



# Review of ReseaRch

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## IMPACT OF MECHANIZATION ON PADDY CULTIVATION

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### ABSTRACT:

*In many developing countries, including India, agricultural mechanization is considered a crucial catalyst for agricultural transformation and rural development. Paddy cultivation has been identified as a promising sector for mechanization due to the arduous labor demands associated with manual rice farming. The adoption and impact of mechanization in Indian agriculture remain a subject of ongoing investigation and debate.*



**KEYWORDS:** including India, agricultural mechanization.

### INTRODUCTION :

In recent years, the Indian government has taken various policy measures to promote the adoption of mechanization in agriculture, including paddy cultivation. One of these initiatives is the Sub-Mission on Agricultural Mechanization (SMAM), which aims to make farm mechanization accessible to small and marginal farmers through the creation of custom hiring centers (CHCs). These centers offer services such as land preparation, sowing, and crop harvesting using modern agricultural machinery. Despite the establishment of CHCs, the uptake of mechanization among small and marginal farmers remains limited, and the sustainability of CHCs is frequently questioned.

### REVIEW OF LITERATURE

According to Indurwade's (2004) perspective, the prosperity of agriculture depends heavily on the adequacy and quality of the road infrastructure. An efficient road network enables the implementation of modern techniques and equipment in agriculture while also connecting isolated villages, promoting various agricultural industries such as dairy farming, beekeeping, poultry farming, and village-based enterprises.

Mohammad Ali Hormozia et al.'s 2012 study assesses the effect of mechanization inputs and cultivation systems on the productivity and technical efficiency of rice production in the Khuzestan province of Iran. The study reveals that there was significant variation in efficiency levels, ranging from 0.15 to 0.99, with a mean of 0.67. The application of farm machinery for rice production also varied greatly, as demonstrated by the mechanization index, which ranged from 0.06 to 0.52. The study establishes a strong correlation between the mechanization index and technical efficiency, demonstrating the significant impact of mechanization on rice producers' efficiency.

Xinshen Diao et al.'s 2014 study focuses on the mechanization of agriculture in Ghana. The study highlights that even small-scale farmers have shown a growing demand for mechanized farming operations, particularly plowing, indicating that supply issues may now be the primary obstacle to successful mechanization. The authors identify two significant flaws in current policies: firstly, the agricultural mechanization service centers promoted by the government are not utilizing tractors efficiently, and secondly, direct importation of agricultural machinery by the government hinders the import of appropriate and cost-effective machinery. Conversely, the development of a mechanized service hiring market, in which medium and large-scale farmers offer their tractor services to small-scale farmers for a fee, is a promising model for sustainable mechanization in Ghana.

In their 2018 study, Alex G. Parka et al. assess the impact of mechanization on agriculture in Nepal. The study suggests that cultural and economic barriers have impeded the widespread adoption of costly precision agriculture technologies, such as zero-till, that have the potential to enhance labor and farm input efficiencies. Nonetheless, the use of basic mechanization techniques resulted in positive and significant yield efficiencies for nitrogen and phosphate. This approach was also associated with higher seedling density, leading to more predictable yields and profits for farmers. Conversely, hand-applied inputs created a disassociation between inputs and end-of-season yield, thereby increasing the level of risk in farming operations.

In their 2021 study, Ben Belton et al. explore the rapid expansion of agricultural mechanization in Myanmar between 2011 and 2020. The study reveals that the adoption of machinery for land preparation, harvesting, and threshing was close to being scale-neutral due to a dynamic outsourcing services market. Rather than being a single transformative shift, the appeal of mechanization to farmers results from a gradual accumulation of benefits, such as labor savings, reduced drudgery, convenience, improved speed and timeliness of operations, better ability to manage weather-related risks, and reduced grain loss during harvesting.

In their 2022 study, Thomas Daum et al. investigate the opinions of local stakeholder groups in four African countries, including Benin, Kenya, Mali, and Nigeria, regarding agricultural mechanization, digital agriculture, and youth in agriculture. The findings indicate that these groups generally support agricultural mechanization, which presents a potential avenue for policymakers to prioritize efforts in this area. The study also highlights that mechanization encompasses more than just tractorization and that animal traction may still be relevant in certain countries.

## OBJECTIVES AND METHODOLOGY

The study aims to assess the impact of mechanization on paddy cultivation by considering the perspectives of farmers. The study has examined the perceptions of the sample respondents on the impact of mechanization on saving of inputs, reduced labour cost, mitigating the problem of labour shortage, reducing overall cost of cultivation, increased productivity of land and reduced drudgery. The study is based on primary data. Primary data is collected from 640 farmers using interview schedule from Guntur District of Andhra Pradesh using random sampling method. Percentages are drawn to analyze the data.

