

A Business Model of Custom Hiring of Agricultural Machinery

for Enhanced Farm Mechanization in Madhya Pradesh

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Farm mechanization has become inevitable for augmenting agricultural production and achieving the steady growth in agriculture in synchronization with population growth. Increasing shortage of agricultural labours also necessitates availability of agricultural machinery at right time and at an affordable cost to farmers. Further, utilization of appropriate farm machinery reduces the unit cost of production through enhanced input use efficiency and their judicious use. The farm mechanization necessitates substantial investment on farm power sources and implements which is neither essential nor feasible for small and marginal farmers, who constitute over 80% of the total farm holdings in India. In this situation, custom hiring of agricultural machinery appears to be logical and most appropriate best institutional intervention pushed forward in recent years.

Key words: Agricultural machinery, Custom hiring, Farm Mechanization, Small-marginal farmers

THE Directorate of Agricultural Engineering, Government of Madhya Pradesh has made an attempt to develop a business model to accelerate setting up of enterprises which would facilitate availability of agricultural machinery to farmers at an affordable cost. The Directorate has made the partnership with custom hiring in private sector, with the help of financial assistance from Ministry of Agriculture and Farmers' Welfare, Government of India under Sub-Mission on Agricultural Mechanisation and other welfare schemes for establishing custom hiring centres. For the first time, ICAR-CIAE as the knowledge partner to the Directorate of Agricultural Engineering, Government of Madhya Pradesh acted as the nodal agency for this programme ensuring transparent selection of the entrepreneurs, coordinating with financial and training institutions and releasing the

back-end subsidy to the selected entrepreneurs. Public sector and cooperative banks extended financial assistance in the form of bank loan and the training and capacity building, development of basic skills and expertise on operation and maintenance of farm implements and development of business skills was developed to the entrepreneurs by ICAR-CIAE. During 2012-13 to 2017-18, a total of 1,153 custom hiring entrepreneurs were trained at ICAR-CIAE.

The trend towards over-capitalisation in agriculture and the increasing cost of production are becoming the new challenges for competitive production. The basic requirement to meet this competition is to reduce the unit cost of production and maximize resource productivity which depends greatly on the availability and judicious use of mechanization means by the farmers. Custom Hiring of

Agricultural Machinery is one of the best institutional innovations established in recent years as a panacea for all these problems. Pace of mechanization of agriculture in Madhya Pradesh has not been at par with the developed states like Punjab and Haryana. To increase the availability and adoption of agricultural machines and thereby increase the level of mechanization, 'Custom hiring model and skill development for improving farm mechanization level in Madhya Pradesh', in association with Directorate of Agricultural Engineering, Govt. of Madhya Pradesh, was launched to help the farmers to raise the farm productivity through custom hiring of machines and introduction of improved farm machinery and equipment.

The model

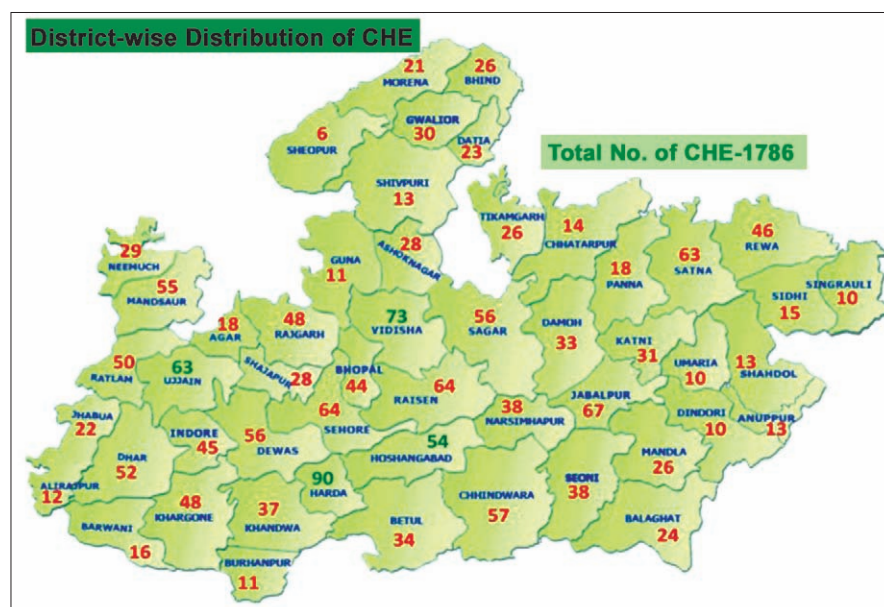
To ensure that the benefits of the mechanization aptly reach the

farmers, it is vital to make appropriate machines accessible to the farmers along with professional services at affordable cost and time. One of the ways of doing so is creation of bank of high capacity – high efficiency machines along with suitable prime mover and then making them available to farmers with trained operator. Selection of machines vis-à-vis utility, demand, cost and market availability is vital and so is awareness about operation, adjustment, repair and maintenance for optimal performance of machinery. ICAR-CIAE, Bhopal already engaged in development of machines and protocols for different farming operations, besides a two pronged approach – developing skills in farm-machinery management and creating awareness of availability of machines across the country – was implemented in collaboration with Directorate of Agricultural Engineering, Government of Madhya Pradesh.

