OPEN ACCESS

Global Journal of Research in Agriculture & Life Sciences
ISSN: 2583-4576 (Online)
Volume 03| Issue 04 | July-Aug. | 2023
Journal homepage: https://gjrpublication.com/gjrals/

Research Article

# Effects of Farm Mechanization on the Production of Arable Crop Farmers in Iseyin Local Government of Oyo State, Nigeria

Mojisola Oladipo Abosede[1], Henry Amaegberi[2] & Adewole Williams Adekunle[3]

[1&2]Department of Agricultural Economics and Extension, Faculty of Agriculture, University of Africa, Toru orua Sagbema, Bayelsa State, Nigeria
[3]Department of Agricultural Extension and Rural Development, Faculty of Agricultural Sciences, Ladoke Akintola University of Technology, Ogbomoso, Nigeria

**DOI: 10.5281/zenodo.8217813** **Submission Date: 13 July 2023 | Published Date: 05 Aug. 2023**

***Corresponding author: Adewole Williams Adekunle**
Department of Agricultural Extension and Rural Development, Faculty of Agricultural Sciences, Ladoke Akintola University of Technology, Ogbomoso, Nigeria

## Abstract

The general study analyzed the effects of mechanization on the production of arable crop farmers in Iseyin Local Government of Oyo state. The study was carried out at Iseyin Local Government of Oyo state. The population of the study includes all the arable crop farmers in the study area. Multistage sampling technique would be used for this study. A well-structured interview schedule was used to obtain relevant information from the respondents. Data for the study was analyzed using descriptive statistics tools like frequency, percentages and mean while Pearson Product Moment Correlation (PPMC) was used as the inferential tool to test the hypothesis of the study. The findings revealed that the respondents were still young and in their productive active ages with mean age of 41.1years, more than half (55.6%) of respondents were male while 44.4% of respondents were females, 50.0% of respondents were Christians while another 50% were Muslims, Majority (71.1%) were married, the mean year of schooling was 4.7 years while the mean year of farming experience was 16.2 years. The various machines (light machinery) in use revealed that all the respondents (100.0%) were using cutlass and hoe, 72.2% were using bucket/basket, 66.7% were using axe while only 38.9% were using arrow. The major benefits of the usage of farm mechanization as identified by the respondents are increased productivities (100%), creation of employment opportunities (83.3%), effects of mechanization on farmers revealed that timeless of farm operation ranked first with weighted mean score (WMS) of 2.39, increase in farm size ranked second with WMS of 2.33 while Reduced stress and pains as a result of crude farm tools and increase in farm income jointly ranked 3rd. The suggestions to improve the use of farm machineries revealed that 77.8% of respondents suggested that government should make the machineries available at low cost, 72.2% of respondents suggested that government should provide credit facilities for the farmers, 60.0% of respondents suggested regular training on the usage and maintenance of the facilities.

The study concludes that increased productivity and employment creation were the major mentioned benefits of mechanization among the respondents, timeless of operation and ability to increase the farm size under cultivation were the major effects of farm mechanization while high cost of machinery was the major identified constraint to the usage of agricultural mechanization. The study hereby recommended that government should provide these machines at low cost to the farmers and also, train them on the usage and maintenance of these machineries in order to be able to use it.

# INTRODUCTION

According to the Food and Agriculture Organization (FAO), agricultural mechanization generally refers to the application of tools, implements, and powered machinery as inputs to achieve agricultural production. It encompasses various technologies across the production-processing chain from basic tools such as hoes and cutlasses to motorized equipment such as tractors and grain milling machines. The importance of mechanization in Nigeria stems from its recognition as the pivot to agricultural revolution in many parts of the world, contributing greatly to the increased output. In this vein, Nigeria needs to enhance the number of farmers who utilize mechanical power-based mechanization in order to (i) increase the food production capacity of farmers leading to reduced poverty and improved livelihoods, (ii) reduce the drudgery associated with agricultural production, (iii) reduce the level of post-harvest losses that occur across different agricultural value chains, and (iv) increase the prospects of the local agro-allied industry and the conversion of crops and tubers to value added products (VAPs). While Looking beyond Tractors revealed that Crop production involves labour-intensive activities such as land preparation, planting, weeding, fertilization, irrigation, crop protection and harvesting.

