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Farmers' Perception, Usefulness and Impact of Custom Hiring Centre: A Case Study of Buxar district in Bihar

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ABSTRACT

Mechanization and sustainable resource management are critical for enhancing agricultural productivity, especially among small and marginal farmers. To address this, a Custom Hiring Centre (CHC) was established at Krishi Vigyan Kendra, Buxar, Bihar, to provide easy access to agricultural machinery for farmers. The CHC offers various resource-conservation machines, such as the happy seeder, multi-crop planter, raised bed planter, tractor-mounted sprayer, cultivator, and laser land leveler, on a rental basis. A survey was conducted to assess farmers' perceptions and the usefulness of the CHC, collecting data from 49 beneficiary farmers using an interview schedule. Descriptive statistical tools were used for data analysis. In the year 2022-23, the CHC generated a revenue of Rs. 1,77,646 by covering an area of 119.5 hectares. The rental rates for machinery were kept low to make them affordable for small and marginal farmers, who are often economically constrained and unable to purchase modern agricultural equipment. The CHC has become a vital resource for non-Climate Resilient Agriculture (CRA) farmers in the region, enabling them to practice farming with reduced labor. The use of these machines has increased profitability by lowering labor costs and, more importantly, acted as a catalyst for the rapid demonstration and adoption of climate-resilient agricultural practices.

Keywords: Custom hiring centres, Climate resilient Agriculture, economics Farm mechanization, usefulness

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INTRODUCTION

The Indian agriculture sector is largely dominated by small and marginal farmers. According to the Agricultural Census 2015-16, small and marginal farmers (those with landholdings of less than 2 hectares) constitute 86.2% of the total farmers in India, operating around 47.3% of the total agricultural land. During recent times, several studies have pointed out scarcity of human labour as one of the major agricultural constraints. With increasing urbanization and migration of people from rural to urban area for better job opportunities further aggravates this situation (Chandra et al. 2018). Therefore, alternate ways of managing human labour is necessary for which farm mechanization can be the most appropriate answer. Mechanization not only saves labour in agriculture but also contributes in enhancing productivity, improving quality of produce and help in sustainable management of natural resources like soil, water, biodiversity etc. The country has seen significant changes in use of machineries in agricultural sector in last few decades (Shubha et al. 2020). The shift can be seen from the fact that animal power has reduced significantly in last three decades. Forecasting of use of power evaluated that use of animate power sources in 1960-61 was very high i.e 93% which will come down to an estimated figure of only 4.1% in 2032-33 suggesting increasing mechanization at a faster pace (Tiwari et al. 2019). With limited availability of human labour, agriculture is now becoming mechanization driven. Using implements and machineries has increased the efficiency of agriculture sector and at the same time it has reduced the drudgeries faced by farmers and agricultural labors during farming related activities. Despite many benefits of using machineries, large number of small and marginal farmers struggle to access timely modern farming tools (Singh et al. 2022). This is largely due to higher cost of machineries which negatively affects the affordability of small and marginal farmers to buy it. Under such scenario, Custom Hiring Centres (CHCs) can play the role of the game changer. A custom hiring centre facilitates the availability of small and large machineries to farmers at one place which can be hired by farmers on hourly or daily basis with some fixed amount of money. It is a win-win situation for both farmers and service providers as farmers does not have to pay heavy amount of money for using machines and service providers gets a regular income from the custom hiring centre. Owning a