While implementing the custom hiring model and skill development for improving farm mechanization level in Madhya Pradesh, entrepreneurs were given 1-2 weeks training at CIAE, Bhopal by scientists and technical officers, who educated them about the usage and benefits of advanced agricultural techniques. These trainings were provided without any gender bias. The skill development programme included classroom field practical sessions (20% classroom and 80% practical) and exposure visits to other organizations. Each programme essentially included exposure to all the agricultural machines required for carrying out tillage operations, seedbed preparation, sowing-planting and transplanting, weeding & plant protection, harvesting, threshing, straw management and selected post-harvest operations, besides technically correct and safe operation of tractors and its maintenance. Thus, a number of Technological Agents of Farm Machinery have been produced through this model.

Scheme details

The scheme has been introduced for providing mechanization

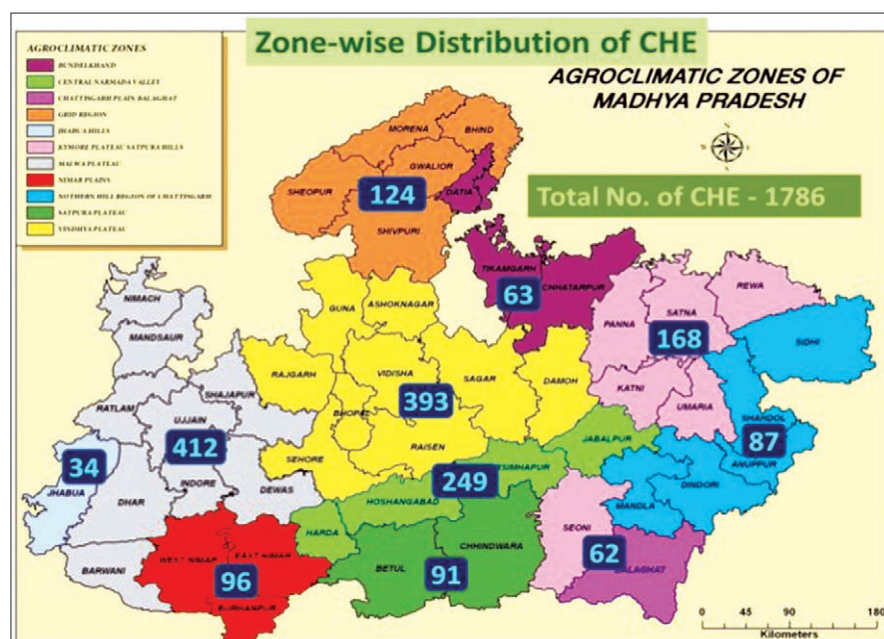


solutions to small farm holders who cannot afford to have their own machines, and that way to increase the mechanization of agriculture in the state. In order to ensure the availability of complete package of farm machines to the small farmers, the scheme has been introduced with certain measures as following:

- Eligibility: Persons below 40 years of age belonging to all categories. An applicant must be a graduate. (Preference to Agricultural Graduates).
- Custom hiring centres costing ₹ 10-25 lakh
- Subsidy: 40-50 percent subsidy upto to maximum ₹ 10 lakh. Subsidy only on loans obtained

from banks. “Back Ended Subsidy” (4-years lock-in period).

- Each unit should have at least one tractor, plough, rotavator, cultivator, disc harrow, seed-cum-fert drill and one thresher. Besides, selection of other suitable implements can be made on the basis of additional area and crops.
- Under the scheme tractors of 35 to 55 horsepower can be obtained.
- A centre will have to give tractor and agricultural implements on custom hiring for minimum ten years.
- Even if bank loan is repaid within this period, custom hiring services will have to be provided to farmers up to stipulated period. Sanctioned



loan will be recovered in maximum 9 years.

During 2012-13 to 2016-17, 1786 enterprises have been established, out of which 55% (986 participants) were trained at ICAR-CIAE.

