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Impact of custom hiring centers on input utilization patterns in Anantapur district of Andhra Pradesh

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Abstract

This study examines the impact of Custom Hiring Centers (CHCs) on input utilization patterns in groundnut farming among small and marginal farmers in Anantapur District, India. Through primary data collected from 160 farmers, including CHC beneficiaries and non-beneficiaries, significant shifts in agricultural practices are analyzed. CHCs facilitate increased mechanization, reduce human and animal labor usage, and enhance farm machinery utilization. Moreover, CHCs promote better management of inputs such as manures and fertilizers while optimizing seed usage. Labor utilization costs indicate efficiency gains for CHC beneficiaries, particularly in hired labor expenses. Additionally, machine labor costs are lower for CHC beneficiaries across various farm operations, highlighting the cost-effectiveness of accessing machinery through CHCs. The findings suggest that CHCs have led to a paradigm shift in groundnut cultivation practices, characterized by increased mechanization, enhanced input utilization, and optimized labor management. These results underscore the pivotal role of CHCs in fostering agricultural sustainability and productivity in the region. Overall, the study provides valuable insights into the transformative impact of CHCs on agricultural practices and emphasizes their significance in driving rural development and economic growth in Anantapur District.

Keywords: Custom hiring centers (CHCs), groundnut farming, mechanization, input utilization patterns, small and marginal farmers

Introduction

Farm mechanization is recognized as a fundamental determinant for augmenting land productivity, optimizing agricultural operations, and enhancing the efficacy of farm practices (Raina *et al.*, 2021) ^[15]. This transformative paradigm not only amplifies labor output but also yields substantial economies, encompassing diminished input expenditures and heightened crop yields (Gurung *et al.*, 2017) ^[12]. Nevertheless, the journey toward mechanization is fraught with multifaceted challenges, spanning economic constraints, technological intricacies, and contextual impediments (Madukar *et al.*, 2021) ^[13]. In negotiating these hurdles, Custom Hiring Centers (CHCs) emerge as pivotal enablers, particularly for small and marginal agrarian cohorts, facilitating access to cutting-edge agricultural machinery and bolstering productivity indices. CHCs are also a plausible solution to address labor scarcity in farm mechanization (Singh *et al.*, 2013) ^[16]. The concerted endeavors of the Indian government through initiatives such as the Rashtriya Krishi Vikas Yojana (RKVY) and the Submission on Agricultural Mechanization (SMAM) have further catalyzed the adoption of mechanized methodologies. The institutionalization of CHCs, farm machinery banks (FMBs), and hi-tech hubs under the aegis of SMAM has considerably broadened the purview of

modern agricultural machinery, particularly at the grassroots level, ensuring equitable access for smallholder farmers to mechanization dividends (Mehta *et al.*, 2019) ^[14]. Within this framework, Andhra Pradesh emerges as a pioneering locus, with the Anantapur district spearheading CHC proliferation. Against this backdrop, this case study seeks to delve into the intricate relationship between CHCs and input utilization patterns in Anantapur District. By examining the impact of CHCs on labor utilization, seed and fertilizer usage, and the adoption of mechanized practices, the study aims to unravel the underlying mechanisms driving changes in input utilization. Additionally, it aims to identify the constraints and challenges faced by farmers in accessing CHC services and leveraging mechanization technologies.

Data and Methodology

The research predominantly relies on primary data, which was gathered through personal interviews with a sample of groundnut farmers during 2021. A specially designed schedule, previously tested for validity, was employed for data collection purposes. Utilizing a stratified random sampling technique, two talukas, Anantapur and Dharmavaram, were chosen randomly from the district. Subsequently, two clusters of villages were selected from each taluka: one with established government-supported

Custom Hiring Centers (CHCs) and another without formal CHC presence, located at a distance from the former to ensure the absence of custom hire services. Forty farmers were then randomly chosen from each selected cluster of villages, totaling 160 farmers in the sample - comprising 80 CHC beneficiary farmers and 80 non-beneficiary farmers.

Investigating the effectiveness of Custom Hiring Centers on Input Utilization Patterns in Groundnut Farming in Anantapur District, the study exclusively focuses on small and marginal farmers. These farmers are categorized into beneficiaries and non-beneficiaries based on their association with Custom Hiring Centers (CHCs). The methodology employed utilizes simple statistical averages to analyze the quantities and values within each category. Additionally, the study calculates the percentage difference between beneficiary and non-beneficiary farmers to ascertain the impact of CHCs on input utilization patterns.