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machine has its benefits but custom hiring of these from CHCs gives economical and adaptable solutions to those farmers having low purchasing power (Blank et al. 1991). The progress of CHCs got the boost after the launch of Special Sub-Mission on Agricultural Mechanization (SMAM) during 12th plan (2012-2017) by the Indian government. The mission emphasized 'Small and Marginal Farmers' and promoted 'Custom Hiring Services' through a 'rural entrepreneurship' model (Tiwari et al. 2019). Current data shows that there is a total of 74144 CHCs registered in India till October, 2023. Among the states, Punjab tops the list with a total of 11,133 centres, followed by Andhra Pradesh and Haryana with 8,471 and 8,253 centres respectively. In eastern Indian states, custom hiring centres have not progressed well as states like Odisha, Bihar, Jharkhand, Assam, Chhattisgarh and West Bengal together have only 6345 CHCs which contribute 8.55% of total CHCs in India (Bethi and Deshmukh 2023). Bihar state has only 685 centres which needs to be enhanced since 90% of farmers in Bihar comes under small and marginal category as per agricultural census. Under the Climate Resilient Agriculture (CRA) Programme funded by Govt. of Bihar; custom hiring centre was established at Krishi Vigyan Kendra, Buxar during 2021-22. Several machineries like zero tillage machine, raised-bed planter, multi-crop planter, straw baler, happy seeder etc. were purchased and given to beneficiary farmers of the project area. The main aims were to popularize the climate resilient technologies in the region and increase its adoption rate among farmers sustainable natural resource management. This centre is serving farmers of nearby villages since last 3 years. While Custom Hiring Centers (CHCs) provide affordable access to agricultural machinery for small and marginal farmers, several research gaps remain. There is limited research on the perception of farmers users regarding CHCs in less-developed states like Bihar. Farmers' perception plays important role in success of CHCs. Therefore, current study was undertaken to find out the economic benefits, farmers' perception and usefulness of this CHC.

MATERIALS AND METHODS

The CRA programme is being implemented in five selected villages of Buxar district since 2020. The present study was conducted in these villages of Buxar namely Dalsagar, Balapur, Churamanpur, Ramobariya and Harikishanpur (Fig. 1). The identified technologies like zero tillage method, laser land leveling, raised bed planting, balance fertilizer dose, integrated pest management etc. were implemented on more than 500 farmers' field covering almost 1500 acres of land. The required machineries were purchased and many awareness programs were organized along with on farm demonstration of climate resilient technologies. Farmers were encouraged to hire machineries from CHCs. This study was conducted to assess the perception of farmers regarding the services of CHCs and its usefulness. The perception was measured using seven statements on scale of three (3) points continuum based on farmers agreement i.e., strongly agree, agree, and disagree. Similarly, the usefulness of CHC was also measured on three (3) points continuums i.e., highly useful, moderately useful, and not useful categories. The weightage was given as 2, 1, and 0 for highly useful, moderately useful, and not useful categories respectively and weighted mean score (WMS) was calculated for each response. The constraints faced by farmers in service delivery through CHCs were analyzed in terms of severity i.e. severe, moderate and no constraints. The impact of CHC was also analyzed based on number and frequency of implements hired, its hiring charges and income generation by hiring of major machineries by beneficiary farmers. Data was collected from selected villages with a sample size of 49 randomly selected beneficiary farmers from all selected villages. Survey method was used for collection of data using a structured interview schedule. Data was analyzed using suitable statistical tools like mean standard deviation, frequency, percentage, correlation, etc.

