



Constraints of Custom Hiring Services Utilization & Suggestions for Advancing Farm Mechanization in Vijayapur District of Karnataka, India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: <https://doi.org/10.9734/jeai/2024/v46i92853>

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/123270>

Original Research Article

Received: 02/07/2024

Accepted: 03/09/2024

Published: 03/09/2024

ABSTRACT

Indian agriculture has been evolving significantly, with one notable transformation being the shift from muscle power to mechanical power. Thus farm mechanization has a direct impact on crop productivity. However, small and marginal farmers often face financial constraints that prevent them from acquiring the necessary machinery. Custom Hiring Centers (CHCs) offer a viable solution by providing access to farm machinery at affordable rates. Custom hiring represents a farm machinery sharing practice, enabling farmers to utilize essential equipment without the burden of ownership costs. But there are some prominent lingering concerns associated with the functioning of custom

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Cite as: Das, Chitra, and S. B. Patil. 2024. "Constraints of Custom Hiring Services Utilization & Suggestions for Advancing Farm Mechanization in Vijayapur District of Karnataka, India". *Journal of Experimental Agriculture International* 46 (9):555-62. <https://doi.org/10.9734/jeai/2024/v46i92853>.

hiring service centres. The present study aimed to identify the major issues encountered by farmers and custom hiring service providers when hiring machinery, indicating few major ones like lack of timely availability of required machinery during peak season (81.42%), non-availability of well-trained technical manpower (57.14%), inadequate & cumbersome service provision (56.42%), unaffordable charge for hiring machinery (40.71%) alongside their suggestive measures to unlock the full potential of custom hiring services, resulting in significant advantages for both farmers and the agricultural sector. Later a synoptic study in 2022 (post-pandemic scenario), showcases few significant constraints associated with CH services like reduced adoption, rigid rules, lower profit margins, disruptive operations, rising dissatisfaction which can be addressed if the suggestive measures are to be followed with proper modifications and adjustments to improve upon the functioning of CHCs.

Keywords: Mechanization; custom hiring service centers; constraints; suggestions; post-pandemic scenario.

1. INTRODUCTION

Agriculture serves as the cornerstone of the Indian economy, constituting the primary source of livelihood for a substantial portion of the population. However, labor shortages and a decline in the population of draft animals have exacerbated challenges in ensuring timely agricultural operations, resulting in increased labor costs and diminished productivity. Notably, a majority of rural households are heavily reliant on agriculture, with approximately 82% of farmers classified as small and marginal, and 54.3% of the workforce engaged in agriculture and allied sectors [1].

The adoption of farm mechanization presents a viable solution to these issues by facilitating timely and precise agricultural operations, minimizing crop loss, and enhancing labor efficiency [2]. Over the years, agricultural operations in India have increasingly incorporated mechanized practices, with the available power per hectare rising from 0.3 kW in 1970 to 2.54 kW today. Nonetheless, the high cost of certain farm implements remains a significant barrier for many small and marginal farmers.

To address the problem of unaffordability of farm equipment to the large section of farmers mainly comprising of small & marginal farmers due to the limited financial resources, high cost of equipment, lack of access to credit, low economies of scale, high interest rates and unfavorable loan terms, lack of awareness and knowledge, the concept of custom hiring centers (CHCs) has been introduced, wherein a consortium of farmers can access farm machinery and implements on a need-based, rental basis at affordable rates. CHCs provide an

essential service by offering cost-effective access to mechanization, thereby reducing labor costs and mitigating the physical demands of farming. This system not only facilitates the timely execution of agricultural activities but also enhances productivity through a cost-efficient approach. Thus, the establishment of CHCs plays a critical role in promoting sustainable agricultural practices and improving overall farm productivity. The earliest instance of custom hiring in farm mechanization dates back to the 19th century in Indian agriculture, and it began in Punjab in 1912 with the introduction of a steam thresher [3,4]. Custom hiring services experienced a surge in demand after the Government of India introduced a nationwide program in 1971 to establish agricultural services centers. Under the National Agricultural Technology Project (NATP) and National Agricultural Innovation Project (NAIP) programs, custom hiring was also given consideration, albeit with less priority. The Karnataka government's Department of Agriculture under "Krishi Yantradhare" program proposed in 2014 to build 186 Custom Hiring Service Centers (CHSCs), to be managed by two private companies namely, Shree Kshetra Dharmastala Rural Development Project, Dharmastala (SKDRDP) and Indian Society of Agribusiness Professionals, New Delhi (ISAP). The Dharmasthala temple's administrator supports the charity trust Shri Kshethra Dharmasthala Rural Development Project.