Results and Discussions

Input use pattern in groundnut cultivation on sample farms

The input use pattern in groundnut cultivation on sample farms for the agricultural year 2021 across different farm size categories for both the beneficiaries and non-beneficiaries of CHC was estimated and presented in Table 1. It can be viewed from the table that the use of human labor in groundnut cultivation has declined in terms of man hours per hectare with the establishment of CHC in villages from 425.0 on non-CHC farms to 405 on CHC farms on an overall basis. Similar trend was observed on both the small and marginal farms. The use of bullock labour has also declined from 2 hrs per hectare on non-CHC farms to 1.3 hrs per hectare on CHC farms on overall basis with similar pattern across farm size categories. However, the use of

farm machinery on overall basis has increased from 16.5 hrs per hectare on non-CHC farms to 18 hrs per hectare on CHC farms with similar patterns across farm size categories. It can be concluded that with the establishment of CHC in villages, employment of both human and animal labor has declined and that of farm machinery increased. This may be because due to the establishment of CHC, the availability and affordability of farm machinery have improved in the CHC villages which has led the more use of farm machinery on farms in those villages where CHCs were established in comparison to villages devoid of formal CHCs.

It can be viewed from the table that the use of manures and fertilizers has increased on overall basis with establishment of CHC from 87.5 kg/ha on non-CHC farms to 92.5 kg/ha on CHC farms with similar pattern across farm size categories while that of seed use declined with the establishment of CHC from 165 kg per hectare on non-CHC farm to 162.5 kg/ha on CHC farms with similar pattern across farm size categories. This may be due to the better use of seed on farms with high use of farm machinery in comparison to low use of farm machinery by adopting improved farm machines for groundnut sowing in which seed requirement is less.

The use of plant protection chemicals and irrigation charges has increased with the increase in mechanization due to the establishment of CHC on the overall basis from Rs. 1540.5/ha and Rs. 497.5/ha on the non-CHC farm to Rs. 1455.5/ha and Rs. 542.5/ha. Though the increase is very low it indicates the increased confidence in these inputs in improving the yield of the crop and hence establishment of CHC is not only helpful in increasing the use of farm machinery but also in better use of other inputs that have a positive impact on crop yield.

Table 1: Input use pattern in the cultivation of Groundnut at farms of the beneficiary and non-beneficiary farmers of CHC

Particulars	Beneficiaries			Non-Beneficiaries		
	Marginal	Small	Overall	Marginal	Small	Overall
Human labour (hrs./ha)	414	396	405	438	412	425
Bullock labour (hrs./ha)	1.7	0.9	1.3	2.7	1.3	2
Machine labour(hrs./ha)	15.5	20.5	18	15	18	16.5
Seeds (Kg/ha)	163.5	161.5	162.5	166.5	163.5	165
Manure and Fertilizers (Kg/ha)	91	94	92.5	86	89	87.5
Plant protection chemicals (Rs./ha)	1455.5	1544.5	1500	1411.5	1489.5	1450.5
Irrigation charges (Rs/ha)	542.5	543.5	543	496	498.5	497.5
Miscellaneous (Rs./ha)	1435	1621	1528	1538	1553.5	1557.5

Source: Compiled from field survey, 2021

To understand the changes in labour use patterns owing establishment of CHC, the labour utilization pattern on sample farms across farm size categories for both the CHC- and non-CHC farms were estimated and presented in the Table 2. The results show that the family labor use in the case of beneficiaries was higher than non-beneficiaries of

CHC and hired labour hours used was 250 hrs/ha, which was higher than beneficiaries. Ranade *et al.* (2006) ^[8] also observed that Custom hiring services have multiple opportunities to provide better implements to their clients at reasonable rates

Table 2: Labour utilization pattern of beneficiaries and non-beneficiaries of CHC

Particulars	Beneficiaries			Non -Beneficiaries			Difference over Beneficiaries (percent)
	Quantity			Quantity			
	Marginal	Small	Overall	Marginal	Small	Overall	
Human labour (hrs/ha)							
Family	160	150	155	150	130	140	9.7
Hired	248	252	250	277	292	285	-14
Bullock labour (hrs/ha)							
Owned	1.7	0.9	1.3	2.6	2.4	2.5	-92.3
Hired	1.9	1.1	1.5	2.7	1.3	2	-33.3
Machine labour (hrs/ha)							
Owned	0	0	0	0	0	0	0
Hired	15.5	20.5	18	15	18	16.5	8.3
Total	427.1	424.5	425.8	447.3	443.7	446	-4.74

Source: Compiled from field survey, 2021

Bullock labor hours used in the case of non-beneficiaries were higher than of beneficiaries. Beneficiaries used 18 hrs/ha which was higher than non-beneficiaries as they were using 16.5 hrs/ha. Chinnappa *et al.*, (2018) ^[9] also reported similar findings that farmer's dependency on animal and human labour was less by 16.29 percent and 68.30 percent respectively in case CHC villages compared to villages not covered by CHC. In the case of beneficiaries, family labour use was 9.7 percent more compared to non-beneficiaries of CHC. In the case of hired labour, it was 14 percent more in non-beneficiaries as compared to beneficiaries. Under owned bullock labour, it was used 92.3 percent more on non-beneficiary farms as compared to beneficiaries of CHC. Hired bullock labour hours used by non-beneficiaries was 33.3 percent more as compared to beneficiaries. Machine labour used by beneficiaries was 8.3 percent more as compared non -beneficiaries of CHC.

