

‘Yantradoot Villages’ in Madhya Pradesh



Prepared for:

Directorate of Agriculture Engineering,
Govt. of Madhya Pradesh
under
Small Farmers’ Agribusiness Consortium



PREPARED BY



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REPORT NO. – IWIN/12-13/F/DPR/R0/026

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EXECUTIVE SUMMARY

The use of mechanized power for agricultural purpose reduces not just the hardship faced by farmers under traditional manual practices but also speeds up agricultural processes, saves costs and enhances agricultural productivity. These benefits of farm mechanization among many others have driven Indian states to motivate their farmers for switching over to the use of modern farm equipments.

One such mechanization drive that stands out among all such efforts relates to the implementation of the Yantra Doot Village Scheme in Madhya Pradesh. Under this scheme, district level officers of the Department of Agriculture Engineering periodically demonstrate the use of farm implements to farmers in villages spread across districts in the state and make these implements available on hire by the agricultural community at nominal prices.

The uniqueness of the Yantradoot lies in its impact driven approach. Under Yantradoot each of these villages are being turned into complete models for agricultural mechanization. Farmers in these villages are using modern farm tools for each stage in the production of their crops. Such mechanization is resulting in a reduction of their agricultural input costs as they require lesser seeds, fertilizers, pesticides, human and animal labour etc for conducting their farming exercises. Further, increased mechanization is resulting in an increase in the agricultural productivity of farmers because now their crops are being sown, irrigated, treated and harvested adequately and timely. Farmers' income as well as standard of living has also seen an increase in the past two years that the scheme has been operational. As a result of these outcomes, many nearby villages are also switching over to the Yantra Doot model of farm mechanization.

By implementing the Yantra Doot scheme through Directorate of Agricultural Engineering, Madhya Pradesh, the Government of Madhya Pradesh is creating an access to advanced agricultural technologies and machinery among farmers in the rural areas and subsequently increasing the overall agricultural productivity of the state and empowering its farming community. Initially 25 other villages were chosen for this kind of development in the year 2010-11. With a view of spreading this program another 14 villages were included in the year 2011-12.

The scheme is implemented through district level agricultural engineering officers who set up custom hiring centres in the villages so farmers can avail the machines. Since demand of machines are high as each one of the farmer need same machine at the same time, a farmers committee is formed where farmers maintain a log book regarding who gets machine at what time.

A five prolonged methodology has been used such as Reconnaissance survey, Extensive secondary research, Stakeholder meet & feedback, Structured interview and Focus group discussion to conduct the survey.

The effect of the scheme can be seen clearly in the increasing productivity of crops like soybean, paddy, wheat, gram, lentil etc. More than 60% to 85% increase can be observed for various crops. Other than increase in productivity, 75% to 100% increase in income can be observed for majority of farmers. Apart from these the scheme also helped the farmers to expand their knowledge base regarding use modern agricultural methods, techniques and machineries.

After implementation of Yantra Doot the following changes have been observed in some major crops:

- 79% increase in productivity of Soybean.

- 83% increase in productivity of Paddy.
- 63% increase in productivity of Wheat.
- 81% increase in productivity of Gram.

Even though the scheme has been successfully implemented in various villages for one year, the tenure of the scheme can be extended to two year so the farmers can have a better understanding and knowledge about the scheme and its effects. For very backward tribal villages it can be extended to more than two years.

The scheme Yantra Doot left a major impact on all types of crop production in Madhya Pradesh. The main findings of the study are as follows:

- Production of crops almost doubled after the implementation of the scheme.
- Farmers' earning has increased many folds so there socio-economic status has improved.
- Farmers' knowledge base regarding the use of new techniques and machineries has increased.
- The scheme has increased output level without any major increase in input cost.

One of the main goals of the scheme is to make farmers knowledgeable and financially sustainable so that they can buy farming machineries themselves after seeing the benefits through the scheme. Subsidy should be provided to farmers to help them buy agricultural machinery and they should be encouraged to rent those machines to other farmers which can inturn reduce the burden on agriculture officials to provide more machines to a single village and can help them to implement the scheme on many more new villages.

The farmers are brilliantly coping up with the Yantra Doot scheme. A few suggestive measurers will be like icing on the cake, the measures are following:

- The tenure of the scheme for one village should be increased.
- Supplies of machineries should be increased to each village.
- Subsidy should be provided to farmers to encourage them to buy agricultural machinery.
- As the rainfall is not adequate, hence proper irrigation facilities have to be set up in order to fulfill the excess demand for water.
- Available area has to be reformed to bring in more and more part under cultivation in order to increase the scale and volume of production.

CHAPTER 1

Introduction

India is primarily an agricultural country. Over the ages, Indian farmers have mainly used human and animated power and traditional methods passed onto them by their ancestors for cultivation of various agricultural crops. There was not much use of mechanical power in farming practices. These traditional farming practices are time consuming, require huge amounts of human labour and effort and depend heavily on climate & nature. Also they often fail to utilize full capacity of the agricultural land and seed.

The use of mechanical power and new technology for agricultural purposes reduces not just the labour of farmers under traditional manual practices but also speeds up agricultural processes, reduces the cost of operation by ensuring better management of costly inputs, enhances agricultural productivity and reduces dependency on nature & climate for agricultural purposes.

Over the years Indian farmers have been informed about different farm mechanization techniques and equipments used in farming and its various uses and positive aspects. These benefits have encouraged various Indian states to motivate their farmers to use more modern farm equipments and techniques.

One such effort relates to the implementation of the Yantra Doot Village Scheme in Madhya Pradesh. Under this scheme, district level officers of the Department of Agriculture Engineering periodically demonstrate the use of farm implements to farmers spread across villages of Madhya Pradesh and make these implements available for hire by the agricultural community at nominal prices.

Background

The Yantra Doot Yojana started its implementation from the village of Matha in the district of Satna in MP. In the year 2009-10 a special campaign of farm mechanization was started with 155 farmers of this village. The village was very backward in the field of agricultural techniques and so there was no benefit from farming to the small and bordering farmers. So the farmers used to work in the near by cement factory. Summer cultivation of the field was done by new innovative & highly mechanized farm equipment like the rotavator, seed grading was done by the seed grader, sowing was done by double box seed cum fertilizer drill instead of single box, ridge furrow & ridge bed planter was also used and broad Weeder & insect controller. Mechanized harvesting and threshing was done. Great results were achieved using this technique. The per capita yield was much more in only one season of Rabi. There was an increase in per hectare production of wheat & gram.

Taking the model of village Matha, 25 other villages were chosen for this kind of development in the year 2010-11. With a view of spreading this program another 14 villages were included in the year 2011-12

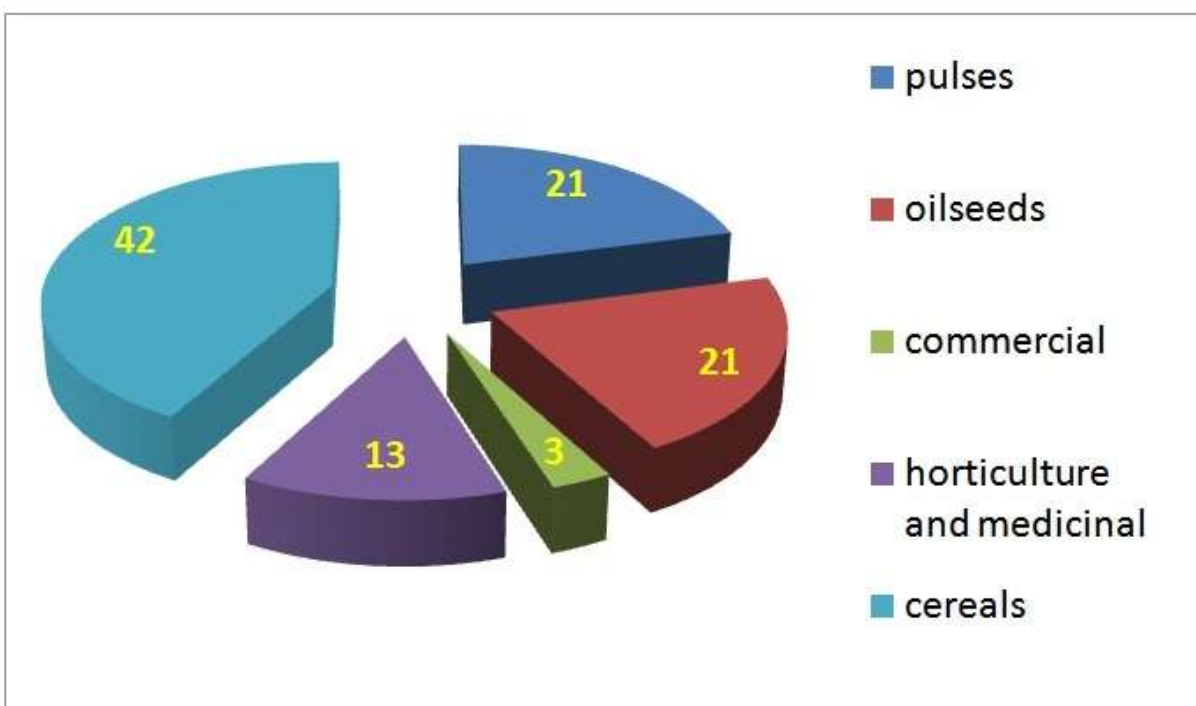
Initially when the scheme was launched government charged Rs.325 per hour & Rs.10 per km as travel cost for each machine. From September, 2012 the rent for each machine is increased to Rs.410 per hour & Rs.15 per km as travel cost from custom centre to field.