The study aims to highlight the constraints of CHC services for farmer and the service providers, and also the suggestions to overcome the challenges and improve CHC accessibility to farmers and for better functioning of the CHCs. It also consists of a

synoptic study in 2022, of the post pandemic scenario, regarding the constraints in services of CHSCs by farmers along with its suggestive measures reflecting the plausible changes that took place post-pandemic phase.

2. MATERIALS AND METHODS

The present study was conducted in the Vijayapur district of Karnataka, purposively selected due to the implementation of seven Custom Hiring Service Centers (CHSCs) in all its five taluks: Vijayapur, Indi, Basavana Bagewadi, Muddebihal, and Sindagi. An ex-post facto research design was employed as the phenomena had already occurred, making this design appropriate for the study. Each taluk was chosen purposively since CHSCs were established at the hobli level in all these taluks. Using a proportionate random sampling procedure, respondents were selected, resulting in a total sample size of 140 farmers from each hobli (CHSCs). The selected farmers were interviewed through the open-end method, and the necessary information was collected using a pre-designed and pre-tested interview schedule. To identify the constraints faced by farmers & custom hiring service providers regarding services from CHSCs, probable constraints were listed through discussions with experts. The responses obtained from farmers were analyzed using statistical tools of frequency and percentage. Later on a snapshot of the post pandemic scenario (in 2022) was taken regarding the farmers' challenges associated with the services provided by CHSCs in Vijayapura district (secondary data collected from the NGO, Kala Chetana Yuva Samas the) alongside with the suggestive measures provided by the experts.

3. RESULTS AND DISCUSSION

Constraints hindering the enhancement of farm machinery accessibility were gathered individually from each category of respondents and organized systematically to identify the major ones. The obtained percentage position of each factor showed the frequency of concerns faced by the farmers in the district. A scrutiny of the data metrics in Table 1, the most prominent constraint among most of the farmers (81.42%) identified was the "Lack of timely availability of required machinery during peak season", leading to delays in essential farming activities, impacting

crop yields and quality. Timely access to machinery is crucial for various farming operations and overall agricultural productivity. Addressing this issue requires government intervention, infrastructure improvement, and promoting cooperative farming practices. Ensuring timely machinery access is essential for sustainable agricultural development and farmer welfare [3,5,6]. Next in order is the second major constraint with about 57.14% farmers, is "Non-availability of well-trained technical manpower", underscoring that the inadequacy of skilled labor leads to longer equipment downtime due to improper operation and maintenance, causing delays and crop losses. Skilled operators ensure efficient machinery use and routine maintenance, minimizing breakdowns. The shortage of skilled labor in CHSCs significantly impacts agricultural productivity, costs, and sustainability. Addressing this requires government support (like SMAM scheme - establishment of Custom Hiring Centers(CHCs), creating Hubs for hi-tech & high value farm equipment and Farm Machinery Banks; Tractor training centres Krishi Vigyan Kendras, and industry should be made responsible for training young farmers/owners/operators; Strengthening Front-line Demonstration of farm machinery; Addressing Skill Shortages- Agricultural Skills Council of India at the district level; Industrial Training Institutes (ITIs) addressing the skill gaps in repair and maintenance, and service centres at the regional and State levels), farmer awareness, and technological innovation to fully leverage mechanization benefits. Following closely, with about 56.42% frequent issue among farmers is regarding "Inadequate & Cumbersome service provision", showcasing operational irregularities, which could result in problems such equipment failures, service delivery delays, or restricted equipment availability at peak season. The fourth major concern, accounting for approximately 40.71%, was the "high cost of machinery rental." This indicates that modern agricultural equipment, such as diesel pump sets, reapers, rotavators, seed and fertilizer drills, and paddy transplanters, tends to be prohibitively expensive. The CHSC has modern machinery that is available, but it comes with hiring costs that cover fuel, maintenance, driver's wage, wear and tear, and other expenses. Conversely, high hiring costs drive away farmers who would otherwise embrace technology, pushing them to stick with labor-intensive, conventional farming practices. This may impede the development of cutting-edge, productive farming techniques. Reduced agricultural output, more labor-intensive

farming practices, and lost possibilities for sustainable agricultural growth can all be consequences of limited use of mechanization. "Lack of awareness about Custom Hiring Service Centers" ranked fifth with 32.14%, indicating the necessity for awareness-raising initiatives. Next in order with 23.57% is "Lack of timely access to information regarding farm machinery", highlighting how crucial it is to enhance communication about the availability of machinery. Custom hiring center services might significantly increase farmers' happiness if several issues—including Limited number of available custom hiring centers, Elevated hiring fees encountered during peak seasons, frequent breakdown of machinery/implement and lacking in their timely repair, Instances of favoritism exhibited by Service providers—are addressed. The studies were supported by the findings of, Srinivasrao *et al.* [4], Hiremath *et al.* [7], Sampathkumar [8] and Chandrashekar [9],

Padhee & Pingali [10], Kisku & Singh [11], Anil *et al.* [12].

