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### Custom hiring centers: A pathway to sustainable mechanization for small farmers in Adilabad district

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#### Abstract

Agricultural mechanization is vital for enhancing productivity and reducing labor costs, especially for small and marginal farmers in India. The National Initiative on Climate Resilient Agriculture (NICRA) project addresses this by establishing Custom Hiring Centers (CHCs) to provide affordable access to modern farming equipment. This study examines the CHCs in Lachampur, Sakinapur and Palsi K villages in Adilabad district. The main objectives were to improve access to agricultural implements, reduce labor costs, and increase productivity, particularly during the rabi season. The study involved surveys, forming a Village Climate Risk Management Committee (VCRMC), and monitoring revenue generated through rental services. The total revenue across all three villages was ₹1,07,560, benefiting 225 farmers and covering 576 hectares. Implements like battery sprayers and tarpaulins were widely used, improving plant protection and post-harvest management. The results highlight the success of CHCs in overcoming financial barriers and promoting sustainable mechanization, offering a viable solution for improving agricultural productivity and resilience among smallholder farmers.

**Keywords:** Custom hiring centers, agricultural mechanization, small farmers, NICRA project, farm equipment rental, climate resilience

#### Introduction

Agricultural mechanization plays a crucial role in increasing productivity and reducing labor costs, especially for small and marginal farmers. These farmers, who often face financial constraints, can greatly benefit from mechanization, as it helps them enhance production efficiency. However, one of the major challenges of mechanization is the high cost of modern farming equipment. For individual farmers, especially those with limited income, purchasing such equipment can be financially unfeasible. In India, where a significant proportion of the farming community is made up of small and marginal farmers, access to affordable modern farming technology remains a key barrier to adopting mechanization (Aryal *et al.*, 2021; Singh and Kisku, 2022) [2, 16]. High competition, transportation costs, and operational expenses further challenge economic viability. Additionally, environmental impacts and technological gaps may limit the adoption of sustainable and advanced farming practices (Bhatt *et al.*, 2023) [4].

The National Initiative on Climate Resilient Agriculture (NICRA) project addresses these challenges by promoting mechanization through the establishment of Custom Hiring Centers (CHCs) in rural areas. The NICRA project ensures cost-effectiveness and efficient resource usage while improving the timeliness and precision of agricultural operations, which are essential for smallholder productivity in an increasingly unpredictable climate. With CHCs set up in 121 villages, the NICRA project not only helps farmers gain access to modern machinery but also strengthens the

farming community as a whole by offering a collaborative and supportive approach. The initial investment for each center, which amounts to Rs. 6.25 lakh, contributes to the financial sustainability and operational success of these centers, making them a viable and long-term solution for rural mechanization (Ministry of Agriculture & Farmers Welfare, 2021; Bethi and Deshmukh, 2023) [10, 3].

In India, 86.2% of farmers are small and marginal, owning less than two hectares of land. Their limited resources and high machinery costs make ownership difficult (Bhatt *et al.*, 2023) [4] and CHC aims to rent farm equipment to small, marginal, and low-income farmers at affordable prices for short periods (Rakhra and Sigh, 2022) [12]. The success of CHCs, however, goes beyond their financial viability. The acceptance and use of these centers by farmers depend largely on their perceptions and attitudes towards them. The effectiveness of CHCs is significantly influenced by farmer's awareness and trust in these centers. While misinformation can limit their impact, positive experiences and testimonials from early adopters can foster broader acceptance, encouraging more farmers to take advantage of this cost-effective alternative to purchasing expensive machinery (Reddy *et al.*, 2022) [13].

Custom Hiring Centers (CHCs) help small and marginal farmers by providing affordable access to modern farm equipment, reducing the financial burden of ownership. They enhance productivity, ensure timely agricultural operations, and promote sustainable and eco-friendly farming practices. CHCs also reduce labor dependency, improve crop quality and support income diversification by

enabling farmers to try new techniques. Additionally, they foster rural economic growth, lower machinery maintenance costs and facilitate knowledge transfer (Bhatt *et al.*, 2023) [4].