Scheme Applicability in the Context of Madhya Pradesh's Agriculture

The state ranks 1st in production of Soybean and Gram in India. There are 50 districts in the states and almost all the districts are involved in the cultivation of Soybean and Gram. The state has an area of 113 lakh hectares under Kharif crops in the year 2011. Other major crops in Madhya Pradesh are Aharar, Tur, Jowar, Maize, Channa (gram) etc. The state has 11 agro climatic zones.

- Geographical area of the state is 30.744 million hectares out of which net cultivated area is 14.838 million hectares.
- Two sowing seasons: Kharif -10.666 million ha. & Rabi - 8.428 million ha.
- Area under double crop : 5.378 million ha
- Irrigated Area 43.30%
- Cropping intensity 136 %

There are basically 5 major crop types in Madhya Pradesh. The area wise division of cultivated area under them are depicted in the following pie diagram.



Major Crops of MP and Rank in India

Crop	All India Production (in MMT)	Production in MP (in MMT)	Percentage of production to national total	All India Rank
Soybean	8.85	4.78	54.01%	1st
Gram	6.33	2.41	38.07%	1st
Pulses	14.2	3.2	22.54%	1st
Lentil	0.91	0.26	28.57%	2nd
Rapeseed & Mustard	7.44	0.69	9.27%	4th
Wheat	75.81	7.33	9.67%	4th
Tur	2.31	0.22	9.52%	5th
Maize	15.1	0.84	5.56%	7th

[Source: Agricultural Website of Government of Madhya Pradesh]

From the above table it can be inferred that Madhya Pradesh contributes a large percentage of India's total production of Soybeans, Lentils, Pulses and Gram. It holds 1st position in four respective areas such as Pulses, Oilseeds, Maize, Gram and Soybean. Moreover there are 11 agro climatic zones in the state. Considering all the above mention fact it is obvious that the Yantra Doot scheme should be implemented in the state to further increase the production of these crops and to consolidate Madhya Pradesh status as one of the major agricultural states in this country.

CHAPTER 2

SCHEME DETAILS

The Economy of Madhya Pradesh depends mainly on the agricultural sector as more than 80% of the people of the state depend on this sector for their livelihood. The agricultural sector contributes around 46% to the state's economy.

Major Kharif agricultural crops are soybean, paddy, maize, urad, moong, groundnut etc.

Major Rabi agricultural crops are wheat, gram, lentil etc.

About 74% population of M.P. resides in rural areas. Around 65 percentage of the total land holdings belong to small and marginal farmers occupying only 26 percent of the cultivable land. The net sown area is about 147.90 lakh hectares. The gross cropped area is 202.16 lakh hectares. The total irrigated area of the State is 43.3 % and remaining area is rain fed. The cropping intensity of the State is 136%. The major soil groups are alluvial black (deep, medium and shallow) mixed red and black, red and yellow and skeletal soils. Black soils cover about 47.6 % of the total area of the state followed by red and yellow soils about 36.5 percent. The State has about 70 percent rain fed farming area.

Erratic and uneven distribution of rainfall is the major constraint for achieving targeted level of production. Due to failure of rains, drought condition also prevails almost every year in one part or the other. In this geographical and natural conditions traditional farming practices are not adequate to maintain desired level of production. So introduction of new agricultural technology, modern farming tools are required to help small and marginal farmers who are not financially capable to acquire these modern methods and machineries by themselves.

Objective

The basic objectives of the scheme are as follows:

- Demonstrate the use of innovations in agriculture mechanization
- Encourage marginal and small farmers for adoption of new technologies and methods.
- To create farmers' access to such improved technologies
- Reduce the cost of agriculture production
- Increase production and productivity
- Establish Yantra Doot villages as Model villages.

By implementing the Yantra Doot scheme, the Government of Madhya Pradesh is creating access to advanced agricultural technologies and machinery among farmers in the rural areas, enabling subsidized purchase of agricultural implements by farmers, increasing the overall agricultural productivity of the state and empowering its farming community.

Key Stakeholders

Key stakeholders of the Yantra Doot scheme are the following:

- *Directorate of Agricultural Engineering, Madhya Pradesh:* The Directorate planned and implemented the Yantra Doot Yojana. It monitors the day to day functioning of the scheme and provides constant technical support and suggestions.
- *District Level Agricultural Engineering Officers:* These officers are responsible for creating awareness among farmers about the scheme and demonstrating the usage of the new advanced agricultural implements.
- *Custom Hiring Centers:* These centers have all the new agricultural implements and, are responsible for providing these agricultural implements on hire to farmers and providing necessary support for their usage.
- *Farmers:* They are reaping the benefits of advanced agricultural technologies and machineries extended to them by the government.



Machinery being demonstrated to I-Win Team Members by govt. officials

Implementation of the scheme

This scheme is for farmers empowerment & it has been implemented as main component of Yantra Doot village development. The salient features regarding implementation of the scheme has been given below:

1. The base line survey of the village: All information regarding Farming lands of the villages, irrigation implements, types of harvest, variety, availability of farm implements, seed treatment & grading, etc are compiled here.
2. Evaluation of techniques of productivity and status of mechanization in the villages on the basis of collected information: Evaluation of modern farming activities & equipments are done on the basis of presently adapted techniques for production, requirement of improvement in these techniques and use of farm mechanization pattern.
3. A group discussion is held with the farmers to assess the requirement of farm mechanization, scope for improvement of existing technology. Also a Farmers Day is decided based on the evaluation of the selected village, & the need and demand of farm mechanization and some beneficial changes in the method of farming as required by the farmers. Symbolization of the newly implemented farm mechanization in the villages New uses and techniques of the harvest, Inclusion & Implementation of the new techniques in place of the old popular techniques, Evaluation of necessary steps required by farmers for the improvement of the quality of seed, & specific commitment of different levels of for farmers.
4. According to the determined program the requirement of the farmers need during the year: According to the discussions held with the farmers the organizing & implementation of the program & the requirements of various things for farmers. Each & every farmer will be informed fully with what types of equipments will be made available to him & when and also a program will be prepared on Execution of the farming equipments like tractor & farm equipments. According to the mentioned program the farmers will be getting the tractors and other farming equipments all round the year.
5. Through farmer's forum or groups the evaluation of the production & valuation of the harvest will be done according to the decided program, and the implementation of the upcoming program & technical availability will also be taken care of.

Produce of the harvest and other important points: Preparation of the fields, quality of seed and its treatment, sowing and tilling, post harvesting and threshing forums or group organization and its methods of execution, information regarding precautions to farmers will be provided which helps the farmers to improve their quality.

Challenges in Implementation

1. Initially it was very challenging for the officials to convince the farmers to give up traditional farming practices and switch over to modern technologies and machineries. At the beginning only a few farmers in a village adopted these new techniques. After a year when their production of crops as well as income increased then only more farmers supported these modern practices.
2. Even though farmers of Yantra Doot villages were introduced to modern technologies and given access to machineries day to day farming activities there were some problems like unavailability of adequate irrigation facility, inadequate electricity, unavailability of good quality seeds, high cost of pesticides resulted in delays for the scheme.
3. Each village consists of small, marginal and large land holding farmers. While the large farmers are capable of renting modern machines, small and marginal farmers lack both financial resource and land to get full benefit of these modern methods and machines.

Physical plan of the scheme

The physical plan of the scheme revolves around three major components:

- a) Demonstrating agricultural implements at the field level
- b) Making the agricultural implements available through custom hiring centres/camps
- c) Enabling subsidized purchase of agricultural implements by farmers

Field demonstrations

Focused field demonstrations of various agricultural methods and implements are conducted in each of these 25 villages. These demonstrations are held periodically during both the Kharif crop season (planting of summer crops like millet, paddy, soya bean, green gram, pigeon pea happens during this season) and the Rabi crop season (planting of winter crops like wheat, gram, mustard happens during this season). Keeping in mind the varied socio-economic status of farmers, the district officials of the Department of Agriculture Engineering ensure that these demonstrations cover some agricultural equipments that can be utilized by small and marginal farmers as well as bigger equipments that can be used by larger land holding farmers.

In each demonstration, agricultural tools that are appropriate for that particular season are displayed in the village common area and a collective meeting of all village farmers is called. Agricultural officers then provide direct information to the farmers about the various tools present and the benefits that they can incur on the farmers. Subsequently, a particular farm land is selected and an on field demonstration of various tools is presented to the farmers and all their queries are answered.

The information and technology provided to farmers under the Yantra Doot Yojna covers all the phases of farming including soil preparation for cultivation, removing weeds and destroying insect habitats from the field by deep ploughing, improving the fertility of the soil, maintaining correct distance between rows of crops, promotion of seed treatment and proper harvesting and threshing procedures.

Setting up custom hiring centers

After the field demonstrations are held, custom hiring centers/camps are set-up in these model villages. Each centre is managed by a field coordinator, who hires drivers from among the village youth for operating certain equipments. All the equipments that are demonstrated on the field are parked in these camps and can be hired by farmers for usage on their agricultural lands by paying a nominal price. Farmers contact the field coordinator and book the equipments they require and the coordinator gives them a slot i.e. day and time when the equipment will be available for their use and informs them about the hiring price. For instance, a farmer can hire a deep ploughing tractor for an hour by paying a price of Rs. 325. This cost includes the cost of the driver as well the diesel cost. All the farmer has to do is guide the driver to his land and supervise him while the driver conducts the deep ploughing process. Similarly, farmers can hire other implements for their agricultural work

The hiring rate at these custom hiring centres is cheaper than the rate at which private companies provide this service. For instance the tractor that is hired at Rs. 410 previously from the government custom hiring centre is given at the price of Rs 700 to 800 by private companies. Thus the custom hiring centres under the Yantra Doot Yojana are helping farmers cut down on agriculture input costs.

