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## A Study on the Impact of Mechanisation in Agriculture with Special Reference to Eramam Kuttur Grama Panchayath in Kerala

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### ABSTRACT

The use of technology, procedures, and processes to increase the efficacy and efficiency of food moving along value chains is known as mechanization in agriculture. It includes everything from tractors and advanced drone-enabled soil tests to tiny solar dryers and rice threshers. Mechanization is essential to smallholder agriculture's future growth and development since it can help a variety of stakeholders in the food and agricultural systems. This paper examines the effectiveness of machines among farmers, identify the level of satisfaction in agricultural mechanization and assess the impact of recent mechanization on agricultural growth. It also tries to find out the challenges faced by agricultural farmers. Both primary and secondary data were used for the study. Primary data have been collected through questionnaire and interviews from farmers in Eram Kuttur Grama Panchayath in Kerala. Survey result shows that most of the farmers are using modern technologies in the field of agriculture. Also, there is a significant relationship between use of harvest machine in agriculture and improvement in agricultural growth rate.

## Introduction

Mechanized agriculture refers to the use of agricultural machinery to dramatically increase farm worker productivity by mechanizing agricultural task. In the modern era, powered technology has replaced manpower and working animals like mules, horses, and oxen in many agricultural activities. The history of agriculture contains numerous examples of the application of tools such as the hoe and plough. But because to the industrial revolution, farming has become considerably less labor intensive, which has allowed technology to continue to advance.

Among the many agricultural equipment used in contemporary mechanized agriculture are tractor, trucks, combine harvester, and many more. Precision agriculture even use satellite navigation (GPS guidance) in conjunction with computers to increase yields.

Mechanization was one of the primary drivers of urbanization and industrial economies. Mechanization not only boosts production efficiency but also encourages large - scale production and occasionally improves the quality of agricultural products. It may, however, lead to the loss of unskilled farm labor and environmental harm (such as pollution, deforestation, and soil erosion) if it is used in piecemeal rather than Agricultural mechanization involves using a variety of power sources and better farm tools and equipment to increase cropping intensity , speed, and timeline of efficient utilization of various crop inputs , reduce loss of at different stages of crops production ,and lessen the labor - intensive tasks of human and draft animals. The ultimate goal of farm mechanization is to reduce production costs while increasing total production and productivity.

In addition to mechanical energy, fertilizers, Pesticides, Irrigation, and chemical and biological input from high yielding field varieties, agricultural mechanization has been recognized for its contribution to increased productivity. The Indian Green Revolution is regarded as one of the greatest achievements of 20<sup>th</sup> century.

## Objectives of the study

- To evaluate how new Mechanization has affected agricultural growth.
- To investigate how well farmers use machines.
- To identify the level of satisfaction in agricultural mechanization.
- To know the challenges facing by agricultural farmers.

## Scope of the study

Kerala's Ernakulam Kuttur Panchayath was the site of the study. The primary goal of the study is to determine how effective farmers machines are and to identify eight steps that may need to be taken at different levels to facilitate farm mechanization. Three basic approaches can be used to do this: introducing new agricultural tools, using power drillers, tractor drawn machinery and small tractors, or using giant equipment.

## Hypothesis

Ho = There is no discernible correlation between increased agricultural growth rate and the use of harvest machines.

H1 = Using harvest machines in agriculture and increasing the rate of Agricultural Expansion are significantly correlated.

**Research Design and Methodology**

The study’s participants comprise the farmers of Kerala, India’s Eramam Kuttur Panchayath. Data collection methods included both primary and secondary sources. Questionnaires and interviews were used to gather primary data. Research papers, periodicals, journals and the internet were the sources of the secondary data. Convenient sampling was used to choose a sample of 50 farmers for the investigation. The chi-square test and the percentage technique were used to analyze the data that was gathered.

**Review of literature**

According to a study by Sanjeev Goyle (December 2013), continued agricultural mechanization guarantees higher returns and timely operation. According to him, India's agricultural output is far lower than that of the United States, Brazil, China, and other industrialized nations. However, India's population is growing at a very rapid rate. Therefore, farm mechanization is the sole solution to this issue in order to supply enough food grains for the country's population.

Mechanized farming increases production and productivity, claim by Singh and Singh. Tractor farms produce 42 high yields of wheat, paddy, and sugarcane, according to 1972 research they conducted. Compared to non-mechanized farming, mechanized farming produces more per hectare overall.

In 1973, the National Council of Applied Economic Research (NCAER) carried out research to determine how farm mechanization affected agricultural output and productivity. Research on farm mechanization was conducted in 1975 by Techno-Economic Studies, Madras. The purpose of this study is to compare the production differences between hired farm mechanized farming and tractor-owned mechanized farming. The productivity of peanuts, sugarcane, and paddy on tractor-owned farms rose from 4.1% to 28.3%, according to the study. The correct use of the seed-cum-fertilizer drills is also aided by this robotic farming.

In 1980, the National Council of Applied Economic Research (NCAER) conducted another survey on tractor ownership, the use of custom-hire tractors, and bullock ownership in seven states spread over three Argo climatic zones for agriculture purpose. The survey found that a typical farm with tractors produced more than a farm with custom hiring and bullocks.

