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# Constraints in adoption of farm mechanization and suggestions to overcome the constraints

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**Abstract**
The present study was conducted in Kurnool district of Andhra Pradesh to analyze the constraints faced by the farmers in adoption of farm machinery and suggestions to overcome the constraints. The study was conducted with a sample of 120 farmers. The results indicated that High initial cost, High fuel cost, Lack of credit facilities, Small and fragmented land holdings, High maintenance cost, Non-availability of nearby service centres, Low re-sale value of farm machinery and implements, Non-availability of spare parts shops nearby, Inadequate hiring agencies, High hire charge, Wastage during harvest, High tax rate, Frequent repairs, Lack of awareness about implements, Not suited to all type of soils, Non-availability of fuel bank in nearby, Lack of skilled labour, Difficulty in providing recommended spacing and Lack of training on use of farm machinery, implements and tools and Frequent power cuts etc. Regarding suggestions increase of subsidy portion to purchase the machinery, communal based custom hiring centres, refinement of existing implements, increase in number of units under subsidy, trainings and workshops to increase awareness are the major suggestions mentioned by the farmers.

**Keywords:** farm machinery, farmers, constraints and suggestions

## Introduction
Agricultural mechanization implies the use of various power sources and improved farm tools and equipment, with a view to reduce drudgery of human being and draught animals, enhance the cropping intensity, precision and timeliness of efficiency of utilization of various crop inputs and reduce the losses at different stages of crop production. A farmer can save 15-20% of seeds, 20- 30% of fertilizer, 20-30% of time 2-5-20% of labours with increase in cropping intensity in the tune of 10-15 per cent, higher productivity around 15-20 per cent with proper utilisation of farm mechanization (Nagraj *et al.* 2013) [10]. The end objective of farm mechanization is to enhance the overall productivity and production with lowest cost of production. It is one of the good alternatives to farmers, who aim to get a higher income. Apart from the increase in production from farm mechanization sector is plagued by various challenges related to product, technology, markets, operations, legislation, policy framework and other related areas which pose a serious impediment to the growth of the industry.

## Material and Methods
The study was conducted with an *Ex post facto* research design to assess the constraints faced by the farmers in adoption of farm mechanization and suggestions perceived by the farmers to overcome the constraints. Andhra Pradesh state was purposively chosen for this study since the researcher belongs to the same state and was familiar with the local language. Kurnool district of Andhra Pradesh was selected purposively as the district is having highest area of major crops under farm mechanization. Six mandals were selected purposively based on the highest acreage under farm mechanization. Two Villages from each mandal were selected by simple random sampling procedure and ten respondents from each village were selected by following simple random sampling procedure thus making a total of 120 respondents as sample of the study. After review of literature and consultation with experts as set of 15 personal, psychological and socio-economic variables were selected. The data was collected through a structured comprehensive interview schedule and analyzed using mean and standard deviation for drawing meaningful interpretations.
The farmers were asked to express their constraints in adoption of farm mechanization. The constraints were stated by them were recorded in close ended form. The constraints were based on frequency as expressed by the farmers and also farmers were requested to elicit their suggestions in open ended form to overcome the constraints of farm mechanization.

The suggestions were ranked based on frequency as expressed by the farmers.

## Results and Discussion

### 1. Constraints faced by the farmers in adoption of farm mechanization

It was true that farm mechanization had shown good results in increasing production and reduced drudgery in the cultivation, but a number of arguments have been advanced against farm mechanization. The farm mechanization sector was plagued by various challenges related to product, technology, markets, operations, legislation, policy framework and other related segments which posed a serious impediment to the adoption. The key challenges faced by the farm mechanization are discussed below in the Table 1.