As per the perusal of the data in Table 2, shows the constraints faced by the seven custom hiring service providers in the Vijayapur district. The study revealed that the majority of constraints were shared across all custom hiring service providers. These challenges include payment delays, low machinery utilization or infrequent demand, a shortage of skilled technical personnel, high maintenance costs for machinery, limited operating hours, inadequate service, repair, and maintenance facilities, mishandling of machinery by customers, delayed returns of machinery, insufficient operational knowledge and expertise, and a lack of awareness programs by Custom Hiring Centres for farmers. Most of these constraints were in line with the findings of Jyoti [13], Aitwade [14], Singh & Kingra [15], Sampathkumar [8] and Kisku & Bisht [16], Sagar *et al.* [17].

Table 1. Constraints faced by farmers in availing CH services

(n= 140)			
Sl. No.	Constraints	f	%
1.	Lack of timely availability of required machinery during peak season	114	81.42
2.	Non-availability of well-trained technical manpower.	80	57.14
3.	Inadequate & Cumbersome service provision	79	56.42
4.	Unaffordable charge for hiring machinery	57	40.71
5.	Lack of awareness about availability of CHS in public sector	45	32.14
6.	Lack of timely access to information regarding farm machinery.	33	23.57
7.	Limited number of available custom hiring centers	32	22.85
8.	Elevated hiring fees are encountered during peak seasons	27	19.28
9.	Frequent breakdown of machinery/implement and lacking in their timely repair	26	18.57
10.	Attitude of management (Instances of favoritism exhibited by Service providers)	20	14.28

Table 2. Constraints faced by Custom hiring Service Providers in availing CH services

(n=7)			
Sl. No.	Constraints	f	%
1.	Payment delays	7	100
2.	Low utilization or infrequent demand for machinery	7	100
3.	Shortage of skilled technical personnel	7	100
4.	High machinery maintenance costs	7	100
5.	Limited operating hours	7	100
6.	Insufficient service/repair/maintenance facilities	6	85.71
7.	Mishandling of machinery by customers	7	100
8.	Delayed return of machinery by customers	7	100
9.	Insufficient operational knowledge & expertise	6	85.71
10.	Limited awareness programme by Custom Hiring Centres (CHC) for farmers	7	100

Table 3. Constraints faced in the post-pandemic scenario regarding CH services

S. No.	Constraints	Suggestions
1.	Prolonged reduction in farmer adoption of farm machinery rental despite post-pandemic recovery	Enhance awareness about CHCs through nominal hiring fees to aid farmers in boosting productivity. Encourage & train rural youth and farmers through accredited institutions like MANAGE to establish CHCs as viable rural enterprises.
2.	Rigid CHC rules on services, machinery management, and rental rates risk rapid performance decline of CHC	CHC must ensure learning and change are agreed upon at the constitutional level.
3.	Smaller CHCs with smaller & lesser equipments, not generating sustainable profits for basic operation & management purposes like (to pay for full-time drivers/ operators.).	An arrangement should be implemented wherein the CHC driver sets up and prepares the machinery, after which the renter or renter group operates it following proper instruction. The driver may then leave but should periodically return to check on the operation and address any issues that arise. This approach is feasible as many farmers are already trained and capable of operating the machinery for their own use or for sub-renting purposes.
4.	Disruptive Supply chain of farm machineries & workforce inadequacy	Boost investment in critical logistics and incentivize e-commerce, transportation firms, and startups to ensure efficient demand-supply logistics. Implement policies offering incentives through state-owned entities, FPOs, and NGOs to address pressing issues related to agricultural labor shortages.
5.	The pre-existing lower penetration and consensus regarding CH services has been exacerbated, leading to a negative inclination in operation and performance during the post-pandemic period.	The respective managerial authorities of CH should conduct periodic reviews and operational analysis to ensure competitiveness, sustainability, and effective financial management of CHCs.
6.	Rising Dissatisfaction and Varied Engagement Levels with CHCs	A dedicated toll-free hotline service/call center (local/language) need to be established.