**Data Analysis and Interpretation**

**Table No.1 Demographic Profile of the Respondents**

Age of the Respondents	Frequency	Percentage (%)
<b>Age of the Respondents</b>		



Below 20 Years	1	2
21 to 40 Years	8	16
41 to 60 Years	32	64
Above 60 Years	9	18
<b>Gender of the Respondents</b>		
Male	42	84
Female	8	16
<b>Educational Qualification</b>		
School Level	19	38
Graduate	8	16
Post Graduate	6	12
Diploma	12	24
No Formal Education	5	10
<b>Monthly income</b>		
Below Rs.10,000	5	10
Rs.10,001 to 20,000	10	20
Rs.21,000 to 30,000	14	28
Above Rs.30,000	21	42

**Interpretation**

The respondents' demographic characteristics are detailed in Table 1 for this survey, fifty respondents were taken into account.

Out of 200 respondents that were taken into consideration for this study, 64% belong to the 41-60 age group, 18% belong to the over – 60 age group, and 16 % belong to the under – 20 age group, according to the percentage analysis

in Table 1. Similarly, 16 % of respondents were female and 84% of respondents were male. Five groups of respondents were identified based on their educational background: 38% had completed school, 24% had earned a diploma, 16% had graduated, 12% had earned a post – graduate degree, and 10% had no formal education.

Four income classification intervals are taken into consideration, with the majority (42%), of them, falling into the groups of people earning more than Rs. 30000 per month. 28 percent is between Rs. 21000 and Rs. 30000. Ten percent of respondents make less than Rs. 10000.

**Source: Primary Data****Table No. 2 Agricultural activity**

Agricultural activity	No. of respondents	Percentage (%)
Paddy cultivation	24	48
Coconut cultivation	7	14
Rubber cultivation	14	28
Others	5	10
<b>Total</b>	<b>50</b>	<b>100</b>

**Source: Primary data**

- **Interpretation:** According to Table 2, 48% of respondents grow paddy, 14% grow coconuts, 28% grow rubber and 10% grow other crops.

**Table No. 3 years of experience**

Duration	No. of respondents	Percentage (%)
Below 2 Years	5	10
2-5 Years	15	30
5-10 Years	20	40
Above 10 Years	10	20
<b>Total</b>	<b>50</b>	<b>100</b>

**Source: Primary data**

**Interpretation:** The aforementioned table indicates that 40% of the respondents had worked in the agriculture industry for five to ten years, 30% for two five years, and 20% for more than ten years

**Table No. 4 Scale of income**

Annual Income	No. of Respondents	Percentage (%)
Below 100000	6	12
100000-200000	25	50
200000-300000	17	34
Above 300000	2	4
<b>Total</b>	<b>50</b>	<b>100</b>

**Source: Primary data**

- **Interpretation:** Tables 4 shows that 50% of respondents report earning between 1 lakh and 2 lakh per year from the agricultural industry, 34% between 2 lakh and 3 lakh, 12% below 1 lakh, and 4% above 3 lakh.
- **Table No. 5 Usage of modern technology**

Category	No. Of Respondents	Percentage (%)
Yes	36	72
No	14	28
<b>Total</b>	<b>50</b>	<b>100</b>

**Source: Primary data**

**Interpretation:** According to Table 5, 72% of respondents use modern technologies, whereas 28% do not.

**Table No. 6 Agricultural growth after using modern technologies**

Agricultural growth	No. of respondents	Percentage (%)
Yes	30	84

No	06	16
<b>Total</b>	<b>36</b>	<b>100</b>

**Source: Primary data**

**Interpretation:** Table 6 indicates that 92% of respondents believe that the use of contemporary technologies has improved agricultural growth, whereas 8% believe that the rate of agricultural growth has not improved

**Table No. 7 Way of harvesting**

Way of harvesting	No. of respondents	Percentage (%)
Self	5	10
Machine	12	24
Employees	9	18
Jointly	24	48
<b>Total</b>	<b>50</b>	<b>100</b>

**Source: Primary data**

**Interpretation:** According to table 7, 10% of respondents harvest their own crops, 24% use machinery, 18% rely on personnel, and 48% labor together.

**Table No. 8 difficulty** in agriculture mechanization

Difficulties	No. of Respondents	Percentage (%)
Yes	30	60
No	20	40
<b>Total</b>	<b>50</b>	<b>100</b>

**Source: Primary data**

**Interpretation:** According to Table 8, 40% of respondents indicate they have no problems with agricultural mechanization, whereas 60% of respondents report having difficulties

**Table No. 9 Reason** behind the use of machine

Reason	No. of respondents	Percentage (%)
To reduce the time and effort	14	28
Inadequate no. of employees	8	16
To increase the productivity	17	34
To bring modernization in the agriculture	11	22
<b>Total</b>	<b>50</b>	<b>100</b>

**Source: Primary data**

**Interpretation:** Table 9 demonstrates that 34% of respondents utilize machinery in agricultural activities to boost production, 28% to save time and effort, and 22% to modernize agriculture.

