Original Article
ISSN (Online): 2582-7472

ShodhKosh: Journal of Visual and Performing Arts
June 2024 5(6), 2286–2292

A STUDY ON FACTORS CONTRIBUTING TO FARMERS' ADOPTION OF AGRICULTURAL MACHINERY IN SALEM DISTRICT

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DOI
10.29121/shodhkosh.v5.i6.2024.5471

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

Indian agriculture has marked its presence in the world. It ranks among the best countries in the world for the production of a number of crops, including rice, wheat, sugar cane, fruits and vegetables. Agriculture contributes 26 percent of national income. Therefore, India's prosperity depends on agricultural prosperity. Although the opportunities in the agricultural equipment sector in India are immense, the sector faces challenges on several fronts. Unlike other agricultural sectors, the agricultural mechanization sector has a much more complex structural composition. The mechanization of farms depends on factors such as capital and interest rates, lack of data, small size and dispersion of land, etc. The Indian government has encouraged mechanization through various policy interventions. The technologies that have evolved in the agricultural machinery sector in recent years have enormous potential to realize the vision of the "Make in India" initiative which promotes innovation and investment. The trend paved the way for a range of agricultural tools. This has resulted in a shift from the traditional agricultural process to a more mechanized one. Although the level of mechanization in India is lower than that of other developed countries, it is certainly increasing. This paper discusses farmers' perceptions of the use of agricultural equipment in Salem district.

Keywords: Agricultural Equipment, Factors Influencing, Farmers Perception

1. INTRODUCTION

India is primarily an agricultural country. Agriculture is the sole means of livelihood for nearly 70% of the employed class in India. Agriculture, as an important driver of job creation and livelihoods, remains the mainstay of India's rural economy. Agriculture, along with its related sectors, is arguably the largest livelihood provider in India and most of the key industries depend on the sector for their inputs. In fact, high economic growth will be meaningless for the masses of people living in rural areas unless agriculture is revitalized. Profitability and sustainability of Indian agriculture with inclusive growth requires well distributed efforts in mechanization and energy management. Agricultural mechanization is the backbone of modern agriculture and many developing countries have followed the same path. With a growing population resulting in rapidly growing food demand, increasing the efficiency of agriculture is essential to ensure the

country's food security. Therefore, it is imperative to focus on increasing the production, productivity and profitability of agriculture by improving the intensity of agricultural mechanization in the country.

Faced with the achievements of the industrialization of the post-independence period, the country's economy still has an essentially agrarian character. In the context of the current pressing need to achieve food self-sufficiency as soon as possible, the development of the agricultural sector to optimize its yields has become of crucial importance. For this reason, systematic growth of agriculture is essential not only for reasons of food security, but also to accelerate the pace of industrial development by ensuring an increased supply of raw materials for industries and wages for those employed in the industry. Acceleration in the growth of the economy would be possible provided that the agricultural sector does well on a sustainable basis. Improved agricultural performance is the result of continuous technological advancements and appropriate policies and rapid government response measures. To achieve higher production levels, great importance is given to crop specific strategies. New strategies are being developed to remove yield barriers, use inputs more efficiently, and diversify into more sustainable and higher-value crops. In agricultural innovation, the heart of sustainable agriculture is to maintain the balance between economic, social and environmental expectations. Radical changes in natural resources are accompanied by changes in the structure of agricultural production and make it necessary to introduce alternative technologies. These processes should be supported by new types of quotas, including elements focused on increasing efficiency.

2. BENEFITS OF FARM MECHANIZATION

The introduction of machinery to replace labour is a common phenomenon associated with the release of labour for employment in other sectors of the economy or to facilitate the cultivation of more large area with the same workforce. The idea of using agricultural equipment is to produce more from existing land. The introduction of a machine can reduce production costs or offset the increased costs of draft animals or labour. Additional benefits for the farmer may be associated with reduced drudgery of farm work, greater leisure, or reduced risk. Provided the appropriate technological solutions are employed, agricultural mechanization removes the drudgery associated with agricultural labour, overcomes time and labour bottlenecks to complete tasks within optimal time windows, and can influence the environmental footprint of agriculture leading to sustainable results.