The synoptic study on farmers' challenges associated with the custom hiring of farm machinery following the pandemic indicates a considerable decrease in mechanized agricultural practices during the initial phase of the crisis. This decline is linked to transportation restrictions and limited mobility, leading to labor shortages (despite of the reverse labor migration in rural areas). As a result, reliance on hired labor significantly decreased, with families becoming the primary workforce. However, by 2022 (post-pandemic), the situation began to improve, with the utilization of farm machinery gradually increasing to boost cultivation and enhance productivity, which had been stagnating for some time [18]. The Table 3 enlisted the overall constraints of farmers and service providers associated with the CHSCs in the post-pandemic phase with the suggestions alongside, to improve the mechanization in the study area [19,18,20]. This phenomenon may stem from the recovery period following the disruptions caused by the pandemic, highlighting the need for machinery suitable for varying scales to address labor shortages effectively [21]. The abridged study accentuates polymorphous and multi-layered challenges like reduced adoption, rigid rules, lower profit margins, disruptive operations, rising dissatisfaction with proper suggestive measures to resolve those concerns. The findings indicate a growing inclination among farmers to utilize the services offered by CHSCs, aiming to enhance their agricultural productivity [12,17].

4. SUGGESTIONS AND CONCLUSIONS

Custom hiring service centers are instrumental in the modernization of agriculture and providing vital assistance to farmers. However, there are significant and multifaceted challenges associated with their functioning and utilization by farmers, which needs great attention for better operation and management of CHCs. Based on the study conducted, few recommended interventions have been proposed i.e. Establishing fixed hiring charges in advance can help farmers budget and plan their expenses more effectively, reducing the risk of unexpected financial burdens during peak seasons, Enhance government subsidies for custom hiring centers, expand these centers to every necessary panchayat and ensuring small and marginal farmers have access to their services, Fixing affordable hiring charges by the district monitoring team, Strengthen custom hiring centers by increasing the availability of farm machinery to

address the issue of non-availability, particularly during peak seasons, especially for small and marginal farmers, Enhance manpower training, provide subsidies for constructing shelters to house machinery at CHCs, and increase awareness about machinery rental services at CHCs.

Regular reviews of custom hiring service center operations by service providers are necessary to ensure competitiveness, sustainability, and effectiveness in meeting the needs of small and marginal farmers. Finding skilled operators remains a challenge for service providers, so organizing training programs can increase the pool of skilled labor and improve machinery efficiency. Addressing farmers' dissatisfaction with the availability of well-maintained machinery requires investing in a diverse range of equipment and ensuring regular maintenance. Many farmers are unaware of the services offered by custom hiring service centres, highlighting the need for awareness campaigns to educate them about the benefits and encourage greater utilization. To alleviate constraints caused by machinery scarcity during critical periods, ensuring an adequate supply during peak seasons is essential. Setting up centers closer to villages after thorough geographical and demand analysis can enhance accessibility for farmers, reducing travel time and expenses. Extension organizations such as Krishi Vigyan Kendras (KVKs) and Agricultural Departments play a vital role in advancing agricultural mechanization by providing education through workshops, training, and informational materials. They offer technical support, facilitate access to machinery, and promote financial assistance programs for equipment acquisition. Additionally, they showcase successful practices, conduct research, and build local expertise to enhance farmers' adoption of modern technologies, thereby improving agricultural productivity and efficiency. Focusing on customer support and promptly addressing farmers' concerns can enhance overall satisfaction and loyalty. Furthermore, Government agencies, local communities, and private stakeholders must collaborate effectively. Additionally, emphasizing investments in infrastructure, equipment enhancement, and consistent maintenance stands as a pivotal measure to enhance service quality. Promoting awareness by service providers regarding the advantages of custom hiring services and streamlining administrative processes can incentivize greater farmer

participation in these centers. This, in turn, can bolster agricultural productivity, decrease expenses, and enhance rural livelihoods. Overcoming these hurdles can unleash the complete potential of custom hiring services, benefiting farmers and the agricultural domain alike.

The pandemic served as a real-time empirical study of over-reliance on manual labor, revealing how the labor-intensive agricultural sector struggled to meet economic demands. A synoptic study of the post-pandemic landscape highlights the critical need to initiate anew with machinery tailored to specific scales to mitigate labor shortages. To start, extension organizations should prioritize off-season attachments such as trailers and milling, along with processing equipment and facilities. These initiatives not only provide essential services but also generate income for CHCs during periods of low activity like in the post-pandemic period. It is recommended that CHCs incorporate learning and adaptability into their foundational policies concerning service provision, machinery management, and rental rates, especially in light of the significant disruptions experienced by CHSCs. This strategic shift aims to foster a more effective start towards farm mechanization. Additionally, to ensure the sustainability of CHCs post-pandemic, it is crucial to designate at least one or more individuals (or part-time CHC managers) to oversee machinery servicing within the community. These dedicated approaches will facilitate improved services for farmers following the prolonged period of inactivity.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

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Details of the AI usage are given below:

1. ChatGPT

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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