Agricultural mechanization is the application of engineering technology into the field of agriculture, in order to improve agricultural output, as well as deliberate conscious departure from the peasant and subsistence agriculture into a commercial agriculture. This process also involves the development and management of machines for field production, water control, material handling as well as post-harvest operation (Owombo et al. 2012).

To some, agricultural mechanization is synonymous with tractorization while others take it to mean increase in production per farmer per hectare of land cultivated. The high cost of ownership of farm tractors in Nigeria presently militates against the use of tractors by majority of the farmers (Rahman and Mijinyawa, 2001). Nigeria has over 80% of its populace engaged in agricultural activities from where the people derive their means of livelihood either directly or indirectly. Iheanachoet al., (2003) stated that the machines used for agricultural production in Nigeria include: hand tools, animal drawn implements, two wheel and four-wheel drive tractors, motorized or mechanically driven post-harvest handling and processing machines, crop storage equipment and pumps for irrigation. Thus, agricultural mechanization in Nigeria can be divided into three levels of technology; hand tools technology, draught-animal technology and engine powered technology (Oudman, 1993).

Engine powered agricultural mechanization technology include the use of a wheel range tractor sizes as mobile power for field operations, engines or motors to power such machines as threshers, mills, irrigation pumps, air craft for spraying chemicals and self-propelled machine for production harvesting and handling of wide variety of crops. Agriculture is the most important economic activity in Nigeria, in terms of revenue (apart from oil sector revenue) especially in the rural areas. According to the national survey conducted by the Federal Ministry Agriculture, it assessed the quality and quantity of food production. The outcome of this was a document on agricultural development in Nigeria between 1973and 1985.The general conclusions from the document was the problem of modernization of agriculture through the dissemination of modern technologies for agricultural production (Olukosi et al., 2006). This was to be brought about by investment in mechanical technology programmes through public delivery system such as Agricultural Development Agencies like (ADPs) and other agricultural development institutions. Mechanization is a new technology to the farmers in the study area this is as a result of limited spread of machine use, the prevalence of small and fragmented farm holding and lack of capital to acquire the machines, and also adverse cultural practices. In addition, illiteracy of the majority of the farming populace, inadequate rural infrastructural facilities (road, water and electricity) unavailability of spare parts, lack of enough trained machinery operators, poor credit facilities inadequate research programmes to cope with foreign technology (CTA,1992).

According to a study published by the International Conference of the West African Society of Agricultural Engineering, 90% of farmers in Nigeria conduct farm operations using hand tool technologies (World Bank, 2012). This is the case because many farmers lack the resources to acquire agricultural machinery like tractors and ploughs. As a result, Nigeria's mechanization rate of 0.27 horsepower per hectare is well below the FAO's recommended rate of 1.5 horsepower per hectare Ramya and Muruganandham (2016). In fact, for every 10,000 hectares of arable land, farmers have access to 6 tractors. This dependency on human power has not only contributed to low agricultural productivity but also fostered the importation of food from countries like Thailand which have an average of 281 tractors per 10,000 hectares of arable land (Shani, 2020).

According to FAO (2003), although there are large tracts of land with varying degrees of agricultural potential in sub-Saharan Africa there the people who would exploit it for agriculture lack access to appropriate technology for production and postharvest practices. Some of these challenges confronting the agricultural sector in the Sub-region make productivity stagnant.

The drudgery associated with farming and its eventual low returns makes the business unattractive to the youth causing them to leave rural farming communities to urban centers with only the old and frail men and women in the business. It is therefore obvious that the working force on the farm is decreasing at an alarming rate. In the face of this, FAO/UNIDO

(2008), has projected a rapid population increase from 70 million in 2005 to between 1.5 and 2 billion by the 2050. This must therefore be a wake-up call for governments and policy makers in Sub-Saharan Africa to put in appropriate agricultural mechanization measures to ensure all-year-round food production. Specifically, the study described the socio-economic characteristics of the respondents, identified the machines in use by the respondents, examined the benefits of mechanization to the respondents and investigated the constraints to the usage of mechanization.

## Hypothesis of the Study

There is no significant relationship between the selected socio-economic characteristics of the respondents and the effects of mechanization on the arable crop farmers.