The labour utilization pattern in terms of cost (Rs. /ha) was estimated for beneficiaries and non-beneficiaries of CHC

farms across farm size categories and presented in Table 3. The family labor cost in the case of beneficiaries was 9.67 percent more as compared to non-beneficiaries of CHC, hired labor cost was 14 percent more in the case of non-beneficiaries compared to beneficiaries of CHC, and the owned bullock labor cost incurred by beneficiaries was 4 percent more as compared to non-beneficiaries of CHC. Hired bullock labor cost was 1.76 percent higher for non-beneficiaries compared to beneficiaries. In case of machine labor cost, it was 30.9 percent higher for non-beneficiaries compared to beneficiaries of CHC. Overall labour cost was 17.7 percent higher for non-beneficiaries compared to beneficiaries. This indicates the establishment of CHC has led to the utilization of more machine power that has led to a reduction in total labour cost and hence the overall cost of cultivation of groundnut in the study area. Sidhu and Vatta, 2012 ^[7] observed that hiring of machineries from agro machinery service centres was 16 percent cheaper compared to private operators

Table 3: Labour cost of beneficiaries and non-beneficiaries of CHC farms

Particulars	Beneficiaries			Non-Beneficiaries			Overall difference (%)
	Marginal	Small	Overall	Marginal	Small	Overall	
Human labour (Rs/ha)							
Family	6560	6150	6355	6150	6355	5740	9.67
Hired	10168	10332	10250	11357	11972	11685	-14
Bullock labour(Rs/ha)							
Owned	506	494	500	455	495	475	-4
Hired	6350	6150	6250	7560	7340	7450	1.76
Machine labour (Rs/ha)							
Hired	15123	17172	16147.5	20146	21152.5	21152.5	-30.9
Total	38707	40298	39502.5	45668	47314.5	46502.5	-17.72

Source: Compiled from field survey, 2021

Changes in machine cost in groundnut cultivation owing to the establishment of CHCs

Table 4 shows the machine labor utilization pattern across farm operations for beneficiaries and non-beneficiaries of CHC across farm size categories. The difference in cost between beneficiaries and non-beneficiaries of CHC was also estimated and presented in Table 4.20. For land preparation, the machine labor cost of non-beneficiaries was 33.3 percent higher than beneficiaries. For sowing machine labor cost of beneficiaries was 20 percent higher than non-beneficiaries. For the Threshing of groundnut, the machine labor cost was 25 percent higher for non-beneficiaries compared to beneficiaries. For chemical spraying the cost

was 50 percent higher for non-beneficiaries of CHC. Total cost was 25.8 percent higher for non-beneficiaries compared to beneficiaries of CHC. This indicates that the cost of machines was higher at non-beneficiary farms compared to beneficiary farms mainly due to higher charges of custom hire of machinery in non-CHC areas in comparison to CHC areas. This reflects the impact of the establishment of CHC over the hire charges of machines. Chinnappa *et al.*, (2018) ^[1] also observed that farmers hiring machineries from private individuals were less efficient compared to those hiring machineries from formal custom hire service providers.

Table 4: Machine labour utilization pattern across farm operations for CHC and Non-CHC farmers

Farm operations	Beneficiaries		Non- Beneficiaries		Difference of Beneficiary over non-beneficiaries cost (Rs./ha)	Difference of Beneficiary over non-beneficiaries (%)
	Quantity (hrs/ha)	Cost/ha	Quantity (hrs/ha)	Cost/ha		
a) Land preparation	4.5	2250	4	3000	750	33.3
b) Sowing	3.5	3750	2.5	4500	750	20
c) Threshing	7.5	10000	7.5	12500	2500	25
d) Chemical spraying	2.5	500	2.5	750	250	50
Total	18	16500	16.5	20750	4250	25.8

Source: Compiled from field survey, 2021

Conclusion

In a nutshell, input utilization trends demonstrate significant changes with the establishment of CHCs. The use of manures and fertilizers increased from 87.5 kg/ha on non-CHC farms to 92.5 kg/ha on CHC farms, reflecting improved input management. Conversely, seed usage declined from 165 kg per hectare on non-CHC farms to 162.5 kg/ha on CHC farms, attributed to efficient seed utilization with mechanized farming techniques. Labor utilization costs further underscore the impact of CHCs on resource optimization. CHC beneficiaries incur slightly higher costs for family and owned bullock labor, yet lower costs for hired labor compared to non-beneficiaries. This discrepancy signifies the efficiency gains associated with mechanized practices facilitated by CHCs. In terms of machine costs, non-beneficiary farms exhibit higher machine labor costs across various operations compared to CHC beneficiaries. For instance, non-beneficiary farms incur 33.3 percent higher costs for land preparation and 20 percent higher costs for sowing operations compared to CHC beneficiaries, indicating the cost-effectiveness of accessing machinery through CHCs. Overall, the establishment of CHCs has led to a paradigm shift in groundnut cultivation practices in Anantapur District, characterized by increased mechanization, enhanced input utilization, and optimized labor management. These findings underscore the pivotal role of CHCs in fostering agricultural sustainability and productivity in the region.

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