Enabling subsidized purchase of equipments

Along with providing farmers with hiring facilities, farmers can purchase agricultural implements and avail subsidies. For this purpose, agricultural officers prepare subsidy cases of interested farmers who may then purchase the implements from the implement providers registered with the government. In this manner, 25 percent to 75 per cent costs are saved for farmers while buying agricultural equipments.

Training

In order to ensure that the benefits of the Yantra Doot scheme reach the farmers adequately, it is vital to create awareness among them. For this purpose, along with the community awareness efforts during the field demonstrations, farmers are also given training at *farmer training centers/Krishi Vigyan Kendras* by scientists who educate them about the usage and benefits of advanced agricultural techniques. Farmers are also given season- specific advice. These trainings are provided not just to farmers from 'Yantra Doot villages' but also to farmers from nearby villages. Recognizing the role and potential of women in transforming agricultural practices, specialized training sessions for women are also organized.

Exposure visits of farmers from nearby villages to Yantra Doot villages are also organized from time to time to showcase to them the changes that Yantra Doot has led to.

Along with such formal events, there is constant interaction and exchange between the farming community and district officers of the Department of Agriculture Engineering at informal events like the celebration of independence and republic day, cricket matches etc. In this manner, there is a strong rapport is built between officials and farmers which proves beneficial while implementing the Yantra Doot scheme.

Monitoring

To ensure the smooth implementation of the scheme, senior level officials periodically visit these Yantra Doot Villages, inspect the crops, interact with farmers and hold experience sharing meetings. This keeps senior officials up to date with the on field progress of Yantra Doot. In this manner, a scrutiny is maintained on the functioning of the field agricultural officers as the farmers' inputs and field realities reflect the dedication and commitment of these officers.

Machinery

The various types of machines that are used at different stages of farming are given below.

	Summer Deep	Land Preparation	Sowing of seed	Weeding	Spraying pesticides	Harvesting	Thrashing
Plough	Y	Y					
Reversible Plough	Y						
Rotavator	Y	Y					
Cultivator	Y	Y					
Seed Drill		Y	Y				
Zero tillage			Y				
hand held sprayer					Y		
Pesto blaster					Y		
Harvester						Y	Y
Reaper						Y	
Thrasher							Y
Ridge Furrow			Y				
Fertilizer Drill			Y				
Paddle				Y			
Wheel hand				Y			
Hand held soy bidder				Y			

Summer Deep: Main machineries used in this stage of cultivation are plough, rotavator and cultivator.

Land Preparation: Machines that are mainly used for land preparation are seed drill, rotavator, cultivator and plough.

ROTAVATORS



CULTIVATORS



SEED DRILL MACHINE



RAISED BED PLANTER



PESTICIDE SPRAYER



HARVESTER



THRASHER





Machinery being closely observed by I-Win Team Member

The direct information given to farmers under Yantra Doot scheme includes land preparations for cultivation, removing weeds from the field, process to destroy old seeds, insects, maintaining distance between rows of crop through seed-fertilizer drill, promotion of seed treatment through seed drill and rain gun. Farmers are also informed about the use of harvester and thrasher machine.

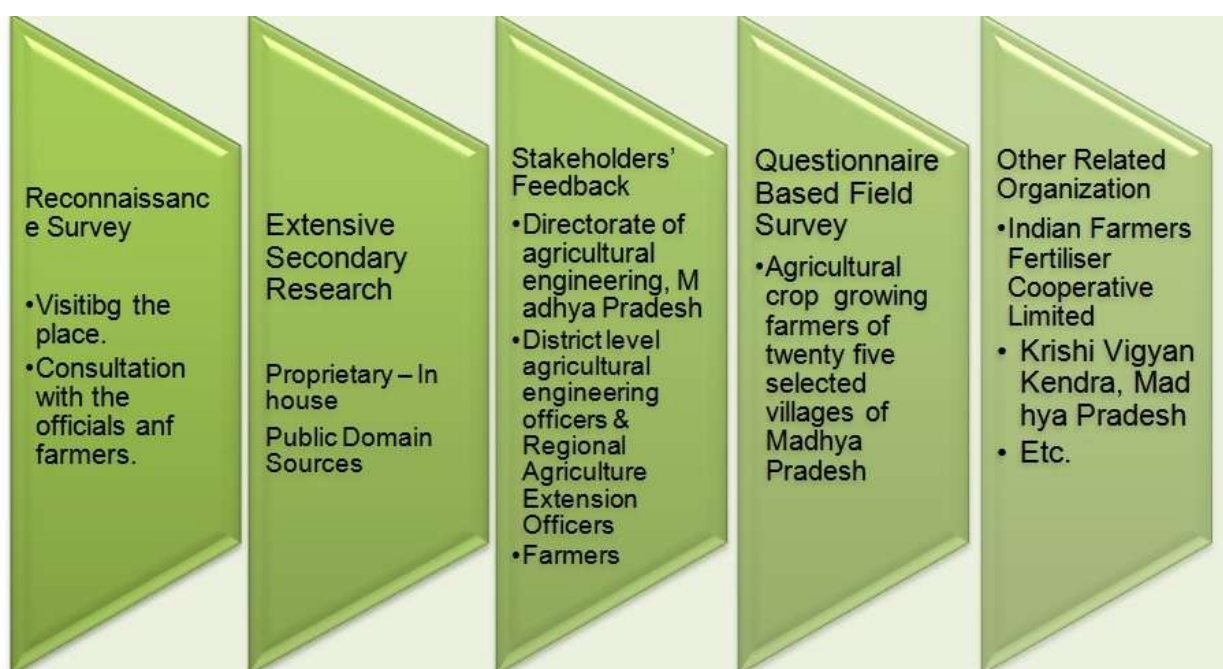
Financial plan of the scheme

The scheme is funded under the Krishi Shakti Yojana scheme of the Madhya Pradesh government for enhancing production and generating employment among the farming community. Funds for the scheme are also collected by merger of funds from various other Central (Macro Management Scheme, Rashtriya krishi Vikas Yojana etc.) and State government sponsored agricultural schemes

CHAPTER 3

Methodology

The evaluation and impact assessment study is designed to assess the overall performance of the scheme with respect to its planned objectives. To carry out the study following approach was adopted as shown below.



- *Reconnaissance Survey:* Target population of reconnaissance was farmers of the villages and government officials. It was conducted to understand the broad parameters of the area in respects of this project. Outcome from reconnaissance survey as expected was:
 - Profile of the area
 - Determination of pockets for drawing samples
 - Identification of key informants
 - Available infrastructure
- *Extensive Secondary Research:* In-House and public domain sources were used for secondary research. Data and Information from a variety of sources were collated in a structural manner so that they could put into perspective.

Outcome from secondary survey as received was related to:

- Land holding under different crop cultivation
- Area & productivity status
- Irrigation status
- Infrastructure availability
- Farmers profile
- Condition of Land
- Profile of the villages

- *Stakeholders' Feedback:* Feedbacks from entities having distinct roles starting from inception of the scheme to implementation and execution have been sought. Discussions and interviews were undertaken from Officers of the directorate of agricultural engineering, Govt. of MP: district level agricultural engineering officers of all 20 identified districts; Field officers; Rural Agriculture Extension Officers (RAEOs) etc. The agricultural farmers have been given specific and distinguished focus for the study and extensive field survey has been undertaken for them.

Outcome from the stakeholder's consultation was as follows:

- Technology using in the cultivation
 - Production status of the particular villages before and after implementation of the scheme
 - Farmer collectives & other disintermediation initiatives taken
 - Planning of the scheme
 - Coverage of the districts
- *Field Survey:* A questionnaire based field survey was conducted on the farmers. Random samples were drawn for surveying the farmers in all the twenty identified districts. The locations were not biased on the level and quantum of agricultural crops grown and thus are not expected to influence the outcome on the required parameters. Outcome of the survey was broadly related to:
- Farmers profile
 - Land holding pattern
 - Land utilization pattern at individual level
 - General production practice, technical knowhow & awareness
 - Cost estimation for production
 - Pre and post income level.
 - Advantages and shortages
 - Major concerns

Due care was put in to see that the weightage to be given to the number of farmer respondents under each district for the sample survey was commensurate with the size and level of vegetable production wherever possible. Secondary research and departmental officers' feedback was the determining

factors in this respect. The random sampling was not biased on the demographic, livelihood and educational parameters. All were treated on the same platform of representation.

- *Other Related Organizations:* The Baseline survey also needs to look into and explore views of the entities and organizations, which may not directly related to vegetable cultivation, or participating in its supply existing chain. But their roles and views were found to be important for the study. There are Department of Agriculture, Govt. of MP; Food & Drug Administration, Bhopal; Department of Agriculture & Cooperation, Ministry of Agriculture, Govt. of India, Bhopal; NHM, MP; etc.