## RESULTS AND DISCUSSION

### Saving of inputs

Table – 1 displays the frequency and percentage of responses for each category of opinion on savings of inputs due to farm mechanization. Out of the total 640 respondents, 6 respondents or 0.90 per cent strongly disagreed that there are savings of inputs due to farm mechanization, while 133 respondents or 20.80 per cent disagreed. On the other hand, 322 respondents or 50.30 per cent strongly agreed that there are savings of inputs due to farm mechanization, and 179 respondents or 28.00 per cent agreed.

**Table - 1**  
**SAVING OF INPUTS DUE TO FARM MECHANIZATION**

Opinion of the respondents	Frequency	Percentage
Strongly disagree	6	0.90
Disagree	133	20.80
Neutral	-	-
Agree	179	28.00
Strongly agree	322	50.30
Total	640	100.00

Source: Computed from the Primary Data.

**REDUCED LABOUR COST**

Table-2 provides information on the opinions of the respondents regarding the impact of farm mechanization on reduced labor costs. Out of the 640 respondents, a majority of 54.5 per cent strongly agreed that farm mechanization has led to a reduction in labor costs. This is an interesting finding, as it suggests that the respondents believe that the use of machines has led to cost savings in the farming industry. On the other hand, a small percentage of 5.6 per cent strongly disagreed with the statement, indicating that they do not believe that farm mechanization has led to a reduction in labor costs. This could be due to various factors, such as the type of farm, the size of the operation, and the level of mechanization. A significant number of respondents, 22.3 per cent, were neutral, which suggests that they may not have a clear understanding of the impact of farm mechanization on labor costs. This finding could be an opportunity for further education and awareness campaigns on the benefits of farm mechanization.

**Table -2**  
**REDUCED LABOUR COST DUE TO FARM MECHANIZATION**

Opinion of the respondents	Frequency	Percentage
Strongly disagree	36	5.60
Disagree	-	-
Neutral	143	22.30
Agree	112	17.50
Strongly agree	349	54.50
Total	640	100.00

Source: Computed from the Primary Data.

**MITIGATING THE PROBLEM OF LABOUR SHORTAGE**

It is clear from the Table - 3 that the majority of respondents (74.2 per cent) either agree or strongly agree that farm mechanization can mitigate the problem of labor shortage. Only a small percentage of respondents (9.4 per cent) disagreed or strongly disagreed with this statement, while a significant proportion (16.4 per cent) remained neutral. It is important to note that the impact of farm mechanization on labor shortage may vary depending on a range of factors, such as the size and type of farm, the availability of skilled operators, and the cost of machinery. Moreover, it is possible that some respondents may have a biased view on this issue based on their personal experiences or interests. Further research is needed to fully understand the complex relationship between farm mechanization and labor shortage, and to develop effective policies and strategies to promote sustainable agricultural development. Nonetheless, the present study provides valuable insights into the opinions of key stakeholders on this important issue, and highlights the need for continued dialogue and collaboration among researchers, policymakers, and practitioners in the agricultural sector.

**Table – 3**  
**FARM MECHANIZATION RESULTS IN MITIGATING THE PROBLEM OF LABOUR SHORTAGE**

Opinion of the respondents	Frequency	Percentage
Strongly disagree	30	4.70
Disagree	30	4.70
Neutral	105	16.40
Agree	292	45.60
Strongly agree	183	28.60
Total	640	100.00

Source: Computed from the Primary Data.

**REDUCING OVERALL COST OF CULTIVATION**

It is evident from Table - 4 that the majority of the respondents (52.8 per cent) strongly agree that farm mechanization results in reducing the overall cost of cultivation. This is followed by 13 per cent of the respondents who agree with the statement, while 28.6 per cent disagree and 0.6 per cent strongly disagree. A smaller percentage of respondents (5 per cent) were neutral on the matter. The results of this study suggest that there is a general consensus among the respondents that farm mechanization is a cost-effective approach to cultivation. This is supported by the large percentage of respondents who strongly agree with the statement. The findings may be attributed to the fact that farm mechanization enables farmers to complete tasks more efficiently and quickly, reducing the need for manual labor and increasing productivity. Furthermore, farm mechanization can help reduce labor costs, which can be a significant contributor to the overall cost of cultivation. This is especially important in areas where labor is scarce or expensive. By automating certain tasks, farmers can reduce their dependence on manual labor and potentially reduce the overall cost of production.

**Table – 4**  
**FARM MECHANIZATION RESULTS IN REDUCING OVERALL COST OF CULTIVATION**

Opinion of the respondents	Frequency	Percentage
Strongly disagree	4	0.60
Disagree	183	28.60
Neutral	32	5.00
Agree	83	13.00
Strongly agree	338	52.80
Total	640	100.00

Source: Computed from the Primary Data.