Moreover, the challenges of climate change, such as frequent droughts, erratic rainfall and extreme weather events have further compounded the need for mechanization. These climatic shifts have reduced the number of workable days, making it essential for farmers to adopt more efficient and timely farming practices. In this context, CHCs that provide access to appropriate machinery have become a critical strategy to meet the mechanization needs of small and marginal farmers, ensuring their resilience in the face of changing climatic conditions (Srinivas *et al.*, 2017) [17]. By addressing both financial and technological barriers, CHCs offer a promising solution to improving agricultural productivity and sustainability in rural India. These centers not only offer a way for farmers to overcome the financial barrier to mechanization but also play a role in fostering resilience to climate variability, further supporting the long-term sustainability of Indian agriculture. Financial performance, operational efficiency, cost-sharing arrangements and the ability to address labor shortages as key factors influencing the economic viability of custom hiring centers (CHCs) in maize cultivation in Karnataka's Vijayapur district (Das and Patil, 2024) [6].

With the view of all, the study was undertaken with the objectives of improving the accessibility of modern agricultural implements for small and marginal farmers in the three villages, reducing the labor cost and enhancing the productivity of farmers in the villages through CHC and to facilitate and increase the area under rabi cultivation.

## Materials and Methods

Custom hiring of farm machinery was first introduced in Indian agriculture in the 19th century (Srinivasarao *et al.*, 2013) [18]. Establishment of CHCs in Adilabad district initiated under TDC NICRA (KVK, Adilabad) in the year 2022 in Lachampur, Sakinapur and Palsi K villages of Talamadugu mandal and Adilabad district.

The establishment of Custom Hiring Centers (CHCs) commenced with primary data collection through household surveys conducted in 2022. These surveys evaluated agricultural practices, resource requirements, and mechanization challenges faced by small and marginal

farmers in these village. Based on the findings, a Grama Sabha was organized to engage the community and establish the Village level Climate Risk Management Committee (VCRMC). This committee oversees the planning, financial management, and operations of the CHCs as per the guidelines of Krishi Vigyan Kendra, Adilabad. The committee members collaboratively opened a bank account in the name of villages respectively in three villages to deposit the revenue generated from the usage of farm machinery. The VCRMC played a pivotal role in setting affordable rental rates for farm equipment, managing maintenance funds and ensuring sustainability (Srinivas *et al.*, 2017) [17]. VCRMCs collaborated with Krishi Vigyan Kendra (KVK), Adilabad for technical guidance and weather-related updates.

Farm implements were allocated to the CHCs based on local agro-climatic conditions and cropping patterns. These included 9-tine cultivators, 3 MB ploughs, bed makers for land preparation, bullock-drawn seed drills and manual hand push seed drills for seed sowing, battery sprayers for plant protection, drip and sprinkler irrigation systems for effective water management and tarpaulins for post-harvest management. These tools were made accessible to farmers at reasonable rental rates, enhancing efficiency and productivity (Anil *et al.*, 2023) [1]. Daily farming operations were guided by real-time weather data, with KVK scientists offering advice on land preparation, sowing, irrigation, pest management, and post-harvest activities (Anil *et al.*, 2023) [1].

The financial management system for the CHCs revolved around a joint bank account, where rental income was deposited and utilized for equipment maintenance and operational costs (Srinivas *et al.*, 2017) [17]. Regular monitoring and impact assessments were conducted to measure the effectiveness of the CHCs (Reddy *et al.*, 2022) [14].

## Results and Discussion

The data on revenue generation through various agricultural implements at Custom Hiring Centres (CHCs) underscores their critical role in enhancing farm mechanization and supporting small and marginal farmers. CHCs have enabled timely, efficient and cost-effective access to farming equipment, leading to improved agricultural productivity and resource utilization.