Out of those participants who have established and running there custom hiring centres for more than a year (Sample size 110 entrepreneurs and 330 beneficiary farmers) were surveyed through personal visit. The data collected from various custom hiring enterprises and famers broadly include the financial details of the enterprise, machines owned, crops and operations for which custom hiring services being offered, custom hiring rates etc. and feedback, future requirements and constraints faced by entrepreneurs and farmers both.

Overall business-service scenario of custom hiring centres

Data from Custom hiring service centres was also collected for profitability and the services they are providing in terms of area coverage and number of families being served, which has been summarized as below in Table 1.

Table 1. Profitability from CHC.

Particulars	Annual Profit (₹ Lakh)	No. of Families Served	Area Covered- Annual (ha)
Average	2.50	103	153.2
Min.*	0.40	6	20.0
Max.	7.00	400	414.0

*Exceptional cases.

- 97% custom hiring entrepreneurs said that they got wide exposure to advanced agricultural machinery during the training at ICAR-CIAE which has been immensely helpful to them in selection of quality machines for their enterprise and also for future planning and expansion
- As far as knowledge on optimal operation and maintenance of machinery is concerned, 97% said that because of the practical knowledge and tips they got during the training, they have been able to minimize the operational expenses.
- 82% entrepreneurs also agreed that they learned about the further prospects in the field of custom hiring so as to maximize the annual use of machinery being owned by them and increase the profitability.
- 75% entrepreneurs are willing to receive support and guidance from ICAR-CIAE, in future too on technical aspects.
- 60% entrepreneurs realized that the training at ICAR-CIAE has also been helpful for them in developing linkages and collaboration.

Constraints faced by entrepreneurs

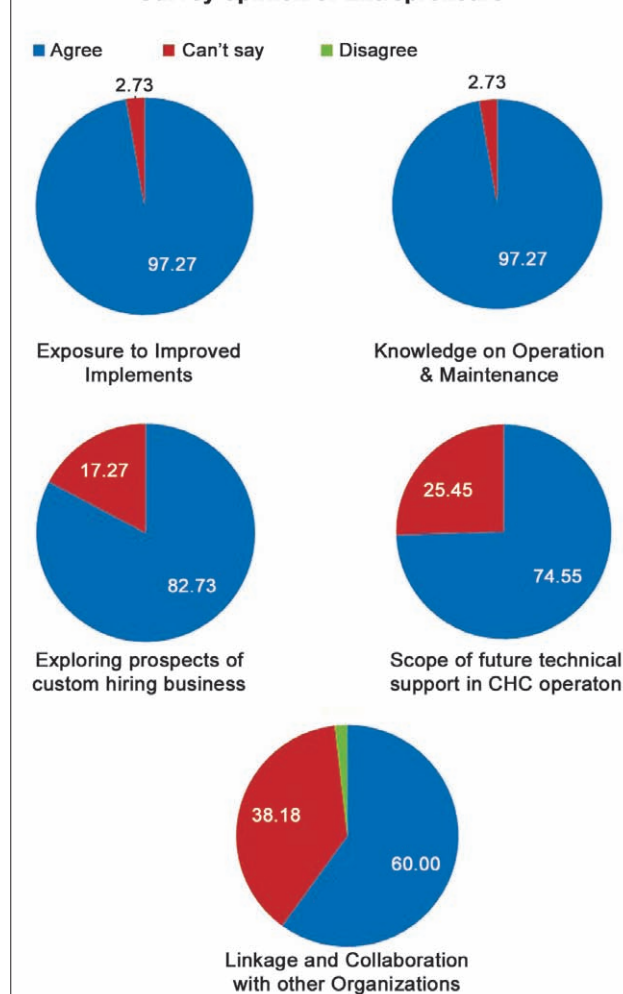
During survey, opinion of the entrepreneurs was also collected for the constraints being faced by them. The analysis of the same is given below.

i. Availability of repair-main-tenance facility:

65.5% told that adequate repair and maintenance facility was available in their area for the machines available with them. While, 33.6% showed concern about timely availability of the facility even when adequate Repair-Maintenance facilities are available within the vicinity.

ii. **Delay in payment:** This has been observed as the biggest constraint, as almost 90% entrepreneurs told that they worked on credit basis and sometimes they received the payment from season to season. Only 10.9% didn't have any problem related to payments from the farmers.

Survey opinion of Entrepreneurs



iii. **Availability of driver/operator:** Approx. 28% entrepreneurs are facing problem in availability of experienced operator. 72% didn't face any problem in this matter.

Benefits of training at ICAR-CIAE, as perceived by entrepreneurs

The entrepreneurs trained at CIAE also shared their opinion about the way they have been benefited with training at ICAR-CIAE.