**INCREASED PRODUCTIVITY OF LAND**

Table-5 presents the results of a survey conducted to study the impact of farm mechanization on the productivity of land. Out of the 640 respondents, 34 (5.30 per cent) strongly disagreed with the statement, 273 (42.70 per cent) disagreed, 122 (19.10 per cent) were neutral, and 211 (33.00 per cent) agreed. No respondent chose the option of strongly agree. The results suggest that the majority of the respondents (55 per cent ) either disagreed or were neutral about the statement that farm mechanization results in increased productivity of land. This could be due to several reasons. First, there may be a lack of awareness or understanding of the benefits of farm mechanization. Some respondents may not have experienced or witnessed the impact of mechanization on productivity, and therefore, may not have a strong opinion on the matter. Second, the cost of mechanization equipment could be a deterrent for small-scale farmers, who may not be able to afford the high cost of machinery. However, it is important to note that a significant portion of respondents (33 per cent ) agreed with the statement, indicating that they have observed an increase in productivity due to farm mechanization. This suggests that mechanization can have a positive impact on land productivity if implemented

properly. The use of machinery can help in timely farm operations, reducing labour costs, and increasing the efficiency of work. Furthermore, mechanization can also help in achieving higher crop yields through improved soil preparation, planting, and harvesting practices.

**Table - 5**  
**FARM MECHANIZATION RESULTS IN INCREASED PRODUCTIVITY OF LAND**

Opinion of the respondents	Frequency	Percentage
Strongly disagree	34	5.30
Disagree	273	42.70
Neutral	122	19.10
Agree	211	33.00
Strongly agree	-	-
Total	640	100.00

Source: Computed from the Primary Data.

**REDUCED DRUDGERY**

Table-6 provides the results of a study on the impact of farm mechanization, specifically on the reduction of drudgery. The results show that a majority of the respondents agreed with the statement, with 44.5 per cent agreeing and 28 per cent strongly agreeing. This suggests that farm mechanization is viewed positively by the respondents in terms of reducing the physical labor required in farming activities. On the other hand, a minority of the respondents disagreed with the statement, with 15 per cent disagreeing and 8 per cent strongly disagreeing. It is interesting to note that a relatively small proportion of the respondents were neutral, with only 4.5 per cent indicating no opinion on the matter. This suggests that the topic of farm mechanization and its impact on drudgery is a relatively well-defined issue in the minds of the respondents. The results of this study have important implications for the adoption and promotion of farm mechanization. If the majority of farmers perceive that mechanization can reduce their drudgery, then they may be more willing to invest in and adopt mechanized farming technologies. This can have a positive impact on agricultural productivity, as well as the well-being of farmers who may experience less physical strain and fatigue. However, it is important to note that there may be other factors that influence the adoption of mechanization, such as the availability of technology, affordability, and access to credit.

**Table - 6**  
**FARM MECHANIZATION RESULTS IN REDUCED DRUDGERY**

Opinion of the respondents	Frequency	Percentage
Strongly disagree	51	8.00
Disagree	96	15.00
Neutral	29	4.50
Agree	285	44.50
Strongly agree	179	28.00
Total	640	100.00

Source: Computed from the Primary Data.

**CONCLUSION**

In conclusion, majority of the sample farmers are of the opinion that farm mechanization results in saving of inputs. The results of this study suggest that a majority of the respondents believe that farm mechanization has led to a reduction in labor costs. This is a positive finding, as it suggests that the use of machines in agriculture has been effective in reducing labor costs and increasing efficiency. The results suggest that there is a widespread perception among farmers and other stakeholders in the agricultural sector that farm mechanization can help address the challenge of labor shortage. This is

likely due to the fact that machines can perform many of the tasks that traditionally require human labor, such as planting, harvesting, and transporting crops. The results of this study suggest that farm mechanization is perceived as an effective approach to reducing the overall cost of cultivation. Further research could explore the specific aspects of mechanization that are most effective in reducing costs and improving productivity, as well as potential barriers to the adoption of mechanization in different contexts. The results suggest that there is a need for greater awareness and education about the benefits of farm mechanization. While some respondents may not have observed an increase in productivity due to mechanization, others have experienced positive outcomes. It is important to note that farm mechanization should not be seen as a one-size-fits-all solution, and proper planning and implementation are necessary for it to be effective. The results of this study suggest that farm mechanization is viewed positively in terms of reducing drudgery, which may encourage the adoption and promotion of mechanized farming technologies.

The findings of this study suggest that farm mechanization has a positive impact on reducing input costs and labor costs, and can address the challenge of labor shortage in agriculture. There is a need for further research to identify the specific aspects of mechanization that are most effective in reducing costs and improving productivity, and to address potential barriers to adoption. Additionally, greater awareness and education about the benefits of farm mechanization are needed. It is important to note that mechanization should be implemented with proper planning and not viewed as a one-size-fits-all solution. Finally, the study suggests that mechanization is perceived positively in terms of reducing drudgery, which may encourage its adoption and promotion.

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