**Table 1:** CHC-wise status of account balance

S. No.	Name of the CHC	Balance (Rs.)
1	Lachampur	41850
2	Sakinapur	39658
3	Palsi K	26052
	Total	107560

The amounts generated by the Custom Hiring Centers (CHCs) established under the NICRA project through the use of agricultural implements include, ₹41,850 for Lachampur CHC, ₹39,658 for Sakinapur CHC and ₹26,052

for Palsi K CHC, totaling ₹1,07,560 across all three villages. This highlights the financial output of the CHCs, reflecting their contribution to agricultural operations through the rental or usage of implements.

**Table 2:** Implement wise amount generated through CHC

S. No.	Name of Implement	Area (ha)	No. of farmers utilized the equipment	Amount generated as revenue (Rs.)	Remarks
1	Bullock drawn seed drill	34	46	11224	Increased accessibility of farm mechanization
2	9 Tyne cultivator	101	53	13094	
3	3 MB plough	120	38	9353	
4	Manual hand push seed drill	23	23	5612	
5	Bed maker	63	20	8106	
6	Battery sprayers	158	316	19486	Timely adoption of plant protection measures
7	Water carrying pipes	76	28	17147	The increased area under rabi cultivation
8	Tarpaulins	-	191	23538	Minimized post-harvest losses
	Total	576	715	107560	

Implements such as the bullock-drawn seed drill and manual hand push seed drill played a pivotal role in small-scale mechanization, particularly benefiting marginal farmers. The revenue generated by these implements (Rs. 11,224 and Rs. 5,612, respectively) reflects their accessibility and suitability for small land holdings. Furthermore, the widespread use of the 9 Tyne cultivator and 3 MB plough, with revenues of Rs. 13,094 and Rs. 9,353, respectively, highlights the adoption of tools for efficient land preparation, reducing labor dependency and improving soil management.

Battery-operated sprayers were as the most widely used equipment, with a total of 316 farmers utilizing them and generating Rs. 19,486 in revenue. Their popularity signifies the importance of timely plant protection measures in ensuring higher crop yields and safeguarding against pest and disease management duly following the agro advisory services. Similarly, the use of water-carrying pipes, which generated Rs. 17,147, facilitated better irrigation access, thereby increasing the area under rabi cultivation and enhancing cropping intensity.

Post-harvest losses were significantly minimized through the use of tarpaulins, which generated the highest revenue among all implements (Rs. 23,538). This emphasizes the importance of providing farmers with tools that ensure proper drying and storage of produce, minimizing post-harvest losses and improving marketability.

CHCs collectively generated Rs. 1,07,560 in revenue by serving 225 farmers and covering 576 hectares. These figures indicate the effectiveness of CHCs in bridging the mechanization gap for smallholders and enhancing operational efficiency in agriculture. The data also highlights the role of CHCs in promoting sustainable farming practices by ensuring timely access to mechanization resources. This profitability indicates that the CHCs are effectively meeting local agricultural needs and their performance suggests a strong farming model for farm machinery rental services in the villages of Lachampur, Sakinapur and Palsi K. The initiative of CHCs resulted in a 20 per cent increase in rabi crop intensity, highlighting the advantages of timely access to machinery. Continuous engagement with farmers ensured the CHCs remained accessible and adaptable, fostering the adoption of climate-resilient agricultural practices under the NICRA project. The observations of the study are in conformity with the findings of Chahal *et al.* (2014)<sup>[5]</sup>; Kumar and Mahadevaiah (2017)<sup>[9]</sup>; Shoba (2018)<sup>[15]</sup>; Kumar and Meena (2021)<sup>[8]</sup>; and Das and Patil (2024)<sup>[6]</sup>.

## Conclusion

Custom Hiring Centers (CHCs) play a vital role in increasing small and marginal farmers' access to mechanization, boosting output, and lowering labor expenses. The results highlight how crucial CHCs maintained by VCRMC to maintaining sustainability over the long run and guaranteeing transparency. CHCs' ability to give smallholder farmers access to affordable agricultural machinery suggests that they possess the potential to be a significant approach for advancing resilience and mechanization in Indian agriculture.

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