum Fertilizer Drill’ (Animal Drawn) | Imp. 80/120 | Feb.,2011 | M/s Bothara Foundary and Machine Works,  Nagar-Pune Road, Ahmednagar-414005(M.S.) |
| 17 | ‘Paras Seed cum  Fertilizer Drill’  (Tractor Drawn) | Imp. 81/121 | Feb.,2011 | -do- |
| 18 | ‘Shivaji Cono  Weeder’ | Imp. 82/122 | Mar, 2011 | M/s Ramteke Agricultural works, At and Post  Khandala, Sakoli, Bhandara (MS) – 441 802 |
| 19 | ‘Om Cono Weeder’ | Imp. 83/123 | Mar, 2011 | Shri Venkateshwara Industries Kalmana  Market Road, NAGPUR-440035 |
| 20 | ‘Landking Rotavator  Model : 500’ | Imp. 84/124 | Mar, 2011 | M/s A.T. Fluid Power Pvt. Ltd., Kalawad  Road, Vajadi-Vad, Dist: Rajkot. |

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| 21 | ‘Om Seed cum  fertilizer drill’  (Bullock Drawn) | Imp. 85/125 | Mar, 2011 | Shri Venkateshwara Industries Kalmana  Market Road, NAGPUR-440035 |
| 22 | ‘Om Serrated Sickle’ | HT. 22/126 | Mar, 2011 | -do- |
| 23 | ‘Om Pedal Operated  Paddy Thresher’ | Equip. 09/127 | Mar, 2011 | -do- |
| 24 | ‘Om Winnowing Fan’  (Manual) | Equip. 10/128 | Mar, 2011 | -do- |
| 25 | ‘Fieldking FK-150  Rotavator’ (Tractor  mounted) | Imp. 86/129 | Mar, 2011 | M/s Beri Udyog Pvt. Ltd.Plot No.-100-101,  HSIDC, Sector-3, Karnal (Haryana) – 132 001 |
| 26 | ‘SHAKTI SKT-03  GL Rotavator’  (Tractor mounted) | Imp. 87/130 | Mar, 2011 | M/s Pace Agro Pvt. Ltd., 401-Ratan Esquire  Building, 14/43 Chunniganj, Kanpur (U.P.) –  208 001 |
| 27 | ‘SHAKTI SKT-04  GL Rotavator’  (Tractor mounted) | Imp. 88/131 | March, 2011 | -do- |
| 2011-2012 | | | | |
| 1 | Nipha NP-1500  Rotavator (Tractor mounted) | Imp. 89/132 | May, 2011 | M/s Nipha Exprot (P) Ltd, Regt. Office, 28/1  Shakelpare, Sarani Kolkata -17 |
| 2 | Multi-Row Jute Seed  Drill (Manually- Operated) | Imp. 90/133 | May, 2011 | Central Research Institute for Jute and Allied  Fibres, Barrackpore, Kolkata |
| 3 | Paras Chaff Cutter  (Power-operated) | Equip. 11/134 | July, 2011 | M/s Bothara Foundaru & Machine Works,  Industrial Estate Nagar Pune, Ahmednagar  (MS) |
| 4 | Fieldking FK 200  Rotavator (Tractor-  mounted) | Imp. 91/135 | July, 2011 | M/s Beri Udyog Pvt. Ltd., Regd. Office 100-  101, Sector-3, HSIIDC, Karrnal (Haryana) |
| 5 | NIPHA NP 1750  Rotavator (Tractor - mounted) | Imp. 92/136 | Aug, 2011 | M/s Nipha Exprot (P) Ltd, Regt. Office, 28/1  Shakelpare, Sarani Kolkata -17 |
| 6 | Krishi Usha HHP-1  Weeder | Imp. 93/137 | Aug, 2011 | Krishi Gram Vikas Kendra, M/S Usha Martin  Ltd., Tatisilwai, Ranchi, Jharkhand |
| 7 | BABA BRTG - 175  rotavator (Tractor- mounted) | Imp. 94/138 | Aug, 2011 | BABA FARM EQUIPMENTS, J-1 Industrial  Area, Begrajpur -251 203, Muzaffar Nagar  (U.P.) |
| 8 | TATA RT-MG-748L-  540  Rotavator (Tractor  Mounted) | Imp. 95/139 | Sept, 2011 | TATA STEEL LTD, Agrico Division,  Bistupur,Jamshedpur – 831 001 |
| 9 | BABA BRTG - 150  Rotavator (Tractor mounted) | Imp. 96/140 | Sept, 2011 | BABA FARM EQUIPMENTS, J-1 Industrial  Area, Begrajpur -251 203, Muzaffar Nagar  (U.P.) |
| 10 | TATA RT-MG-642L-  540 Rotavator  (Tractor Mounted) | Imp. 97/141 | Oct, 2011 | TATA STEEL LTD, Agrico Division,  Bistupur,Jamshedpur – 831 001 |
| 11 | BABA BRTG - 125  Rotavator (Tractor mounted) | Imp. 98/142 | Oct, 2011 | TATA STEEL LTD, Agrico Division,  Bistupur,Jamshedpur – 831 001 |
| 12 | Om seed drill (Tractor  Mounted) | Imp. 99/143 | Oct, 2011 | Shri Venkateshwara Industries Kalmana  Market Road, NAGPUR-440035 |
| 13 | TATA RT – MG -  536L- 540 Rotavator  (Tractor Mounted) | Imp. 100/144 | Nov, 2011 | TATA STEEL LTD, Agrico Division,  Bistupur,Jamshedpur – 831 001 |
| 14 | TATA RT – MG -  430L- 540 Rotavator  (Tractor Mounted) | Imp. 101/145 | Nov, 2011 | -do- |
| 15 | Jai Kisan  Mechanically Reversible Two- Bottom MB Plough | Imp. 102/146 | Dec, 2011 | M/s Balaji Engineering Works  Plot no. 683, MIDC Ahmednagar (MS)  414111 |