Considerable progress and benefits can be achieved through the mechanization of farms in many developing countries. Mechanization of farms is known to provide a number of economic and social benefits to farmers. Mechanization will stimulate food production which will lead to the export of surplus production in order to generate income for the country through foreign exchange earnings. Agricultural mechanization improves the productivity of agricultural workers. The mechanization of farms increases the speed and quality of agricultural work. Looming crisis of water scarcity along with the need to ensure food security in the country, the benefits of agricultural mechanization make it a crucial part in shaping the future of Indian agriculture. It is said that the mechanization of farms allows a number of savings in inputs: seeds, fertilizers and increased crop intensity. It is estimated that the mechanization of farms can help reduce time by about 15-20%. In addition, it helps to improve the harvest and reduce post-harvest losses and improve the quality of the crop. Thus, these advantages and savings contribute to the reduction of production costs and allow the farmers to earn more income.

3. REVIEW OF LITERATURE

Frances Cossar (2019) studied the impact of mechanization on agricultural production of smallholders. The survey is a joint effort undertaken by the Institute for Statistical, Social and Economic Research at the University of Ghana and the Economic Growth Centre at Yale University. The survey used a two-stage sampling design in which 334 enumeration areas were selected to be representative of each of the 10 regions of Ghana. Within each enumeration area, 15 households were randomly selected. Information on the locations of districts for each enumeration area sampled is provided. The results indicate that for these marginal users of agricultural machinery, mechanized plowing does not significantly reduce the labour used for land preparation, and in fact increases the use of labour for land preparation. The cultivated area is increasing, with proportional increases in maize cultivation and an increased proportion of land controlled by women.

Naga Bhushan and Sivakoti Reddy (2019) studied the mechanization of rice cultivation. The present study applied the stratified random sampling technique to collect the required data. The researcher selected 160 samples from

different locations in the Tenali Revenue Division, Andhra Pradesh. A self-administered questionnaire was used to collect the data. The results therefore corroborate that the primary tillage initiatives incorporated in mechanization are producing effective results. Secondary tillage initiatives incorporated into mechanization are yielding effective results. Planting initiatives incorporated into mechanization are yielding effective results. Intercultural operations initiatives incorporated into mechanization are yielding effective results. Harvesting and threshing initiatives incorporated into mechanization are yielding effective results.

Ramana and Lavanya Kumari (2019) studied the level of use and perception of farmers on agricultural machinery in the southern area which consists of three districts namely, Chittoor, Kadapa and Nellore, of Andhra Pradesh. A total sample of 300 farmers in three districts, 100 from each district, is considered at random for the study. The majority of farmers (93 per cent) had moderate knowledge of agricultural machinery, among them only 6% of farmers practice fully mechanized cultivation and almost 94% of them use agricultural machinery partially at certain stages of cultivation. Regarding the availability of agricultural machinery, almost 10 per cent of farmers owned various agricultural machineries and the majority of them purchased on a subsidy basis. In addition, statistically, a significant impact of age, experience of cultivation using agricultural machinery, education, annual income, labour resources and awareness of agricultural machinery is observed on the perception of farmers on farm mechanization while the size of cultivable land has not influenced their perception.

3.1. OBJECTIVES OF THE STUDY

- To find out the factors that influence farmers for the use of agricultural equipment in Salem district.
- Testing of Hypotheses
- The study is based on the formulation of the following null hypotheses.

H01: There is no significant relationship between farmers belonging to different demographic profiles with the factors that influence them for the use of agricultural equipment in Salem district.

4. SCOPE OF THE STUDY

This study was undertaken to examine the perception of farmers with farm equipment in Salem district. The present study is limited to 5 blocks of the district of Salem, namely Ayothiapattinam, Omalur, Peddanaickenpalayam, Thalaivasal and Veerapandi. In the present study, the factors influencing farmers for the use of farm equipment, the level of satisfaction of farmers with the benefits of using farm equipment, and the problems associated with using farm equipment were only studied.

5. SAMPLING DESIGN

The study is limited to the perception of farmers regarding the use of farm equipment in Salem district. As of 06.30.2019, there are 20 revenue blocks in the Salem district. The researcher adopted multi-stage sampling. In the first stage, 25% of the blocks i.e. 5 blocks are selected on a simple random sampling. In the second stage, 20% of the villages are selected from 5 selected blocks. In the final stage, in each of the villages, 10 marginal and small farmers, 5 medium farmers and 5 large farmers were selected based on the purposive basis. Therefore, the sample size consists of 640 farmers. The following table shows the sampling distribution for this study.