**Table 1:** Constraints faced by the farmers in adoption of farm mechanization (n=120)

| S. No | Constraints | Frequency | Percentage |
|---|---|---|---|
| **I** | **Economic constraints** | | |
| 1 | High initial cost | 120 | 100.00 |
| 2 | High maintenance cost | 117 | 97.50 |
| 3 | Low re-sale value of farm machinery and implements | 108 | 90.00 |
| 4 | High fuel cost | 118 | 98.33 |
| 5 | High tax rate | 103 | 85.83 |
| 6 | Lack of credit facilities | 118 | 98.33 |
| 7 | High hire charge | 105 | 87.50 |
| 8 | Increase in cost of production | 78 | 65.00 |
| **II** | **Infrastructural constraints** | | |
| 1 | Non availability of service centre in nearby | 109 | 90.83 |
| 2 | Non availability of spare parts shops in nearby | 108 | 90.00 |
| 3 | Non availability of fuel bank in nearby | 90 | 75.00 |
| 4 | Inadequate hiring agencies | 107 | 89.16 |
| **III** | **Information constraints** | | |
| 1 | Lack of awareness about the implements | 99 | 82.50 |
| 2 | Farmers do not have adequate knowledge about the machinery/Mechanisms | 96 | 80.00 |
| 3 | Lack of skilled labour to operate | 87 | 72.50 |
| **IV** | **Situational constraints** | | |
| 1 | Small and fragmented land holdings | 118 | 98.33 |
| 2 | Difficulty in providing recommended spacing | 84 | 70.00 |
| 3 | Most of the implements not suitable to women farmers | 78 | 65.00 |
| 4 | Not suited to all types of soil | 98 | 81.67 |
| 5 | Use of implements in the field sometimes damages the crop | 98 | 81.67 |
| 6 | Soil compaction | 112 | 93.33 |
| 7 | Wastage during harvest | 104 | 86.67 |
| **V** | **Technological constraints** | | |
| 1 | Frequent repairs | 101 | 84.16 |
| 2 | Frequent power cuts | 81 | 67.50 |
| 3 | Lack of training on use of farm machinery, implements and tools. | 84 | 70.00 |

"High initial cost" was the most predominant constraint for the adoption of farm mechanization as considered by all the respondents (100%) of the major crops. "High fuel cost", "Lack of credit facilities", "Small and fragmented land holdings" were the second most dominant limitations for the adoption of farm mechanization as considered by 98.33 per cent of the respondents. "High maintenance cost" was considered as the third restriction for the adoption of farm mechanization as considered by 97.50 per cent of the respondents. "Soil compaction" was considered by 93.33 per cent of the respondents, "Non-availability of nearby service centres" considered by 90.83 per cent of the respondents, "Low re-sale value of farm machinery and implements", "Non-availability of spare parts shops nearby" considered by 90.00 per cent of respondents, "Inadequate hiring agencies" was considered by 89.16 per cent, "High hire charge" considered by 87.50 per cent, "Wastage during harvest" was considered by 86.67 per cent respondents, "High tax rate" was considered by 85.83 per cent, "Frequent repairs" was considered by 84.16 per cent, "Lack of awareness about implements" was considered by 82.50 per cent, "Not suited to all type of soils" was considered by 81.67 per cent, "Use of implements in the field sometimes damages the crop" was considered by 81.67 per cent, "Farmers do not have adequate knowledge about the machinery/mechanisms" was considered by 80.00 per cent, "Non-availability of fuel bank in nearby" was considered by 75.00 per cent, "Lack of skilled labour to operate" was considered by 72.50 per cent, "Difficulty in providing recommended spacing" and "Lack of training on use of farm machinery, implements and tools" were considered by 70.00 per cent,

"Frequent power cuts" was considered by 67.50 per cent, "Increase in cost of production" and "Most of the implements not suitable to women farmers" were considered by 65.00 per cent as constraints in adoption of farm mechanization in major crops.

Broadly "Economic constraints" were the hindering constraints in the adoption of farm mechanization as considered by the respondents with 90.31 per cent. "Infrastructural constraints" ranked second with 86.25 per cent, "Situational constraints" ranked third with 82.28 per cent, "Information constraints" ranked fourth with 78.33 per cent, and "Technological constraints" ranked last with 73.67 per cent.

Altogether the constraints of farm mechanization illustrated broadly as "majority of the cultivators are small and poor, who are not in a position to purchase the costly machinery like tractors, combine harvesters etc." Small size and scattered

land holdings of the farmers keeps them aside of mechanization, which results farm machinery remains under-utilised. The farm machinery has large turning radius and this requires comparatively larger farm for economical use. Lack of proper knowledge of farmer to purchase farm machinery, operate and maintain it properly leads to wrong choice, makes it un-economical and risky too.