## METHODOLOGY

The study was conducted in Iseyin Local Government Area of Oyo State. It is one of Ten Local Government that makeup Oke-Ogun metropolis. It is subdivided into 10 wards. It is 120m above sea level and has the West African Monson climate. The rainfall season is from March to October while the dry season is from November to February. The vegetation pattern is central rainforest with a mean annual temperature of 26.6-degree census. The major occupations of the people residing in the area are farming, carpentry, trading, marketing, food processing as well as carving work, 90% is involved in agriculture as a primary source of income. The crops types grown in the area include maize, cassava, banana, plantain, cocoyam e.t.c.

The population of the study includes all the arable crop farmers in the study area. Multistage sampling technique was used for this study. The first stage involved the random selection of 40% of the wards in the Local Government area. The second stage involved random selection of four villages four from each of the selected cells the study area, the selected villages were Ado-Awaye, Ishemi, Osoogun, Odo-Ogun. The last stage involved the random selection of 20 respondents from the selected villages. Therefore, a total of eighty (80) respondents formed the sampled for this research work. A well-structured interview schedule was used to obtain relevant information from the respondents. The dependent variable is the effects of mechanization on arable crop production, which was measured on a 3-scale of major effect, minor effect and No effect. Data for the study was analyzed using descriptive statistics tools like frequency, percentages and mean while Pearson Product Moment Correlation (PPMC) was used as the inferential tool to test the hypothesis of the study.

## RESULT AND DISCUSSION

### 4.1 Socio-economic Characteristics of the Respondents

The mean age was found to be 41.1 years. Table 1 also revealed that more than half (55.6%) of respondents were male while 44.4% of respondents were Females, 50.0% of respondents were Christians while another 50% were Muslims. Also, 71.1% were married, 13.3% were single, 10.0% were separated while 5.6% were widowed, 40.0% completed primary school, 35.6% completed secondary school while only 11.1% attended tertiary institution. The mean year of schooling was 4.7 years. primary occupation revealed that 77.8% were farmers, 11.1% were civil servants while another 11.1% were traders. Base on secondary occupation, 66.7% were traders, 22.2% were farmers while 11.1% were artisans. Also, 44.5% uses both family and hired labour, 33.3% used only the hired labour while 22.2% used only family labour. The mean year of farming experience was 16.2 years. This implies that respondents are experienced farmers.

**Table 1**: **Distribution of Respondents by Socio-economic Characteristics of the Respondents**

| Variable | Frequency | Percentage | Mean |
|---|---|---|---|
| Age | | | |
| <=30 | 18 | 20.0 | |
| 31-40 | 27 | 30.0 | |
| 41-50 | 27 | 30.0 | 41.1 |
| 51-60 | 14 | 15.6 | |
| Above 60 | 4 | 4.4 | |
| Sex | | | |
| Male | 50 | 55.6 | |
| Female | 40 | 44.4 | |
| Religion | | | |
| Christianity | 45 | 50.0 | |
| Islam | 45 | 50.0 | |
| Traditional | - | - | |
| Marital Status | | | |
| Married | 64 | 71.1 | |
| Single | 12 | 13.3 | |
| Separated | 9 | 10.0 | |

| | | | |
|---|---|---|---|
| Divorced | - | - | |
| Widowed | 5 | 5.6 | |
| Educational status | | | |
| Non formal Education | 12 | 13.3 | |
| Primary school completed | 36 | 40.0 | 4.7 |
| Secondary school completed | 32 | 35.6 | |
| Tertiary Education | 10 | 11.1 | |
| Household Size | | | |
| 1-3 | 20 | 22.2 | |
| 4-6 | 50 | 55.6 | 2 |
| 7-9 | 20 | 22.3 | |
| Primary Occupation | | | |
| Farming | 70 | 77.8 | |
| Trading | 10 | 11.1 | |
| Civil Service | 10 | 11.1 | |
| Secondary Occupation | | | |
| Farming | 20 | 22.2 | |
| Trading | 60 | 66.7 | |
| Artisans | 10 | 11.1 | |
| Sources Of Labour | | | |
| Family | 20 | 22.2 | |
| Hired Only | 30 | 33.3 | |
| Family and Hired | 40 | 44.5 | |
| Membership of Social Organization | | | |
| Cooperative | 30 | 33.3 | |
| Farmers Group | 40 | 44.4 | |
| Trade Associations | 20 | 22.2 | |
| Years of Farming Experience | | | |
| 1-5 | 14 | 15.6 | |
| 6-10 | 13 | 14.4 | 16.2 |
| 11-15 | 21 | 23.3 | |
| 16-20 | 25 | 27.7 | |
| Above 20 | 17 | 18.8 | |