Table 1

Sampling Distribution

Name of the Block	No. of Village Panchayats	Samples	
		No. of Village Panchayats	Farmers
Ayothiapattinam	32	6	120
Omalur	33	7	140
Peddanaickenpalayam	36	7	140
Thalaivasal	35	7	140

Veerapandi	25	5	100
Total	161	32	640

6. TOOLS FOR DATA COLLECTION

The present study is empirical in nature based on a survey method. First-hand information for this study is gathered from the Office of the Joint Director of Agriculture, Salem district. The study encompasses both primary and secondary data. Primary data was collected from 640 farmers in Salem district. Due to the low level of education and poor understanding of agricultural equipment, the schedule method is used to collect primary data from farmers. The primary data was collected from farmers over a 6-month period from July 2019 to December 2019. The data collected is entered into a master table and tabulated to arrive at useful conclusions. Secondary data comes mainly from books, journals and government reports.

7. DEMOGRAPHIC PROFILE OF RESPONDENTS

Table 2

Demographic Profile of Farmers

Demographic Profile		No. of Respondents	Percentage
Gender	Male	540	84.38
	Female	100	15.62
Age (years)	Upto 35	80	12.50
	36-45	109	17.03
	46-55	306	47.81
	Above 55	145	22.66
Educational status	Illiterate	27	04.22
	Primary education	104	16.25
	S.S.L.C	232	36.25
	H.Sc	169	26.41
	Degree and above	108	16.85
Category	Marginal and small farmer	320	50.00
	Medium farmer	160	25.00
	Big farmer	160	25.00
Annual income (Rs.)	Upto 100000	351	54.84
	100001-200000	147	22.97
	200001-300000	90	14.06
	Above 300000	52	08.13
Block	Ayothiapattinam	120	18.75
	Omalur	140	21.88
	Peddanaickenpalayam	140	21.88
	Thalaivasal	140	21.88
	Veerapandi	100	15.62

Source Primary Data.

Out of 640 farmers in the sample, 84.38% are male and 15.62% are female. Of the total, 12.50% of respondents are under 35 years old, 17.03% are between 36 and 45 years old, 47.81% of respondents belong to 46-55 years old and 22.66% of respondents belong to the group of over 55 years old. In addition, 4.22% of respondents are illiterate, 16.25% have primary education, 36.25% have SSLC education, H.Sc passed out are 26.41% and 16.85% of respondents have a degree and above qualifications. Of 640 respondents, 50% are marginal and small farmers, 25% are medium farmers and 25% are large farmers. The maximum of respondents (54.84%) in the sample belong to the group with annual income below Rs. 100000, followed by 22.97% of respondents with annual income of Rs. 100001 to 200,000. 14.06% and 8.13% of respondents have annual income of Rs. 200001-300000 and over Rs. 300000 respectively. 18.75% 21.88%,

21.88%, 21.88% and 15.62% of farmers belong to Ayothiapattinam, Omalur, Peddanaickenpalayam, Thalaivasal and Veerapandi blocks respectively.

Table 3

Acceptance by Respondents of the Factors Influencing the Use of Agricultural Equipment

Statements	Level of Acceptance					Total	Mean Score
	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree		
Lower cost of inputs	109 (17.03)	242 (37.81)	145 (22.66)	106 (16.56)	38 (5.94)	640 (100.00)	3.434
Reduced labour costs	187 (29.22)	159 (24.84)	183 (28.59)	69 (10.78)	42 (6.56)	640 (100.00)	3.593
Improved yield	105 (16.41)	250 (39.06)	155 (24.22)	84 (13.12)	46 (7.19)	640 (100.00)	3.443
Education and awareness level	120 (18.75)	162 (25.31)	211 (32.97)	80 (12.50)	67 (10.47)	640 (100.00)	3.293
Achievement	141 (22.03)	191 (29.84)	178 (27.81)	100 (15.63)	30 (4.69)	640 (100.00)	3.489
Self-confidence	124 (19.38)	234 (36.56)	123 (19.22)	107 (16.72)	52 (8.13)	640 (100.00)	3.423
Prevention of air pollution	144 (22.50)	165 (25.78)	128 (20.00)	113 (17.69)	90 (14.06)	640 (100.00)	3.250
Lack of water and soil pollution	117 (18.28)	222 (34.69)	211 (32.97)	60 (9.38)	30 (4.69)	640 (100.00)	3.525
Trust and confidence	150 (23.44)	185 (28.91)	102 (15.94)	136 (21.25)	67 (10.47)	640 (100.00)	3.335
Individual participation	163 (25.47)	174 (27.19)	120 (18.75)	78 (12.19)	105 (16.41)	640 (100.00)	3.331
Government loan and subsidy	150 (23.44)	248 (38.75)	133 (20.78)	70 (10.94)	39 (6.09)	640 (100.00)	3.625
Overall	137 (21.41)	203 (31.72)	154 (24.06)	91 (14.22)	55 (8.99)	640 (100.00)	3.431