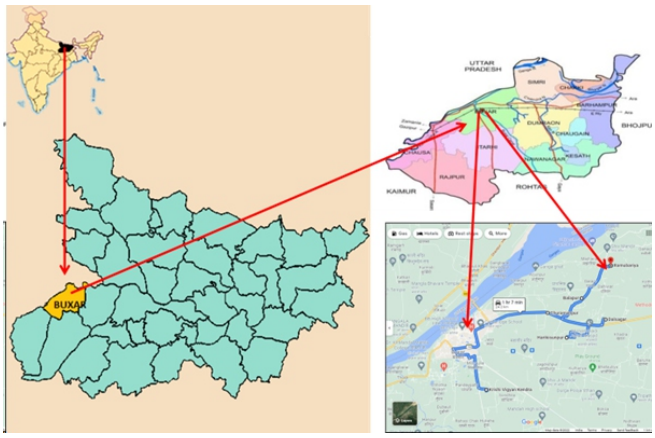

Fig. 1: Study Area in Buxar District

RESULTS AND DISCUSSION

Socio-economic status of beneficiary CHC farmers

The socio-economic status of the beneficiary farmers was assessed using frequency and percentage. It was observed that majority of the beneficiary farmers were highly experienced with >50 years age. Their education level was found to be low as almost half of them had only primary education. Only 30.6% of them were graduate. Landholding is an important factor which can affect mechanization. The analysis revealed that small and marginal farmers constituted 3/4th of the total beneficiary farmers having 0-2 ha land. Since these farmers do not have ability to purchase equipment and machinery, they hired it from the CHC. The annual income of the majority of farmers (55.1%) was found to be higher than 1.5 lakhs per annum. As far as availability of family labor is concerned, 63.3% of farmers had less than two family labor available for farming which may be a favourable factor for hiring of machineries from CHCs.

Table 1: Socio-economic status of beneficiary farmers **(n=49)**

Sl. No.	Variables	Category	Frequency	Percentage (%)
1	Age	18 – 35 yrs. old	12	24.5
		35 – 50 yrs. old	14	28.6
		>50 yrs. old	23	46.9
2	Education	Primary (<10th)	22	44.9
		Secondary (10th -12th)	12	24.5
		Graduation	13	26.5
		Post-Graduation	2	4.10
3	Land holdings	Small & Marginal (<2 ha)	38	77.6
		Semi-medium (2 – 4 ha)	11	22.4
		Medium (4 – 10 ha)	0	0.00
		Large (>10ha)	0	0.00
4	Annual income	< 1.5 lakhs	22	44.9
		1.5 – 4 lakhs	19	38.8
		>4 lakhs	8	16.3
5	Family labors	0-2 nos.	31	63.3
		2-4 nos.	12	24.5
		>4 nos.	6	12.2

Farmers' perception about service delivery through CHC

Farmers' perception on delivery of services through CHC was measured based on their extent of agreement on seven statements related to services. A total of 80% of the farmers strongly agree about the 'availability of expert drivers and operators at CHC' and 'quality service at reasonable price' with highest Weighted Mean Score (WMS) of 1.82. Farmers were also strongly agreeing on services like 'follow up by the visit of CHC personnel to field' and 'availability of all modern machineries at CHC' with WMS of 1.8. Kadaraiah et al., in their study of perception of farmers about CHCs observed that the overall perception of 43.8% of farmers were recognized as under favorable level of perception towards CHCs. However, there were some causes of concern about the repair of machineries (WMS, 1.61) and good condition of machines in CHCs (WMS, 1.69).

Table 2: Perception of farmers towards delivery of services through Custom hiring centres (n=49)

Sl. No.	Statements	Frequency			Weighted mean score (0-2)
		Strongly agree	Agree	Disagree	
1	All modern machineries are available at CHC	39	10	0	1.8
2	The pre booking service facility is available for farmers	36	13	0	1.73
3	Expert drivers and operators are available in CHC	40	9	0	1.82
4	Quality service is available at reasonable price	40	9	0	1.82
5	Visit of farmers field after work by CHC personnel	40	8	1	1.80
6	Repairs of machineries are one in CHC	30	19	0	1.61
7	Machineries available in CHC are in good condition	34	15	0	1.69

Usefulness of CHC

The perceived usefulness of CHC by the beneficiary farmers was calculated using weighted mean score. Almost 95% of farmers were convinced that CHCs are highly useful in terms of benefit of reduction in cost of cultivation with highest weighted mean score of 1.96. A study in Haryana observed that the farmers who hired the machines from CHCs found 10.52 per cent reduction in the paddy operational costs. Also, the net returns of these farmers were approximately 27.06 percent higher (Rawal et al. 2024). Results of this study showed that some other benefits viz. early sowing of crops, reduction in drudgery of farm operations, and easy and timely access to machineries through CHC with their second highest WMS of 1.9. Some studies found out that CHCs have a prominent role in increasing the crop productivity and efficiency of agricultural practices. It was indicated that the CHCs' beneficiaries cost a lower input and receive high net returns from farming (Ganavi et al. 2024). The benefits like 'Timely use of sprayers from CHC helps in effective control of pest and diseases' and 'CHC provides employment opportunities to skilled labour and artisans' were found to be moderately useful with weighted mean score of only 1.31. There were some concerns on benefits viz. 'reduction in the harvest and post-harvest losses and easy access to machineries for small and marginal farmers in CHC' since significant number of respondents termed these as moderately useful with WMS of only 1.55. This result is in confirmation with the findings of earlier study in which it was found that small and medium- sized farmers were unable to hire the farm equipments from CHCs due to high hiring price and the large farmers were in great need of hiring through CHCs (Kadaraiah et al. 2022). CHCs have the potential for integrating agricultural inputs, equipments, seeds with the help of several partners in the environment. It also facilitates the small farmers with capital intensive, high quality, and efficient farm mechanization (Nissa et al. 2017).