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| 16 | Krishi Usha HHP-1  Paddy Weeder | Imp. 103/147 | Dec. 2011 | Krishi Gram Vikas Kendra,  M/S Usha Martin Ltd., Tatisilwai, Ranchi,  Jharkhand |
| 17 | Mahan Primo 2010  Self Propelled Rotary  Tiller | RT-3/148 | Feb, 2012 | M.N. Agro Industires, Nava Falia, Velanja,  Taluka: kamrej, Distt. Surat (Gujrat)- 394 150 |
| 18 | Honda UMK435T  U2ST Brush Cum Paddy Cutter (self- Propelled) | Equip. 12/149 | Feb, 2012 | Honda Siel Power Products Ltd., Greater  Noida Industrial Development Area, Disttl  Gautam Budh Nagar (U.P.)-201 306 |
| 19 | TAS Professional  Weeder/ Bush Cutter And Accessories (Self Propelled) | Equip. 13/150 | Mar, 2012 | Tilak Akriti Service Agro, Division 2, Ground  floor, Kolkata 700001 |

1. UL= User Level, TL= Technical Level, ML=Management Level, AL= Academic Level, NB=Need Based Training [↑](#footnote-ref-1)
2. Comprise of states Rajasthan, Gujarat, Maharashtra, Uttar Pradesh and Chhattisgarh. [↑](#footnote-ref-2)
3. Comprise of Punjab, Chandigarh, Rajasthan, Himachal Pradesh, Uttarakhand and Uttar Pradesh. [↑](#footnote-ref-3)
4. Comprise of states Orissa, Chhattisgarh, Maharashtra, Karnataka & Tamil Nadu [↑](#footnote-ref-4)
5. Not Available [↑](#footnote-ref-5)
6. Trainees specific to FMTTI who were interviewed during the study. [↑](#footnote-ref-6)
7. Specifically estimated for farming Activities. [↑](#footnote-ref-7)
8. Specifically estimated for Technicians and Operators operating Farm Machineries. [↑](#footnote-ref-8)
9. Training and Demonstrations were conducted; however actual numbers were not available. Verified from the filed visits and interaction with beneficiaries of program. [↑](#footnote-ref-9)
10. Figures in parentheses indicates the standard deviation. [↑](#footnote-ref-10)
11. Estimated for Rice in West Bengal, Odisha and Tamil Nadu while for Wheat in Madhya Pradesh [↑](#footnote-ref-11)