Benefits to farmers

Besides survey of entrepreneurs, the associated/client farmers, who have been availing the custom hiring services from the entrepreneurs were also surveyed for the benefits realized from them. A total of 330 farmers (3-4 farmers associated with each entrepreneur) were interviewed and it was observed that the small farmers have been getting the machines for various operations timely from these entrepreneurs, which has precisely been the objective of the scheme i.e.

Table 2. Landholding wise client farmers

Marginal (< 1 ha)	10.8%
Small (1-2 ha)	21.0%
Semi-medium (2-4 ha)	26.9%
Medium (4 - 10 ha)	28.7%
Large (> 10 ha)	12.6%

to ensure the availability of complete package of farm machines to the small farmers. About 32% farmers availing the facility are those who have a loan holding of 1-2 ha only. Land holding wise distribution of farmers availing custom hiring services is tabulated below in Table 2.

Client farmers' opinion about benefits: The opinion of farmers was collected about the following:

- Increase in production
- Saving in input
- Saving in time
- Reduction in losses
- Reduction in cost of production

Data collected from client farmers during survey have been analysed and tabulated in Table 3.

Due to increased mechanization level and easy availability of improved machinery through custom hiring entrepreneurship, even small farmers are now getting encouraged to replace their traditional and time consuming farming practices with improved and mechanized protocols.

Outcome

Until so far, the growth of these custom hiring centres has not only contributed in increasing farm productivity but also in improving rural employment generation. It is raising the self-esteem of the youths associated with it and discouraging the rural migration as well. On the basis of a survey of farmers hiring various machines, major impact of "Custom Hiring Entrepreneurship Development" scheme on farmers and farming practices in Madhya Pradesh are as following:

Entrepreneurship

The entrepreneurs belonged to the age group of 22-40 years with graduates in any discipline as educational qualification. The investment made on custom hiring centre was ranged from 10 to 25 lakhs, inclusive of 40 to 50% subsidy (maximum ₹ 10 lakh) provided as

Table 3. Increase in average productivity of major crops

Major crops for which custom hiring services utilized	Average yield of crop before intervention (kg/ha)#	Average yield/expected yield after intervention (kg/ha)#
Soybean	Soybean – 1450	Soybean – 2580
Wheat	Wheat – 2800	Wheat – 4600
Gram	Gram – 1110	Gram – 2025
Paddy	Paddy – 1950	Paddy – 3500
Pulses & Lentil*	Lentil – 620	Lentil – 1460

*Contributed to significant increase in Cropping Intensity as Pulses family crops (Black gram, Green Gram etc.) are being taken as Third Crop in many areas, which could become possible only because of Increase in Mechanization Level.

#Source: Data made available by Directorate of Ag. Engg., Govt. of Madhya Pradesh

Back Ended Subsidy with 4-years lock-in period. This investment was made to procure at least one tractor, plough, rotavator, cultivator, seed drill or seed-cum-fertiliser drill, thresher and trolley. Besides, procurement of other suitable implements can be made for other farm operations like harvesting and residue management. The aim of this entrepreneurship development programme was to cater the mechanization needs of small farm holders who cannot afford to have their own machines as well as to increase the mechanization of agriculture in the state. The skill development programme included classroom as well as field practical sessions (20% classroom and 80% practical) and exposure visits to other organizations. Each programme essentially included exposure to all the agricultural machines required for carrying out various operations from tillage to post-harvest operations, besides technically correct and safe operation of tractors and its maintenance.

Till the end of 2014-15, a total of 413 aspiring custom hiring were trained and subsequently established their custom hiring centres in different villages across the state of Madhya Pradesh. Based on a sample survey conducted on a randomly drawn sample of 81 entrepreneurs and their 232 client farmers, it was observed that on an average, the entrepreneurs were earning a net

profit of ₹ 2.51 lakhs from the business by serving 103 customers per year covering an area of 153.2 hectare per annum. The custom hiring entrepreneurs also generated an average employment of 1455 man-hours (equivalent to 182 man-days) per enterprise by hiring operators for their machinery either on daily wage or monthly salary basis.

The client Success Stories of Custom Hiring Centres of Agricultural Machinery, M.P. farmers opined that the total production in their farms was increased by about 26% due to higher area coverage within the critical time available for farm operations, better uniformity in operation and greater input use efficiency due to mechanization (Table 4). At the same time, the losses in quantity and quality of output were also observed to be reduced by about 21% due to timeliness especially in harvesting, threshing and transport operations. They unanimously agreed that the

Mandatory Machinery

- Tractor
- Plough
- Rotavator
- Cultivator
- Seed Drill/Seed-cum-Fertilizer Drill
- Thresher
- Trolley

Table 4. Farmers' opinions on CHC Benefits.

