WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

An Assessment of the Current Status of Agricultural Mechanization in Improving Crop Production Capacity in Ekiti State.

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ABSTRACT

Mechanization in agriculture brings numerous benefits, including increased productivity, reduced labor costs, and enhanced resource efficiency. It allows for timely planting and harvesting, which is crucial for maximizing crop yields. Understanding the current status of agricultural mechanization is crucial for collectively contribution to the development, sustainability, and efficiency of the agricultural sector. Thus, the current status of agricultural mechanization in improving the crop production in Ekiti State was investigated. A structured questionnaire was employed by using investigative approach method to retrieve information from 270 farmers from three senatorial districts of the State. The results shows that the socio- demographic characteristic of the respondent, there are more male that are involved in mechanized farming in the state than female. Although, most of the respondents are educated but there are not within the middle age bracket. Also, most of the farming system are still done by using manual labour. There is no significant difference of socio demographic characteristics of the respondents on level of agricultural mechanization. The government should develop and enforce policies aimed at revitalizing agriculture in the State, while also addressing gender and youth issues in agricultural mechanization within the study areas.

Keywords: Agricultural mechanization, socio-demographic characteristics, farming system

Introduction

Mechanization, which essentially means applying engineering concepts to crop production, is the use of tractors in agricultural systems (Akinbamowo, 2013). The main goals are to reduce human labor, improve agricultural activities' timeliness, economic growth, and efficiency, expand the area under cultivation, raise agricultural product quality, and raise rural residents' standards of living (Belton et al., 2021). In Nigeria, farm activities like cultivation, planting, fertilizer application, crop protection (spraying), harvesting, and drying are still being carried out with persistent use of crude hand tools and outdated technologies from past eras. This is a key factor behind the currently low agricultural output, preventing any significant improvement in the nation's agricultural productivity from its current mediocre level. (Olatunji *et al.*, 2022).

Ekiti state is situated in the southwestern part of Nigeria which is bordered by Kwara state to the North, Kogi state to the Northeast, Ondo state to the Southeast and Osun state to the West. Yam, cocoyam, cassava, maize, plantain, banana, rice, beans, pepper, tomato, cocoa, many kinds of vegetables, and cotton are among the crops grown in Ekiti State. According to Osanyinlusi and Adenegan (2016) over 70% of the land in Ekiti State is used for agricultural activities and food crops and cash crops are the prominent crops cultivated in the State.

The necessity to supplement or replace human labour with mechanical power was identified long ago before a meaningful increase in food production in the Nigerian agricultural production system could be achieved. This has prompted the Ekiti State government to partner with The National Centre for Agricultural Mechanization (NCAM) to use agriculture to drive industrialization and economic prosperity in the State by clearing 1,500 hectares of land for allocation to farmers and investors (Filani and Ejiko, 2018). The aim is to make Ekiti State one of the largest producers of rice in Nigeria. Unfortunately, certain necessary types of agricultural machinery for critical unit operations such as land preparation, fertilizer application, planting, chemical application etc are often inadvertently or deliberately left. Other challenges of agricultural automation include availability of credit facilities, improper funding of research and adequate training of machine operators, and insufficient storage facilities for the machines (Olatuji et al., 2022).

Agricultural development continues to be one of the most influential aspects to end poverty and boost prosperity (World Bank, 2016). To achieve this, there is a need to identify issues in modernizing agricultural in Nigeria to find out some of the factors that forestall Ekiti State from achieving food security. Therefore, this study was conducted to ascertain the present state of agricultural mechanization of agricultural mechanization in improving crop production capacity in Ekiti State. The research is anticipated to provide significant benefits to policymakers, educators, trainers, and all other pertinent stakeholders in the domain.

Materials and Method

Study Area

The Ekiti state is found in the southwest of Nigeria between latitude 7.6670 N and longitude 5.2500 E. It has a tropical climate with two distinct seasons (the rainy season and the dry season), temperatures that range from 210°C to 280°C, and significant humidity. It has 16 local government areas. The study was carried out in the South, Central, and North senatorial districts of Ekiti State, namely Ikole LGA, Gbonyin LGA, and Ado Ekiti LGA. These Local Government Area were selected based on the fact mechanized agriculture are majorly practiced in the local governments. Figure 1 shows the Local Government Area in Ekiti State.