Table 3: Perceived usefulness of CHC by farmers

(n=49)

Sl. No.	Variables	Frequency			Weighted mean score (0-2)
		Highly useful	Moderately useful	Not useful	
1	Reduction in cost of cultivation of different crops	47	2	0	1.96
2	CHC helps in early sowing of crop thus saving time	44	5	0	1.90
3	CHC reduces drudgery in farm operations	44	5	0	1.90
4	Easy to get services from CHC without any procedural delays	44	5	0	1.90
5	CHC are charging nominal rents for farm machineries	40	9	0	1.82
6	Timely use of sprayers from CHC helps in effective control of pest and diseases	16	32	1	1.31
7	Through CHC, all modern machineries can be availed in time	39	8	2	1.76
8	CHCs help in overcoming shortage of labor in agriculture	38	8	3	1.71
9	Crop residue burning events have come down drastically with CHC services	35	14	0	1.71
10	In my view with CHC services, farmer can reduce the harvest and post-harvest losses	27	22	0	1.55
11	A farmer has to pay only for number of acres or hours used for the machineries rented	43	6	0	1.88
12	Small and marginal farmers can avail this facility easily and get the machine for agricultural operations	27	22	0	1.55
13	In my view CHC provides employment opportunities to skilled labour and artisans	17	30	2	1.31
14	Establishment of CHC has increased cropping intensity in my area	35	13	1	1.69

Constraints related to services of CHC

The constraints faced by the farmers related to Custom Hiring Centers (CHCs) facility were measured based on its severity. The results showed that lack of subsidy and incentives by Government is a major constraint followed by the lack of awareness about CHC among the farmers. More than half of the farmers realized the need for subsidies and different types of incentive for establishing CHC. It was also observed that the staff of CHC lacked knowledge about operation, maintenance, repairing of machineries and 60% of farmers faced it as a moderate constraint. Due to the limited number of machineries in CHC, 44% of farmers said that their farm operations will be delayed due to dependency on CHC. Earlier studies also had similar findings as it suggested that number of highly demanded farm machineries should be increased for peak seasons (Kumar et al. 2021). More than 1/3rd of farmers reported non-availability of machineries during peak season as moderate constraint.

Table 4: Constraints faced by farmers in getting CHC facility (n=49)

Sl. No.	Particulars	Frequency		
		Severe constraints	Moderate constraints	No constraints
1	Non availability of machines during peak season	1	19	29
2	Possibility of spread of disease through contaminated machines provided by CHC	0	2	47
3	There is lack of awareness about CHC among farmers	15	13	21
4	In my view both modern and traditional farm machineries are not available in CHC	1	4	44
5	In my view farm operations are delayed if I depend on CHC for farm machinery or equipment	0	22	27
6	There is lack of knowledge among CHC personnel in aspects of operation, maintenance and repair of equipment	0	30	19
7	In my view CHC staffs are not supportive and cooperative	0	0	49
8	I feel that lack of subsidy and incentives by government to CHC has hindered the spread of farm mechanization	28	11	10
9	Difficulty in transport of heavy machines to farmers field	1	21	27
10	Rental charges are costly and not affordable	0	1	48
11	Distance of CHC from village is more	0	22	27