High cost of fuel is also a cumbersome to the farmers to adopt farm mechanization. Hence using of expensive oil based farm machinery is not so desirable. The lack of repair and replacement facilities, especially in the remote rural areas is another hindrance in efficient small farm mechanization. Farm mechanization may increase employment in secondary and tertiary sectors but it displaces labour in farm operations. Due to seasonal nature of agriculture, the farm machinery remains idle for much of the time. These are the major bottlenecks in adoption of farm mechanization.

**2. Suggestions to overcome the constraints**

Though mechanization has improved, it is still a bottom of the pyramid story and it will remain so unless concrete measures are taken to boost farmers towards adoption of efficient farm mechanization practices. Custom Hiring is the only practical way to introduce capital intensive, high quality mechanization to the small farming structures prevalent in India. Open type of suggestions was appealed from the respondents to improve the adoption in farm mechanization.

**Table 2:** Suggestions perceived by the farmers for the adoption of farm mechanization (n=120)

| S. No | Suggestions | Frequency | Percentage |
|---|---|---|---|
| 1 | Increase of subsidy portion | 73 | 60.83 |
| 2 | Communal based custom hiring centres | 65 | 54.17 |
| 3 | Refinement of existing implements | 51 | 42.50 |
| 4 | Increase of number of units | 48 | 40.00 |
| 5 | Trainings and workshops to increase awareness | 42 | 35.00 |

Majority of the farmers (60.83%) were expressed that, the government should support the farming community by providing subsidies for implements. Priority should be given to the costly equipment which requires lot of investment by the farmers. Subsidy percentage may be increased to different implements depending on the importance of the operation and its extent of spread among the farmers. Subsidies may also be extended to the spare parts, as they are going to continue the usage of implement for long period by the farmers.

Some farmers (54.17%) expressed that, encouraging custom hiring centres either by private agencies or by farmer producer organizations helps in increasing the adoption rate of farm mechanization by entire farming community including small and marginal farmers.

Refinement of existing implements were suggested by 42.50 per cent of farmers, to increase the adoption of farm implements by the farming community. The machinery must be designed for multipurpose utility from seed to seed operations for effective utilization by the farmers. Low cost implements must be designed to increase the affordability by small and marginal farmers as they constitute major portion of the farming community.

40.00 per cent of farmers suggested to increase the number of units under subsidy, as the weaker section farmers were unable to stand in the competition for the subsidized implements. Majority of the subsidy implements were being procured by big and other influential farmers leaving a little chance to small and marginal farmers.

Lack of awareness was found to be major setback for many low cost implements. 35.00 per cent of the farmers proposed that, there is a great need to create awareness among the farming community about the available implements. Investment is the basic limitation for owning any implement by most of the farmers. Timely supporting the farmer by arranging bank loan/ credit facilities have to be emphasized. Necessary steps towards strengthening the linkage between the manufacturers, distributors, bankers and farmers may be made for proper utilization of bank loans.

**Conclusion**

It is clear from the study that majority of the farmers have limited access to technology, inputs, credit, capital and market. In order to enhance level of mechanization in agricultural operations government needs to extend support to farmers. This support could be in form of custom hiring centres. Farmers should be extended with financial assistance in the form of subsidy for the purchase of agricultural equipment and should have the discretion to select the quality machinery to be purchased with subsidy rather than it being pre-decided vide norms.

To acquaint farmers with new farm technologies and to impart required skill for its usage is primitive for better adoption of mechanization. Hence, KVK along with corporates participation in PPP model may be utilized to increase knowledge of farmers on the benefits of using latest farm machinery and to train them for appropriate use of the machinery. Maximum use of farm machinery is made before and while sowing and for harvesting of crops, whereas the use of machinery in between sowing and harvesting is negligible. To promote the use of farm machinery in the intermediate processes there is a need to develop customized farm machines and equipment with special focus on small and marginal land holders.

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