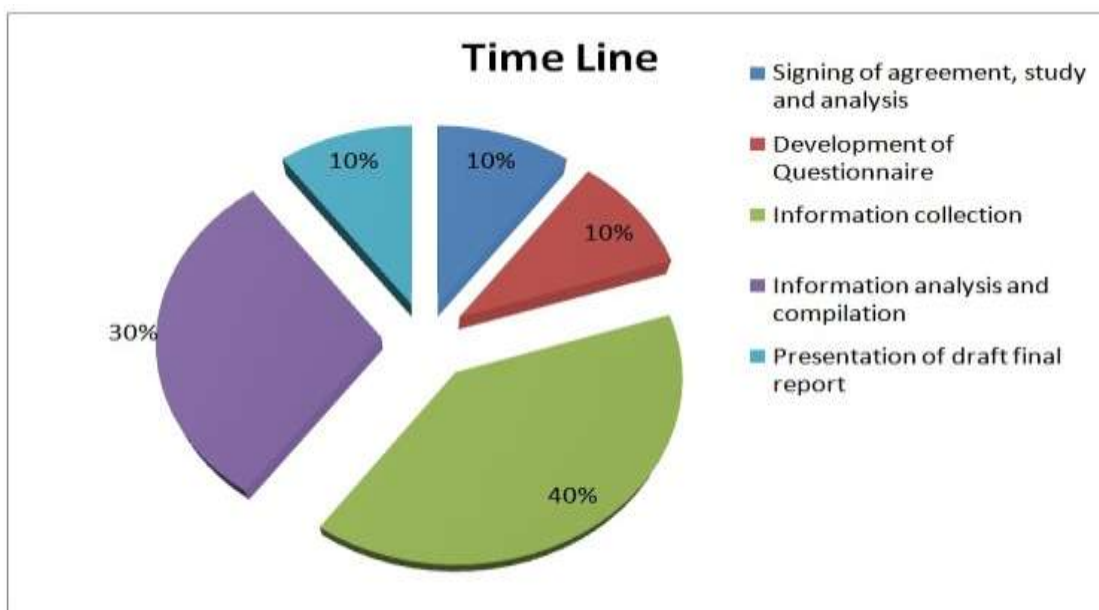
Sample selection method

The study was carried out on a sample basis. The samples were the representative of the entire state. At first according to the Terms of Reference 10 villages from ten different zones are to be surveyed. But it was not enough to get a comprehensive picture about the effects of the scheme. Then it was decided that at least 25 villages are to be surveyed to get a better understanding about the scheme. So, finally 25 villages from twenty one districts were selected. Among those, in 20 villages Yantra Doot scheme was introduced in 2010-11 and in 5 villages it was introduced in 2011-12.

Coverage

Farmers of following twenty five villages in twenty one districts are considered for survey and their views and suggestions are to be taken into account.

Timeline



The present study has been carried out under strict timeline. All the twenty five identified villages have been surveyed with the best possible extent. Feedbacks, interviews, secondary research, field survey etc. have been conducted simultaneously rather than sequentially to satisfy and meet the time requirements. The following table would offer details of days spent with respective activities.

CHAPTER 4

Situation Analysis & Findings of the survey

Findings of the Study

On the basis of farmer's survey, major findings of impact of "Yantra Doot" scheme on farmers and farming practices in Madhya Pradesh are the following:

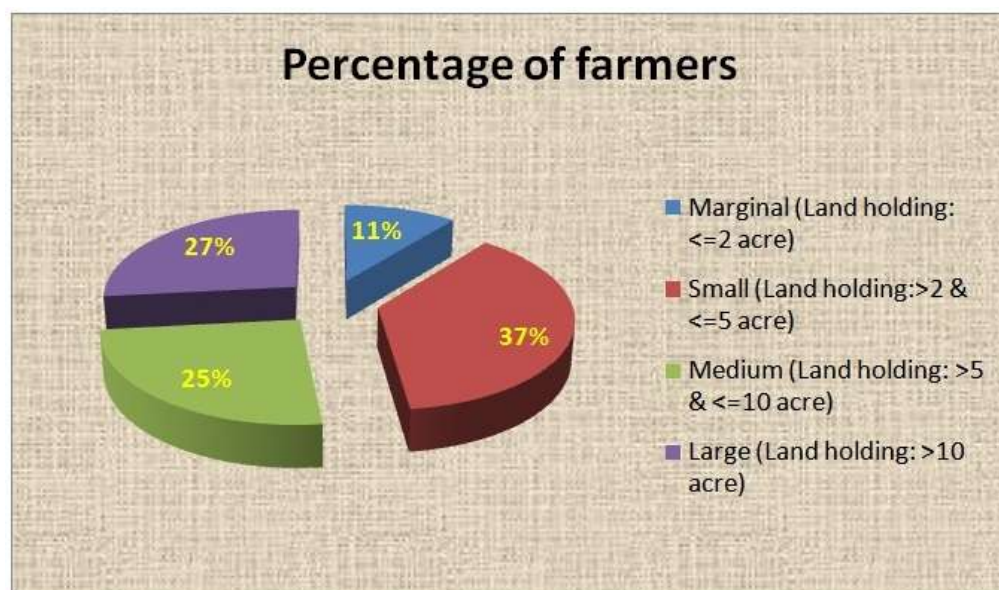
- ❖ Increase in agricultural productivity
- ❖ Empowerment of the farming community
- ❖ Conservation of resources
- ❖ Shortages of machinery
- ❖ Willingness to pay more for services



Farmers are surveyed by I-WIN team

Land holding pattern

Farmers with marginal, small, medium and large land holdings can be observed in the state. It was found that in the surveyed villages average land holding is 9.5 acre. The following pie chart represents the percentage marginal, small, medium and large farmers in those villages.

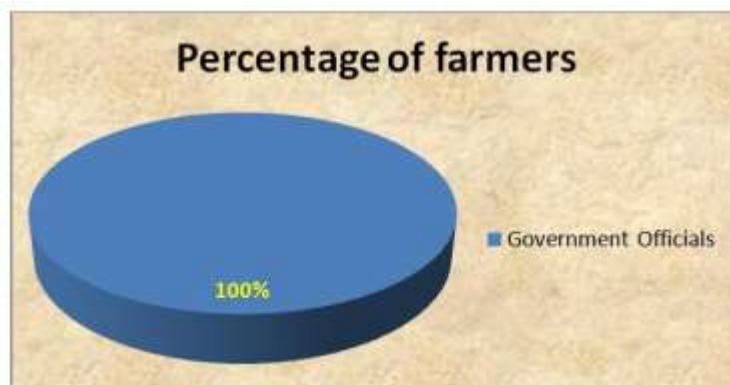


Awareness about the scheme

It was observed that farmers of the area knew about the scheme and got the information from the government officials. Government officials have taken following steps to ensure that all the farmers have knowledge about the scheme

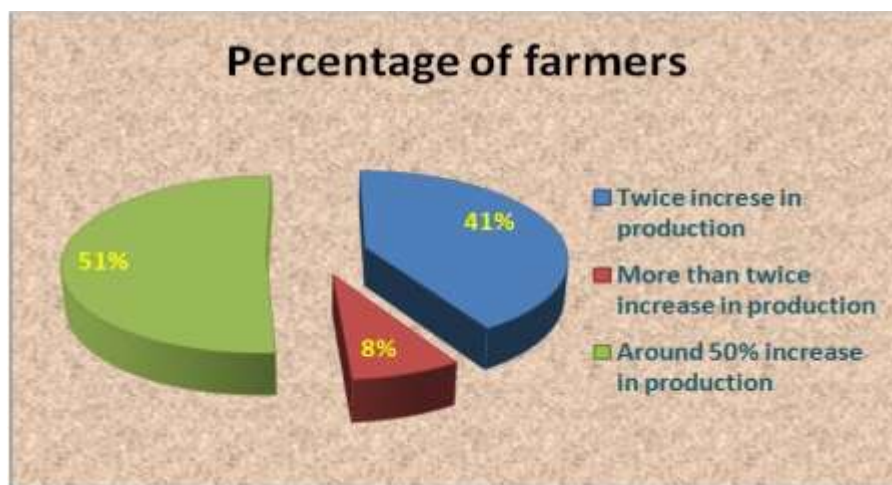
- Meeting with the farmers at a regular basis.
- Workshops for farmers.
- Seminars so that they learn about new techniques and methods.
- Meeting with various agricultural scientists so that farmers can expand their knowledge base.
- Taking the farmers of a village to other villages where the scheme is already applied so that they can see the benefit with their own eyes.

All these initiatives have ensured that farmers are knowledgeable about the benefits of the scheme.



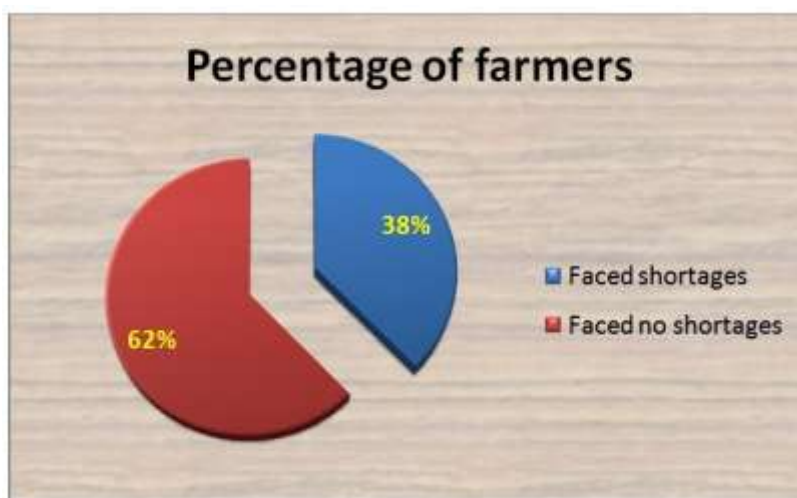
Changes in production

According to the farmers the scheme has made a positive impact on the production of crops in their villages. Majority of the farmers said that their production has increased around 50%. While for some of them production has more than doubled, for rest of the farmers it has almost doubled. The following pie-chart shows the percentage of farmers for whom production has increased at various degrees.