Impact of CHC on farming of the region

The impact of CHC was also estimated in terms of area covered through machineries, number of farmers covered and resource generation. Results shown in table revealed that a total of 821 farmers have taken services from this CHC at KVK, Buxar. The implements from CHC were used for mechanization of 1042 acre area. Most of the farmers approached for hiring of multi crop planter, happy seeder and raised bed planter. These three implements together contributed 66.12% of total area and 81.36% of total farmers covered by CHC. The evaluation of CHC established in Ananatapuram district of Andhra Pradesh also revealed similar results as planters (66%) and threshers (10%) were more in demand for hiring by farmers as compared to other machineries (Reddy et al. 2024). As far as, the resource generation is concerned, the CHC has generated almost 10 lakh rupees during 2023. This is a good indicator that CHC has positively impacted the agriculture sector in adopted villages. The increased mechanization not only helps in timely operations during crop cultivation but also saves significant amount of financial resources for farmers.

Table 5: Impact of CHC through area and farmers coverage in the region during 2023
*Running through service providers around the selected villages

Sl No.	Major Machineries	Rental charges (Rs/hour)	Working hour/year	Area covered (Acre)	Farmers covered (No.)	Resource generated by CHC
1	Zero Tillage Machine	550	41	43.69	11	24030
2	Straw Baler	800	95	80	25	76000
3	Happy Seeder*	650	191	164	171	124150
4	Multi Crop Planter*	700	335	345	375	234500
5	Raised Bed Planter*	700	220	180	122	154000
6	Cultivator	550	93.56	102	14	51458
7	Laser Land Leveler	2500/acre	146.4	113	86	282500
8	Potato Planter	750	10	5	5	7500
9	Potato Digger	750	16	10	12	12000
	Total	-	1147.96	1042.69	821	966138

The findings suggest that the Custom Hiring Center (CHC) at KVK, Buxar, significantly supports agricultural mechanization for small and marginal farmers by providing access to essential equipment. The high usage and revenue generation from machines like the Multi Crop Planter, Happy Seeder, and Laser Land Leveler highlight their importance, consistent with Reddy et al. (2024), who reported a similar trend in Anantapuram, Andhra Pradesh, where planters and threshers were the most hired equipment, contributing to a revenue of Rs. 21 lakhs from serving farmers in 200 villages over 12 years. Murugesan (2021) also found that CHCs in Tamil Nadu benefited 500-600 farmers per block or village, reducing cultivation costs and enhancing farm income through timely mechanization. These CHCs generated an average income of Rs. 0.5 to 1.5 million over three years, enabling them to purchase additional equipment. Chander and Kumari (2023) further emphasize the role of CHCs in promoting water conservation, sustainability, and an eco-friendly agricultural environment.

CONCLUSION

The study reveals that Custom Hiring Centers (CHCs) are perceived positively by most farmers, with 80% strongly agreeing on the availability of expert operators, quality service at a reasonable price, and modern machinery, leading to a high weighted mean score (WMS) of 1.82, 1.82 and 1.8, respectively. The CHCs have significantly contributed to the mechanization of 1,042 acres and served 821 farmers, highlighting their role in reducing costs and increasing profitability. However, concerns remain regarding machinery maintenance (WMS 1.61) and availability during peak seasons, with 44% of farmers reporting delays due to limited equipment. A major constraint identified is the lack of subsidies and incentives, which affects CHC accessibility, especially for small and marginal farmers. Additionally, gaps in staff knowledge about machinery maintenance and repairs were noted by 60% of farmers. Despite these challenges, CHCs have proven beneficial in reducing cultivation costs, improving early sowing, reducing drudgery, and offering timely access to farm machinery. The CHCs' role in enhancing crop productivity and efficiency by lowering input costs and providing higher net returns was well-documented, aligning with previous studies. However, to maximize their potential, there is a need to address constraints related to government incentives, staff training, and machine availability during peak periods. Expanding the number of CHCs and improving their service delivery could further integrate small farmers into capital-intensive, high-quality farm mechanization, thereby promoting sustainable agricultural practices.

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