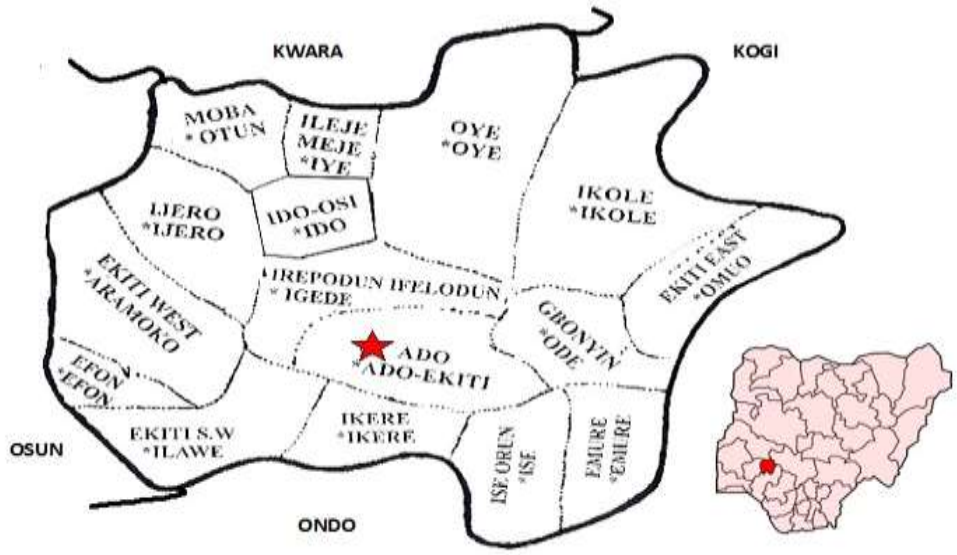

Figure 1: Map of Ekiti State showing the Local Government Areas.

Study Sample and Sampling Method

Data was collected from a farm survey consisting of 270 farmers that are practicing mechanized farming in the three senatorial districts. MSF (2017) method was used in selecting the farmers. Farmers selected are those that are mainly practicing mechanized farming in each of the senatorial district. The farmers are randomly selected and a total of 90 respondents were evaluated in each of the three local government areas, making 270 mechanized farmers. A well-structured questionnaires were administered to extract information on Socio- demographic characteristics and mechanization variables on agricultural mechanization.

Data Analysis

The data collected were subjected to Analysis of Variance using SPSS (21.0) version. Frequency count and percentages was used to analyze the demographic data of the respondents while Chi-square was used to test the null hypotheses at a 0.05 level of significance of influence of socio demographic features of the respondents on level of mechanization.

Results and Discussion

Table 1 and 2 shows the socio demographic characteristics of the respondent, influence of socio demographic characteristics of the respondents on Level of Agricultural Mechanization and significant influence of farm location and local Government Area on agricultural mechanization

respectively. Table 3 shows the farming system practiced by the respondent.

Table 1: Socio Demographic characteristics of the respondent

Gender of the respondents

	Frequency	Percent

Male	199	73.7
Female	71	26.3
Total	270	100.0

Age of the respondents

	Frequency	Percent
25-34	37	13.7
35-44	79	29.3
45-54	94	34.8
55 and above	60	22.2
Total	270	100.0

Marital Status of the respondents

	Frequency	Percent
Single	38	14.1
married	211	78.1
divorce	8	3.0
Missing Value	13	4.8
Total	270	100.0

Educational Level of the respondents

	Frequency	Percent
SSCE	73	27.0
OND/NCE	48	17.8
HND	88	32.6
B Sc / B Tech	32	11.9
M. Sc	10	3.7
Missing value	19	7.0

Table 2: Influence of Socio Demographic characteristics of the Respondents on Level of Agricultural Mechanization.

Gender

	X^2	df	P-value
What type of implement did you use for land preparation	3.792	3	0.040
What type of implement did you use for planting	1.334	2	0.010
What type of implement did you use for chemical application	0.005	1	0.000
What type of implement did you use for fertilizer application	3.833	1	0.010
How did you acquired the land	1.814	3	0.010

Age

	X^2	df	P-value
What type of implement did you use for land preparation	9.646	4	0.050
What type of implement did you use for planting	11.850	4	0.050
What type of implement did you use for chemical application	1.487	3	0.020

What type of implement did you use for fertilizer application	2.943	3	0.030
How did you acquired the land	20.735	9	0.014

Marital Status

	X^2	df	P-value
What type of implement did you use for land preparation	4.846	4	0.050
What type of implement did you use for planting	6.732	4	0.051
What type of implement did you use for chemical application	2.661	2	0.020
What type of implement did you use for fertilizer application	2.399	2	0.010
How did you acquired the land	2.607	2	0.020

Level of Education

	X^2	df	P-value
What type of implement did you use for land preparation	15.511	12	0.015
What type of implement did you use for planting	55.205	8	0.001
What type of implement did you use for chemical application	6.300	4	0.050
What type of implement did you use for fertilizer application	2.438	4	0.010
How did you acquired the land	25.336	5	0.013

Table 3: The farming system practiced by the Respondent

Response of the respondent to the farming system practiced

		Frequency	Percent
Valid	mixed cropping	165	61.1
	single cropping	60	22.2
	Others	44	16.3
Missing	System	1	0.4
Total		270	100.0

Response of the respondent to crops cultivated

		Frequency	Percent
Valid	cereal crops	32	11.9
	Tuber crops	95	35.2
	cash crops	33	12.2
	cereal and tuber crops	91	33.7
	Vegetable	19	7.0
	Total	270	100.0

Response of the respondent to the type of land use for crop cultivation

		Frequency	Percent
Valid	virgin land	71	26.3
	fallow land	40	14.8

	repeated land	158	58.5
Missing	Value	1	0.4
Total		270	100.0

Response of the respondent to the question: How did you acquired the land?