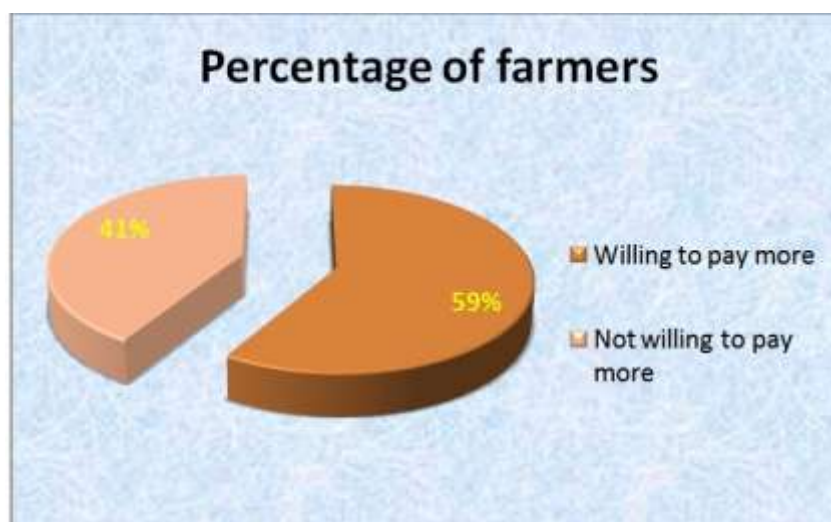
Inadequacy of services

62% of the farmers said that they received adequate number of machinery at every stage of agricultural activity. While 38% said that they faced some shortages of machinery in time of cultivation.



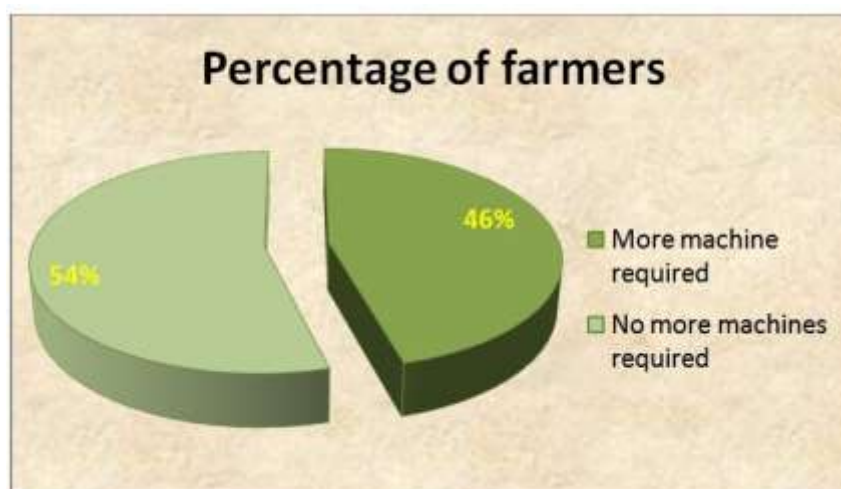
Sustainability of the scheme

The scheme operates on rent basis so farmers are used to the concept of paying rent for services. These services are decided on the basis of consultation with the farmers. 59% of the farmers surveyed said that they are willing to pay more than the current rent (Rs.410 per hour & Rs.15 per km.) for timely services. Majority of them are willing to pay between Rs. 500 to Rs.600.



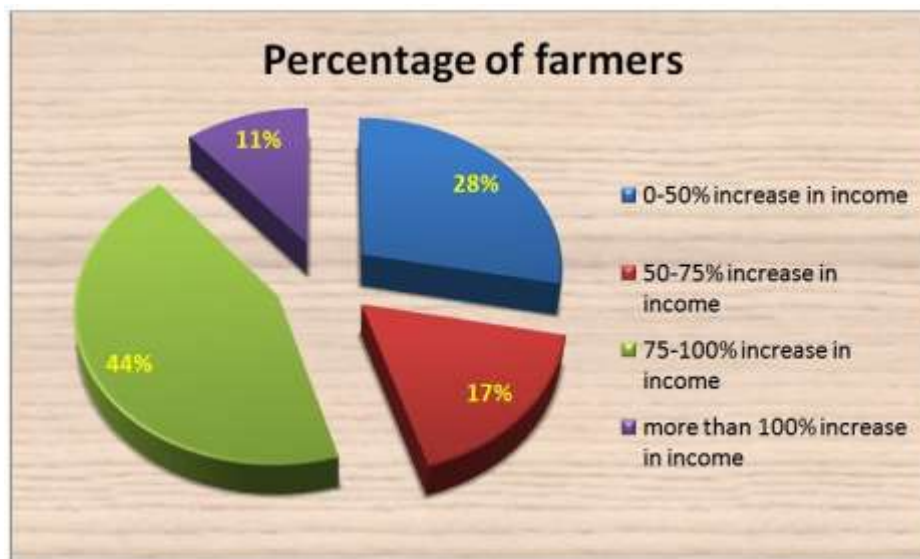
Requirement of more machinery

More than half of the farmers surveyed said that machines provided to them under the scheme is adequate for them and they never felt any shortage of machinery during their time of need. Tractors with high horse power are required in more number in almost all the villages. Other than that cultivator, rotavator and reaper are the machines they required in more numbers.



Empowerment of the farming community

Increasing productivity of each crop has led to increase in farmers' income and improvement of his socio-economic status. While for some of the farmers their income has more than doubled, for majority of them their income has increased up to 75-100%. The following pie chart depicts the percentage of farmers whose income has increased at various percentages.



Case study:

Name of the farmer: Shiven Singh

Name of the village: Matha

Name of the block: Rampur Baghelan

Name of the district: Satna

Total agricultural land: 3.5 acre

Crops cultivated: Rabi season - Wheat, Gram

Kharif season - Soybean, Paddy

His revenue as well as productivity has increased after the implementation of the scheme. The difference in his revenue is shown below in tabular form.

<i>Crops</i>	<i>Average Price</i>	<i>Total Production before the scheme</i>	<i>Revenue (before)</i>	<i>Total Production after the scheme</i>	<i>Revenue (after)</i>	<i>% change in revenue</i>
Soybean	2710.5	18	48789	30	81315	67%
Wheat	1650	30	49500	60	99000	100%
Chana	4500	6	27000	8	36000	33%
Paddy	2245.5	16	35928	30	67365	88%
Total			161217		283680	76%

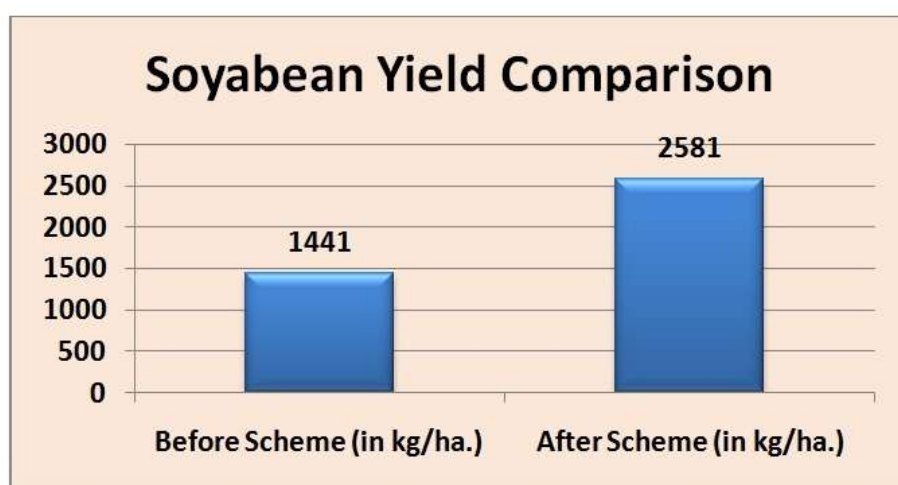
The price of each crop is taken from <http://www.mpmadiboard.com/> (average price is taken as average of minimum and maximum selling price for each crop, as on 30.11.12)

It can be seen from the table that his overall revenue has increased 76% after the implementation of the scheme.

Crop wise effect of the scheme

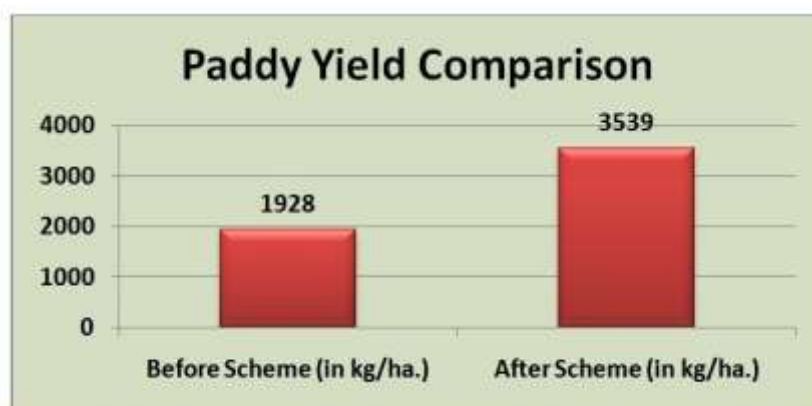
Soybean:

Madhya Pradesh is the largest producer of soybean in India. It contributes almost half of total soybean production in India. It is produced during kharif season here. Before Yantra Doot scheme was launched productivity of soybean in these villages were 1441 kg. Per hectare. Now after the implementation of the scheme the productivity has gone up to 2581 kg. per hectare.