**Relationship between uses of harvest machine in agriculture and improvement in agricultural growth rate**

Ho = There is no significant relationship between use of harvest machine in agriculture and improvement in agricultural growth rate.

H1 = There is a significant relationship between use of harvest machine in agriculture and improvement in agricultural growth rate.

For testing the independence of two attributes we apply chi- square test.

**Table No. 10 Observed frequency**

Uses of harvest machine/growth rate in agriculture	Yes	No	Total
Reduce time & effort	10	0	10
Increase productivity	7	4	11
Modernization in agriculture	5	0	5
Less employees	6	6	12
Others	8	4	12
<b>Total</b>	<b>36</b>	<b>14</b>	<b>50</b>

**Source: Primary data**

$$X^2 = \sum (O - E)^2 / E$$

**Table No. 11 Chi-square test**

O	E	O-E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> / E
10	7.2	2.8	7.84	1.089
7	7.92	-0.92	0.8464	0.109
5	3.6	1.4	1.96	0.544
6	8.64	-2.64	6.9696	0.809
8	8.64	-0.64	0.4096	0.047
0	2.8	-2.8	7.84	2.8

4	3.08	0.92	0.8464	0.498
0	1.4	-1.4	1.96	1.4
6	3.36	2.64	6.9696	2.078
4	3.36	0.64	0.4096	0.122
<b>Total</b>				<b>9.496</b>

**Source: Primary data**

$$X^2 = 9.496$$

$$\text{Degree of freedom} = (r-1) (c-1)$$

$$= (5-1) (2-1)$$

$$= 4$$

Level of significance 0.5

Table value = 9.488

### INTERPRETATION

In the case, the alternative hypothesis is accepted and the null hypothesis (H0) is rejected because the calculated value exceeds the table value. Therefore, the usage of harvest machines in agriculture and the acceleration of agricultural growth rate are significantly correlated.

### Findings

- Paddy cultivation accounts for 48% of the farmers' activities
- 50 percent of those surveyed have worked in agriculture for five to ten years.
- The typical yield quantity for 56% of the responders is between 200 and 500 kg
- Most of the farmers earn Rs 100000 - Rs 200000 annual income from agriculture sector.
- 72 percentage of the respondents are using modern technologies in the field of agriculture.
- 92 percentage of the respondents says there is an improvement in agriculture growth.
- Most of the respondents using machines cost is between 5000 - 10000.
- 52 percent of those surveyed think highly of the machine
  - Accordingly, to 84% of farmers, there is a difference between the yield produced by a machine and the yield produced normally
- 34 percentage of the respondents use machines in agricultural activity for the purpose of increase the productivity.
- 36 percentage of the respondents get knowledge about mechanisation through



agency or persons consulted on farming.

- Most of the farmers are satisfied about the trustworthiness of the machine.
- 58 percentage of the respondents face difficulty of lack of mechanical skill

### **Suggestions**

- Intercropping is one of the best strategies to raise a farmer's annual income. Growing two or more crops simultaneously on the same piece of land is known as this method. Even a single crop that would not otherwise be grow on the same amount of land can yield higher yields.
- The issue of effectively using fertilizer requires more attention. The only way to lower the cost of production is to increase efficiency. The only way to sustain and improve soil fertility and produce more agricultural commodities is to use bacterial, inorganic, and organic fertilizers in a complementary and supplemental manner.
- Farmers should receive training on agricultural machines and equipment.
- The government should use all available media, including TV and newspapers, to disseminate information on farming and mechanized facilities.
- Communities are closely linked to Panchayath and Block development offices, awareness programs can be implemented through these offices.
- The irrigation system should be maintained by the government. Because it is now a major farming issue. Only farmers will be able to use water as needed for their crops if there is adequate irrigation infrastructure.
- Low-interest loans must be made available to farmers.

### **Conclusion**

The varying sizes of land holding farm mechanization vary according to the data examined. I increased land holding size opens up additional opportunity to employ more machinery and boost

Agricultural productivity. The degree of farm mechanization is also impacted by loan availability, as impoverished farmers cannot afford to buy expensive agricultural equipment. The government is offering reduced prices on pricey farm equipment including tractors, power tillers, rotators, combine harvesters, and more in an effort to encourage the use of these machines. Therefore, educated farmers benefit from subsidies for many agricultural inputs.

The aforementioned results indicate that the majority of respondents had a medium level of understanding of farm mechanization techniques used in paddy production. This suggest that there is a lot of room for the Development Departments to step in and raise farmer's awareness of farm mechanization techniques.

According to the study, even though all of the farmers in the study area grow paddy, their scientific understanding of the farm mechanization of this crop and their scientific adoption of particular farm instruments fell short. Therefore, leveraging Krishi Vigyan Kendra's scientific expertise to organize field and Farmer's Day and agricultural machines displays that inform and inspire farmers about the benefits of automation is one of the greatest methods to combat this. In India, agriculture is one of the

most Important industries. Following the Green Revolution, contemporary agricultural technology - such as farm equipment, HYV seeds, fertilizers, and pesticides - had a significant impact on this industry. The demand for energy increased as a result of these developmental shifts in agriculture.

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