		Frequency	Percent
Valid	Purchased	61	22.6
	Inherited	123	45.6
	Rentage	73	27.0
	Other	12	4.4
Missing	Value	1	.4
Total		270	100.0

Response of the respondent to the size of the land use for crop cultivation

		Frequency	Percent
Valid	0.5-1 hectare	12	4.4
	1.5-2 hectare	37	13.7
	2.5-3 hectare	48	17.8
	3.5-4 hectare	44	16.3
	4.5-5 hectare	40	14.8
	above 6h	89	33.0
	Total	270	100.0

Response of the respondent to type of implement use for land preparation

		Frequency	Percent
Valid	Plough	102	37.8
	Tractor	71	26.3
	Bulldozer	30	11.1
	Others	67	24.8
	Total	270	100.0

Response of the respondent to type of implement use for planting

		Frequency	Percent
Valid	seed drill	60	22.2
	plate planter	37	13.7
	Manual	156	57.8
Missing	Value	17	6.3
Total		270	100.0

Response of the respondent to the question on implement use for chemical application

		Frequency	Percent
Valid	boom sprayer	46	17.0

	knapsack sprayer	218	80.7
Missing	Value	6	2.2
Total		270	100.0

Discussion

Gender, age, marital status, educational background and farm location are some of the socio demographic characteristics of the respondents in the study areas as shown in Table 1. The table depict that 26.3% of respondents were female while 73.7% of respondents are men. This finding is similar to that of Ayandiji et al. (2018) and Abubakar et al. (2021) showing more men than women were engaged in farming-related activities. This shows blatant gender imbalance and this should necessitates a determined effort to advance women in this field. Also, from table 2, it was deduced that the type of implement used for applying chemical as a significant effect on type of gender since $p \leq 0.05$. Furthermore, age is a crucial factor to reckon with in farming. 34.8% of respondents were between the aged of 45 to 54, 29.3% were between 35 to 44 while 13.7% were aged 25 to 34 and 22.2% for 55 and above. This shows that most of the sampled farmed are not within the middle age bracket and this can have a negative effect on production. Also, findings by Falaye et al. (2021) had stated that most youth in Ekiti State might not engage in agriculture as they aged. This could be responsible for the result of low engagement by the youth as recorded in this study. In addition, table 2 shows that age does not effect on the equipment (plough, fertilizer application, chemical application, planting) use in farming since $p \geq 0.05$.

Mohiuddin et al (2007) reported that literacy level had its unique advantages and contributions to the process of modernization of the agricultural revolution. 27.0% of the respondents had completed their SSCE, 17.8% OND/NCE, 32.6% Higher National Diploma (HND), and 3.7% master's degree. The high level of literates among the respondents indicate that the majority would easily understand and adopt better agricultural techniques. This finding is similar to those obtained by Olatunji et al (2022) but contrary to the opinion of Ahaibwe et al (2013) that the agriculture sector employs the least educated labour force. In addition, the high level of educated respondents practicing mechanized agriculture may motivate the adoption of innovation which may improve farm productivity and earnings. The type of implement use for planting as a major effect on the level of education as indicated in table 2.

The marital status of the respondents as portray in table 1 indicate that 14.1% of the respondents are single, 71.8% are married while only 8% are divorced. This present that most of farmers that practiced mechanized farming are married. This implies that the married farmers may have more labour from family members which can have effect on the farmers' output and efficiency. This findings however is in line with the results obtained by Ayandiji et al. (2021) and Olatunji et al (2022). Moreover, Chi-square test statistics showed that marital status has no significantly influenced the agricultural mechanization in term of implement used in land clearing, fertilizer and chemical application, planting and land acquisition in Ekiti state (Table 2).

Table 3 shows that most of the farmers practice mix cropping (61.1%) with tuber crops been the highest (35.2%) crops planted in the three senatorial districts by using a repeated land. This could be done to the inability of the farmers having access to fertile land. This is in agreement with the findings reported by Faleye et al. (2021). Additionally, 22.6% acquired land by purchasing, 45.6% by inheritance, 27% by rentage while 4.4% by other means. 33% of the respondents cultivate above 6 hectare of land while 17.8% cultivate between 2.5 and 3 hectare of land. This implies that agricultural mechanization is highly viable in the selected areas. Also, as show in table 3, land preparation was most done using tractor (26.3%) while using manual labour (57.8%) and knapsack sprayer (80.7%) are used for planting and chemical application respectively. The high rate of manual labour used for planting could be due to high cost of most of machines that are used for planting,

Conclusion

This research reveals the level of agricultural mechanization in improving crop production capacity in Ekitii state. The results of the analysis and data interpretation gather from the field study senatorial districts revels that most of the farmers that engaged in agricultural mechanization are male. Also, gender has a significant effect on the implement used for applying chemicals. However, most of farmers are educated but majority are not within the middle age bracket. This might be responsible for the low level of mechanization in the State. Although, land preparation is done using tractor but most of the other farmer practices system are done using manual labor. There is an urgent need for the government and other stake holders in the State to support and motivate youth towards agriculture. There is also a need for the government to formulate and implement policies that will reinvigorate agriculture in the state and closely examine the gender issues in agricultural mechanization in the study areas.

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