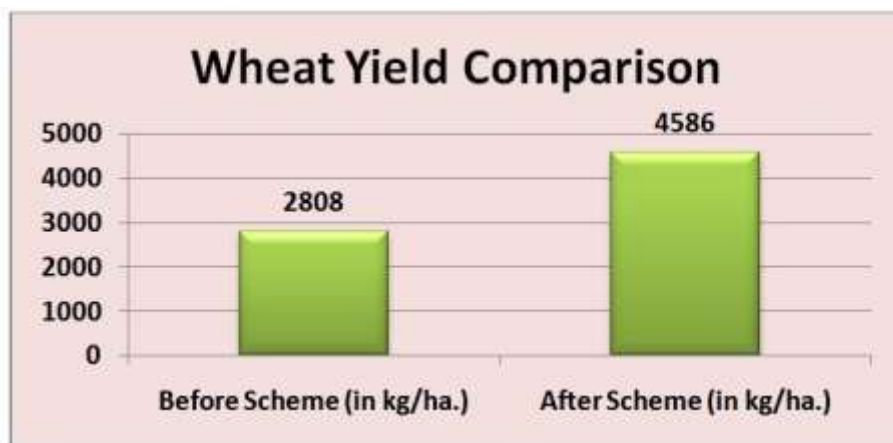
Paddy:

Paddy is cultivated during kharif season in Madhya Pradesh. As it requires lot of water farmers don't cultivate paddy during Rabi season. Previously average productivity of paddy in these villages was 1928 kg. per hectare. Now after the implementation of Yantra Doot scheme the productivity of paddy almost doubled in these villages. The average productivity is 3539 kg. per hectare in these villages.



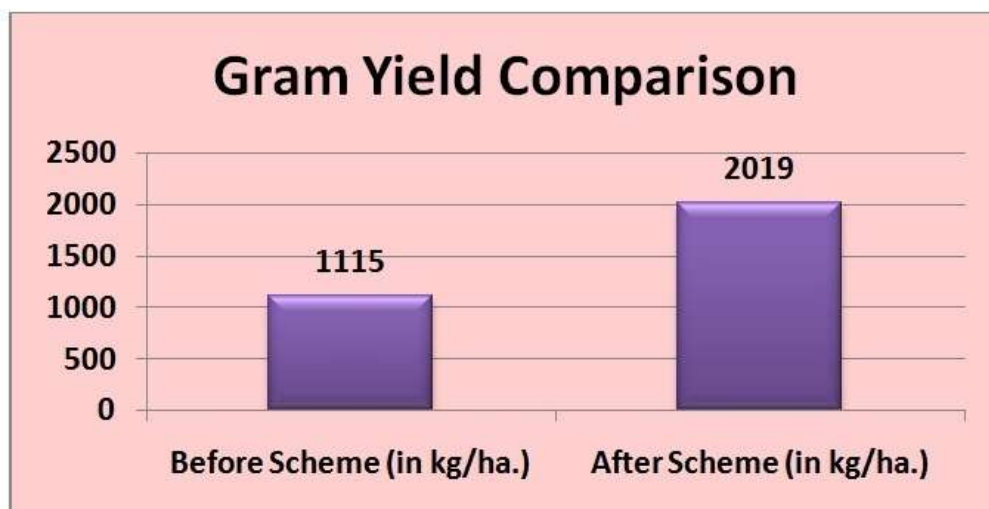
Wheat:

Wheat is one of the major Rabi crops in Madhya Pradesh. The state contributes to almost 8% of total wheat production in the country. Before Yantra Doot scheme average yield of wheat in these villages were 2808 kg. per hectare. After the implementation of scheme average productivity increased more than 60% and now it is 4586 kg. per hectare.



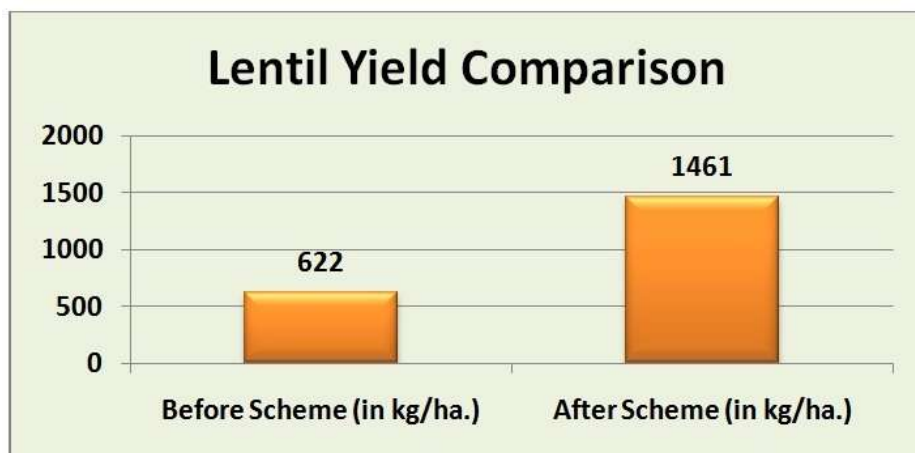
Gram:

Madhya Pradesh is the largest producer of gram in India. It contributes to around 30% of total gram production of this country. It is majorly cultivated during Rabi season. Before the scheme average productivity in these villages were 1115 kg. per hectare. Now after the implementation of the scheme production has increased more than 80% to 2019 kg. per hectare.



Lentil:

One of the major crop cultivated during Rabi season is Lentil or Masur. Madhya Pradesh holds second position in terms of total lentil production in India. It contributes to almost 25% of total lentil production in the country. Before the scheme average productivity of lentil in these districts were 622 kg. per hectare. After the successful implementation of the scheme it has gone up to 1461 kg. per hectare.



Farmers are explaining the difference in productivity to I-WIN team

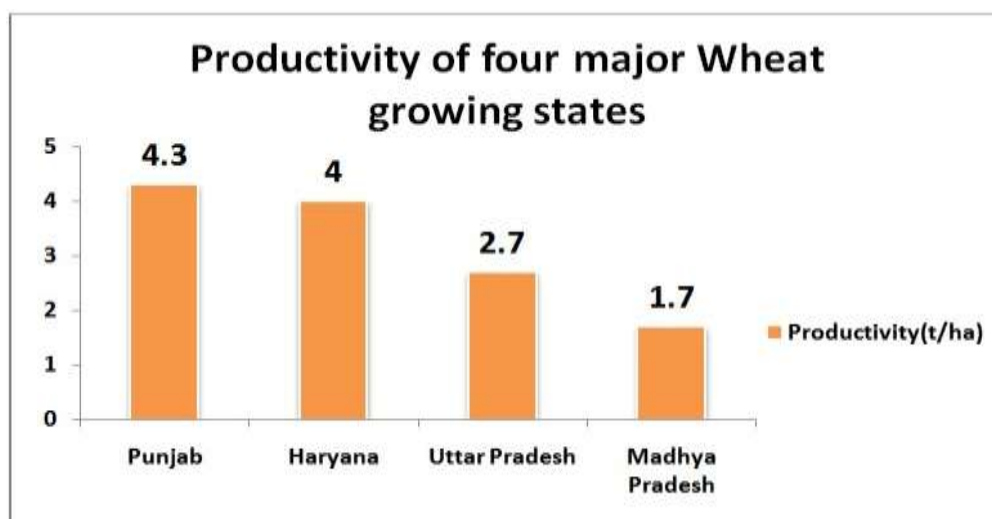
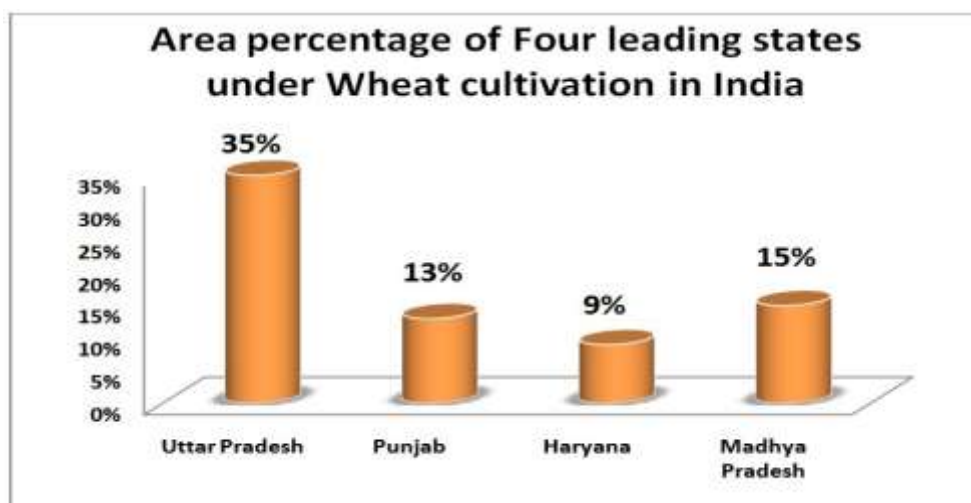
Under the Yantra Doot Yojana, farmers are encouraged to replace their traditional time consuming farming practices with time saving mechanized procedures. The table below presents a snapshot of how Yantra Doot has modified various farming practices in these villages:

<i>Farming Stage</i>	<i>Old Procedure</i>	<i>New Procedure</i>
<i>Ploughing</i>	Bullock carts were used. It did not mix the soil that well and only surface of the land were ploughed. The land retained less water & land was not flattened after sowing	Ploughing is done through tractors and because of that land is deep ploughed, so it retains more water and mixes the soil better. After that land is flattened using rotavator.
<i>Seed separation & treatment</i>	Good quality seeds were not separated from infected or spoilt quality seed properly. Treatment of seeds and fertilizers were done by hands.	Seeds are properly separated using spiral grader and only good quality seeds are used for sowing. Seed treatment drums are used for proper mixing of seeds with fertilizer
<i>Sowing</i>	It was done through sprinkling of seeds by hands. It resulted in eating of seeds by birds which led to wastage of farming land and human labour.	Sowing is done using seed cum fertilizer drill. Modern techniques like raised bed planting & ridge-furrow sowing are also used.
<i>Irrigation</i>	Since ploughing is done improperly soil retains less water therefore it requires more irrigation. Inadequate irrigation technique leads to wastage of water.	Modern ploughing techniques increases water retention capacity of soil so less water is required. Also use of sprinklers reduces wastage of water and also saves time.
<i>Harvesting</i>	Crops were cut manually. It was very time consuming.	Self propelled reaper cuts and bundles crops. It saves time and there is less wastage.
<i>Thrashing</i>	It was done manually with the help of animals. It led to loss of grains due to breakage.	Mechanized multi crop thrasher is used. It reduces time.