Values (%)	Production	Losses	Input	Time	Cost
AVG	26.1	21.1	28.4	51.0	33.2
Max	40.0	50.0	60.0	80.0	50.0
Min	10.0	0.0	5.0	15.0	15.0

saving of time during the critical period was the most crucial benefit of farm mechanization, particularly in unfavourable climatic conditions. They claimed that the problem of unavailability of casual farm labourers during peak period of cultivation coupled with exorbitantly rise in wages for farm labourers resulting into escalation of cost of farm operations, can only be addressed by mechanization of farm operations. As a result, a saving of about 33% in cost of operation has been realized by them.

The entrepreneurs trained at CIAE also shared their opinion about the way they have been benefited with training at ICAR-CIAE. About 97% of the custom hiring entrepreneurs said that they got wide exposure to advanced agricultural machinery during the training at ICAR-CIAE which was immensely helpful to them in selection of quality machines for their enterprises and also for future planning and expansion. They were of the opinion that the practical knowledge on appropriate operation and maintenance of machinery provided during the training at ICAR-CIAE also enabled them to minimize the machine break-down and increase the service life. About 83% of them also agreed that they learned about the further prospects in the field of custom hiring which may be helpful for them to adopt larger machinery. Keeping high expectations on ICAR-CIAE for technical support

Table 5. Year wise detail of Trained Entrepreneurs and their establishment

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Total
Trained	240	173	295	251	194	213	1366
Established Centres	219	146	277	238	172	191	1243

and guidance, about 75% of the entrepreneurs were willing to seek alliance and cooperation on technical aspects from this institute in future also. At the same time, 60% of the entrepreneurs realized that the training at ICAR-CIAE was also helpful for them in developing linkages and collaboration with other government departments and agencies. Overall, they found that the training imparted at ICAR-CIAE, Bhopal was immense helpful to shape their maiden venture in the field of custom hiring services of agricultural machinery.

Business Economics of Custom Hiring Centre

- Age Group of the entrepreneurs = 22-40 years
- Investment made on machinery = ₹ 10-25 lakhs
- Back-end Subsidy = 40%-50% (Max. 10 lakhs)
- Lock-in period = 4 years
- Average annual net income = ₹ 2.51 lakhs
- Average number of farmers served annually = 103
- Average area covered / annum = 153.2 hectare
- Employment generated / annum = 182 man-days.

A Typical Package for Custom Hiring Centre

- Tractor 50 to 60 hp
- Reversible Moldboard plough (2-3 bottom)
- Tractor drawn cultivator (11 tyne)
- Tractor operated rotavator (2 m width)
- Tractor front mounted leveler
- Seed-cum-fertilizer drill (11 rows)
- High capacity multi-crop thresher
- Combine harvester (14 feet)
- Straw reaper
- Tractor drawn trolley

Economic Advantage of Mechanization (%)

- Increase in Productivity 12-34
- Saving in Seeds 20
- Saving in Fertilizers 15
- Enhancement in cropping intensity 5-22
- Increase in gross income of farmer 29-40

Total 1366 Entrepreneurs have been trained by ICAR-CIAE, Bhopal and more than 1240 have been established Custom Hiring Enterprises (Table 5).

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Need to harness youth's potential to end hunger

FAO Director-General speaks at World Youth Forum

16 December 2019. "Youth face immense challenges, reason why it is imperative to scale up youth-focused initiatives and harness their potential to reach the UN Sustainable Development Goal 2." This was FAO Director-General QU Dongyu's main message at a panel on food security in Africa at the World Youth Forum.

"We live in a challenging time," said the FAO Director-General.

Qu went on to highlight the challenges young people in Africa and Middle East are grappling with — rising hunger and malnutrition, uptake of increasingly unhealthy diets, lack of stable jobs and income opportunities, climate change, water scarcity, and in some countries, conflict.

"But we must not feel discouraged by these challenges. There are more solutions than challenges," said the FAO chief.

"We need the energy and potential of young people to achieve rural transformation, and achieve the Sustainable Development Goal (SDG) 2," added Qu.

Failing to achieve SDG2 places reaching all SDGs at risk, stressed Qu.

Making the most of innovation, digital technology, investments, encouraging youth's greater appreciation of sustainable and healthy food systems and enhanced policies are some of the solutions mentioned by the FAO Director-General.

To this end, Qu also presented FAO's recently announced Hand-in-Hand initiative, which seeks to match donors and recipients in a more targeted way to assist the most vulnerable people and help to achieve the SDGs.

Courtesy : <http://www.fao.org/news>