Source: Primary Data.

It is clear from the table above that of the 640 farmers in the sample, the majority of farmers (31.72%) agree with the list of factors influencing the use of agricultural equipment, followed by neither agree nor disagree (24.06%) and strongly agree (21.41%). 14.22% and 8.99% of respondents disagree and strongly disagree, respectively, with the factors influencing the use of agricultural equipment. The average score shows that among the list of factors influencing the use of agricultural equipment, government loan and subsidy rank first with an average score of 3.625, second place is occupied by reduced labour costs with an average score of 3.593 and the third place is occupied by the lack of water and soil pollution with an average score of 5.525. Prevention of air pollution (3.250) was the least influential variable on the use of agricultural equipment, followed by education and awareness level (3,293) and individual participation (3.331).

8. MULTIPLE REGRESSION ANALYSIS

Multiple regression analysis is used to measure the effect of demographic variables on the dependent variable. In order to assess the effect of farmer demographics on the factors influencing the use of agricultural equipment, multiple regression analysis is used. It assesses the effect of each independent variable and the combined effect of farmer demographics on factors that influence the use of agricultural equipment.

Table 4

Effect of Farmer Demographics on Factors Influencing the Use of Agricultural Equipment

Farmer Demographics	B	Std. Error	t	Result
(Constant)	30.617	1.609	-	-
Gender	0.762	0.617	1.236	Ns
Age	-0.306	0.241	-1.268	Ns
Educational status	0.150	0.208	0.720	Ns
Category	3.116	0.269	11.594	**
Annual income	0.095	0.229	0.414	Ns
Purpose of purchase	0.592	0.538	1.100	Ns
Amount of investment	0.105	0.235	0.446	Ns

Source Primary Data.

Ns Not Significant ** Significant at 1% Level

Multiple Correlation Coefficients between Farmer Demographics andFactors Influencing the Use of Agricultural Equipment

R	R Square	F	Result
0.425	0.180	19.885	Significant

It is deduced from the above analysis that there is a moderate correlation (0.425) between the factors influencing the use of agricultural equipment and the demography of the farmers in the sample. The value of the R-square indicates that there is 18 percent of the influence of farmer demographics on factors influencing the use of agricultural equipment. However, 82 percent of the variation in acceptance of factors influencing agricultural equipment use was attributed to other variables outside of the regression model. The F value showed that the multiple correlation coefficients are significant at the 1% level. Independent variables such as gender, age, education, annual income, purpose of purchase and amount of investment do not have a significant influence on factors influencing the use of agricultural equipment. The category of farmers at the significance level of 1% has a significant influence on the factors influencing the use of agricultural equipment.

9. CONCLUSION

Agriculture is the main occupation of most Indian families. In India, agriculture accounts for around 26% of total GDP and 10% of total exports. Over 58% of rural households depend on agriculture as their main means of livelihood. Agricultural equipment allows farmers to use energy wisely for production. Agricultural equipment increases the productivity of land and labour by respecting the speed of agricultural operations. The mechanization of farms allows efficient use of inputs such as seeds, fertilizers and irrigation water. The extent of the use of agricultural machinery in India requires more efforts in terms of introducing better equipment for each farming operation to reduce drudgery, improve efficiency by saving time and labour, improve productivity, minimize waste and reduce labour costs for each operation. Considering the labour shortage for farms due to urban migration, the shift from agriculture to services and the increased demand for labour in non-farm activities, there is a need to use labour wisely for farms, which strongly

justifies the mechanization of farms. In this perspective, the present study was carried out among a sample of 640 farmers from the 5 blocks of the Salem district. Ensure a positive result; attention to the factors identified in the proposed framework is important for the efficient use of agricultural equipment by farmers in Salem district.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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