MAJOR CROP WISE COMPARATIVE ANALYSIS

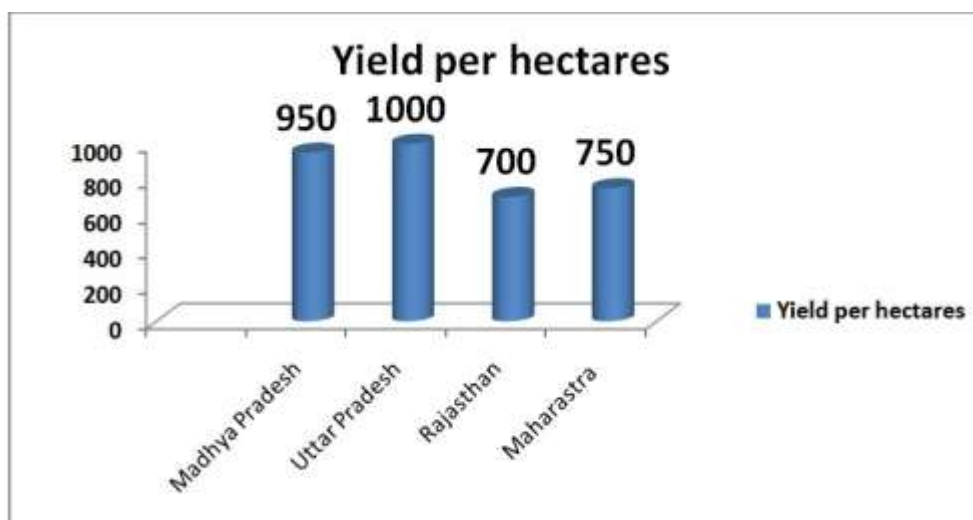
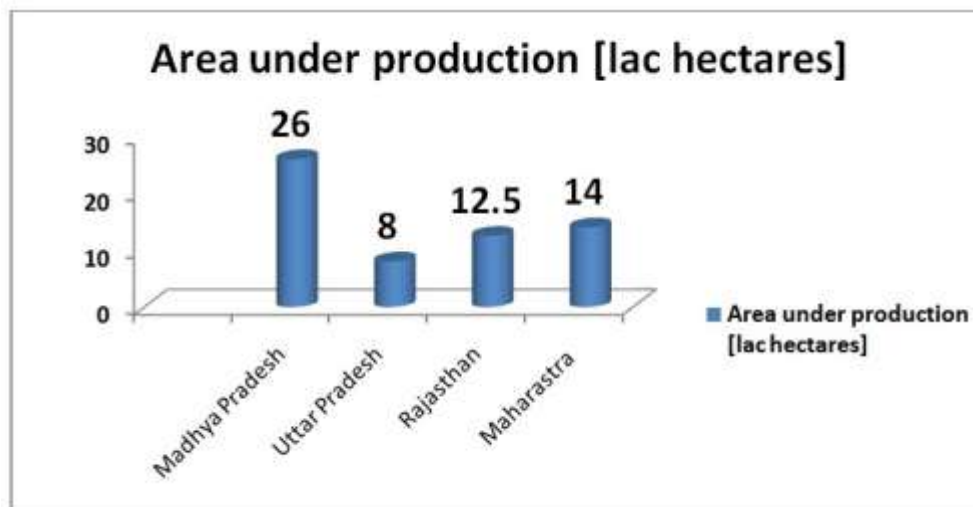
In the following few bar diagrams, we have made a comparative analysis of current agro situation of Madhya Pradesh, wherein we have considered the four main crops of Madhya Pradesh and designed the analysis such that the crops where Madhya Pradesh lags behind has been analyzed first and the crop in which they have distinctive advantage have been given afterwards.

WHEAT:



From the previous two figures it is pretty clear that Madhya Pradesh has more area under wheat cultivation than Punjab and Haryana but the per hectare yield is so low that it lags behind these two states in the overall produce of wheat. The per hectare yield of 1.7 tonnes is almost 42.5 % of Haryana and 40 % of Punjab. So it is clear that Madhya Pradesh is far behind in terms of productivity if we compare it with Punjab and Haryana. Here the Yantra Doot scheme can play a vital role to enhance the productivity of wheat and make Madhya Pradesh one of the leading Wheat producing states in India

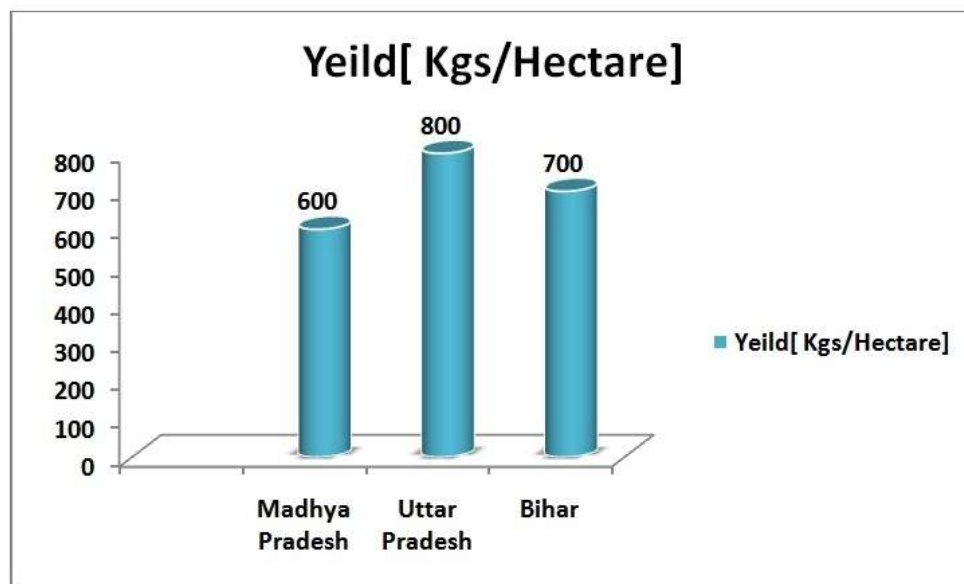
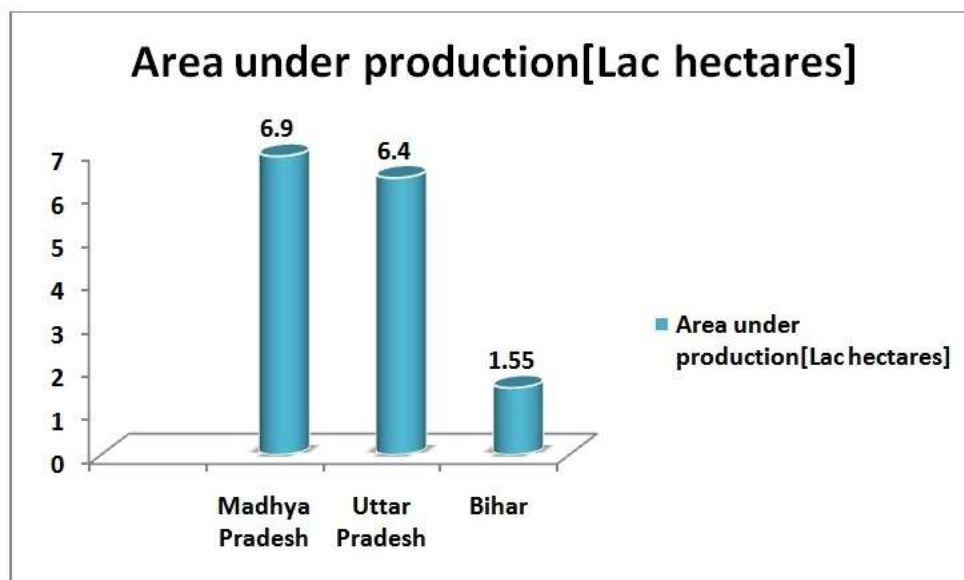
GRAM:



In case of Gram, we can see that Madhya Pradesh holds a comparative advantage when it comes to area under cultivation of gram. It's near about double of its nearest competitors. Hence though the per

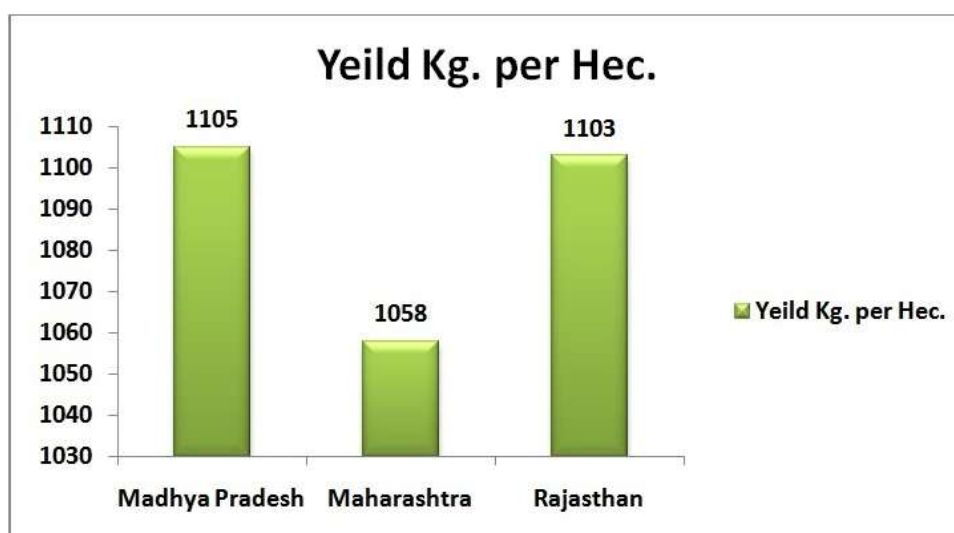
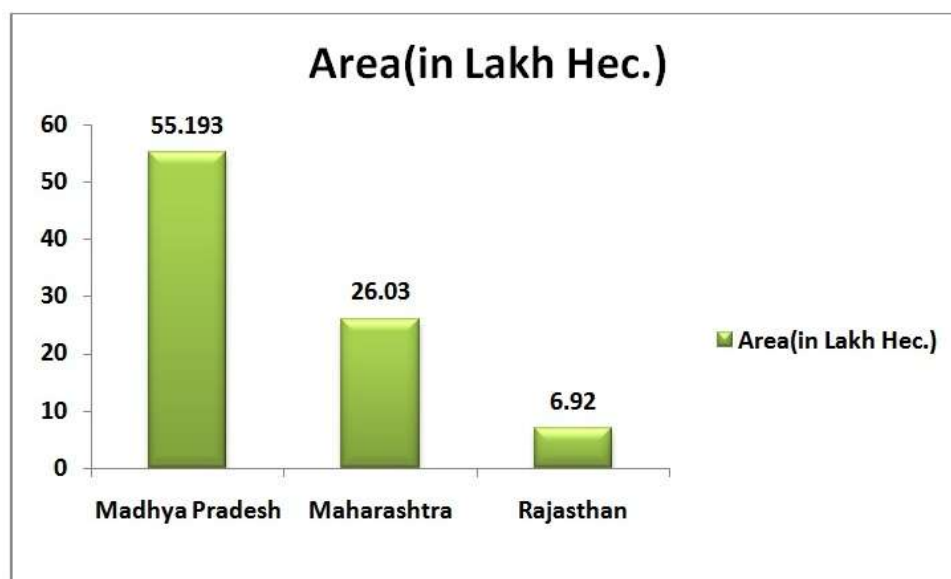
hectare yield is lower than Uttar Pradesh, MP plays on the volume and gets comparative advantage on total produce. But still there is scope for improvement as far as productivity is concerned and herein the Yantradoot Scheme will play a pivotal part in bridging the gap.

LENTIL:

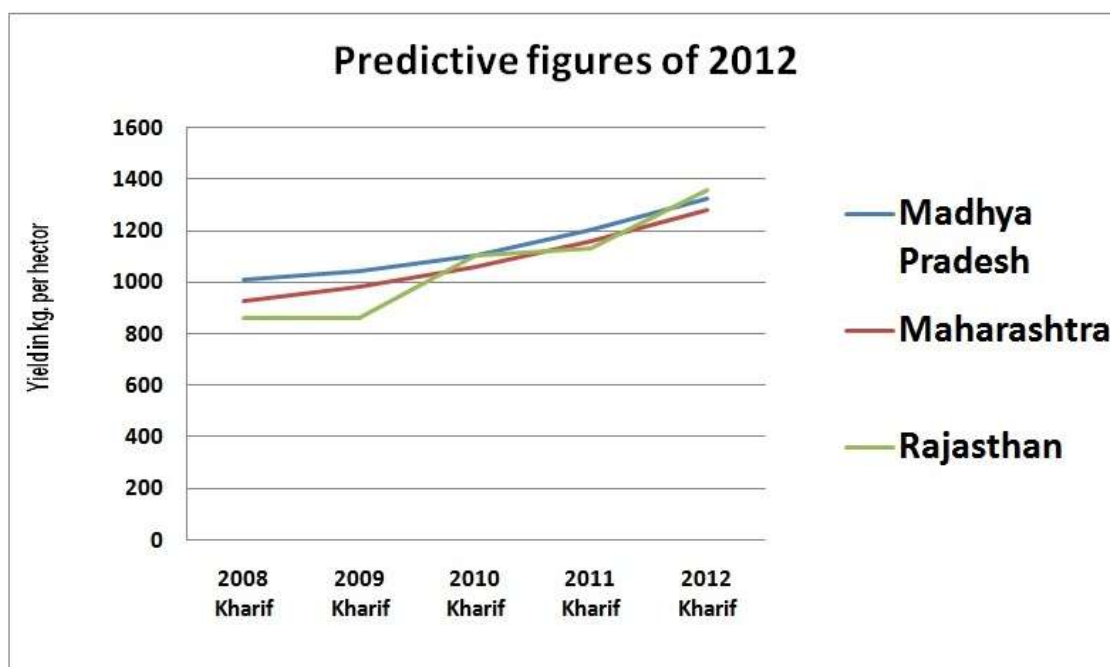


Now we come to Lentil, which is another major crop of Madhya Pradesh. If we see the previous two graphs, its pretty clear that MP and UP are the two leading states followed by Bihar. MP and UP has more or less the same land area under lentil cultivation but where MP lags behind UP is the per hectare yield which is very low compared to UP. Its almost 75% of UP and this productivity is the sole reason that MP is the 2nd ranked state as far as Lentil production is concerned. Herein the Yantradoot scheme can play a significant part in improving the productivity and help in MP gaining comparative advantage over UP.

SOYBEAN:



Soybean is the leading crop of Madhya Pradesh by a long way and its no wonder that MP hold the comparative advantage over all other Indian states in case of soybean production. The area under production is huge and it is increasing day by day. Nearest competitor are Maharashtra and Rajasthan. Although MP has complete comparative advantage, the following graph will depict that there is scope for improvement



The above graph is basically a trend analysis wherein data on years 2008-2011 has been taken and a predictive figure has been designed for 2012. In this we can see that the other two states were lagging far behind in productivity but have caught up with MP in this regard and hence herein the Yantradoot scheme will play a important role in MP wresting back the initiative from the competitors.

CHAPTER 5

Conclusion and Recommendation

Key Findings

- ❖ Production of crops almost doubled after the implementation of the scheme.
- ❖ Farmers' earning has increased many folds so their socio-economic status has improved.
- ❖ The scheme has increased output level without any major increase in input cost.
- ❖ Farmers' knowledge base regarding the use of new techniques and machineries has increased.
- ❖ There is lack of irrigation facility in many villages which creates an obstacle in realizing the full potential of the scheme.
- ❖ There is also lack of adequate power supply.
- ❖ In most villages there are adequate amount of machineries to serve the whole village.

Suggestive Measures

- ❖ The tenure of the scheme for one village should be increased to at least two year (four agri-season) so the farmers can have better understanding of the effects of the scheme.
- ❖ Tribal villages like Dindwariya in Umaria districts where there is very little technical knowledge regarding agriculture the tenure of scheme can be extended to more than two years.
- ❖ Subsidy should be provided to farmers to encourage them to buy agricultural machinery and they should be encouraged to rent those machines to other farmers. This can ease the burden on government to provide more machines in a village also it can encourage more farmers to buy machines on their own. It will increase number machines in a village and save time.
- ❖ Initially incentives can be given for less expensive machines so the well to do farmers are encouraged to buy those machines and government can invest those proceeds in buying machines which are more expensive and beyond the financial reach of a farmer.
- ❖ It should be monitored properly whether the farmers are getting the machines during peak time in every phase of the cultivation process.
- ❖ As the rainfall is not adequate, hence proper irrigation facilities have to be set up in order to fulfill the excess demand for water.
- ❖ Available area has to be reformed to bring in more and more part under cultivation in order to increase the scale and volume of production.

- ❖ Regular and uninterrupted power supply has to be ensured for further betterment.

SWOT Analysis

Strength (S), Weakness (W), opportunities (O) and Threats (T) which were found out from the survey performed are tabulated below.

Strength (S)	Weakness (W)	Opportunities (O)	Threats (T)
• Increase in quantity of agricultural produce. • Socio-economic status of farmers has improved. • Farmers are exposed to modern technique and machineries. • Production increased without any significant increase in cost of production. • Machineries are given at rent at much lower rate than private providers.	• Shortage of staff like drivers and labors • Repairing of damaged machines takes lot of time. • Inadequate number of machines in many villages.	• Opportunities to learn and explore new techniques and methods. • Has huge scope of use as it is a follow up to the Spiral grader and Seed treatment drum project, which has boosted the Quality of seeds. • More use of machines can bring in young and learned people into farming	• Inadequate availability of water due to lack of rain and proper irrigation facilities • Private company's involvement due to shortages of government machineries.

Conclusion

The Yantradoot scheme is a successful model for agriculture mechanization. It created a model which reduces time and cost of farming by implementing modern agricultural technologies and machineries. The scheme has gathered the inputs of various existing agricultural model and directed their effect in a consolidated manner on a particular village. Beginning with a single village, the scheme has now benefited a pool of villages that are inspiring many other villages to follow this scheme. The success of Yantradoot scheme lies in its direct, impact driven approach which has yielded very visible effects in terms of increased agricultural productivity and rising farmers' income and standard of living.

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*IWIN acknowledges the active
support of:*

*Department of Agriculture
Engineering, Govt. of Madhya
Pradesh & its field officers.*

November 2012