**Source: Field Survey, 2023**

## 4.2: Various farm machines in use by the Respondents

Table 2 shows the distribution of respondents by various machines (light machinery) in use. It was revealed that all the respondents (100.0%) were using cutlass and hoe, 72.2% were using bucket/basket, 66.7% were using axe while only 38.9% were using arrow. Base on medium-Heavy Machineries, 55.6% were using tractor and spraying machines, 44.4% were using plough and diesel pump, 33.3% were using trolley/trailer, 22.2% were using fodder cutting while 11.1% were using thresher. The result implies that cutlass and hoe were the major light machineries in use by the respondents while tractor and spraying machines were the medium-heavy machineries been used by the respondents in the study area.

**Table 2: Distribution of Respondents by Various farm machines in use by the Respondents**

| Variables | Frequency | Percentage |
|---|---|---|
| **Light Machinery** | | |
| Cutlass/ machete | 90 | 100.0 |
| Hoe | 90 | 100.0 |
| Axe | 60 | 66.7 |
| Arrow | 35 | 38.9 |
| Basket/Bucket | 65 | 72.2 |
| **Medium-Heavy Machinery** | | |
| Tractor | 50 | 55.6 |

| | | |
|---|---|---|
| Thresher | 10 | 11.1 |
| Plough | 40 | 44.4 |
| Fodder cutting | 20 | 22.2 |
| Trolley/Trailer | 30 | 33.3 |
| Generator/diesel pump | 40 | 44.4 |
| Spraying machines | 50 | 55.6 |

**Source: Field Survey, 2023**

## 4.3 Benefits of the Usage of farm Mechanization

The Table 3 shows the distribution of respondents by major benefits of the usage of farm mechanization. It was revealed that all the respondents mentioned increased productivities (100%), as the major benefit derived, creation of employment opportunities (83.3%), reduction in health hazard dues to manual or over labour drudgery (72.2%), it saves times and encourages large scale farming (61.1%), timeliness of operation, promotes specialization of available manpower (55.6%). The result implies that increased productivity and employment creation are the major mentioned benefits of mechanization among the respondents.

**Table 3: Distribution of Respondents According to the Benefits of the usage of farm Mechanization**

| Benefits | Frequency | Percentage |
|---|---|---|
| Increasing Productivity. | 90 | 100.0 |
| Timeliness of Operation | 50 | 55.6 |
| Reduces health hazard due to manual or over labour drudgery. | 65 | 72.2 |
| Supplements human power several folds for heavy jobs. | 50 | 55.6 |
| It saves time | 55 | 61.1 |
| Encourages large scale farming. | 55 | 61.1 |
| Promotes specialization of available manpower. | 50 | 55.6 |
| Create employment for youths. | 75 | 83.3 |

**Source: Field Survey, 2023**

## 4.4 Effects of Mechanization on Farmers

The result in Table 4, shows the distribution of respondents by the effects of mechanization on farmers. It was revealed that timeless of farm operation ranked first with weighted mean score(WMS) of 2.39, increase in farm size ranked second with WMS of 2.33 while Reduced stress and pains as a result of crude farm tools and Increase in farm income jointly ranked 3rd. Also, decrease in the number of farm workers ranked 5th while reduction in production cost was ranked 6th. The result implies that timeless of operation and ability to increase the farm size under cultivation were the major effects of farm mechanization.

**Table 4: Distribution of Respondents According to the Effects of Mechanization on Farmers**

| Effects of Mechanization | Strongly Agreed | Agreed | Disagreed | Strongly Disagreed | WMS | Rank |
|---|---|---|---|---|---|---|
| Increase in farm Size | 50(55.6) | 30(33.3) | 5(5.6) | 5(5.6) | 2.33 | 2nd |
| Timeliness of farm operation | 60(66.7) | 15(16.7) | 15(16.7) | - | 2.39 | 1st |
| Reduction in production cost | | 70(77.8) | 20(22.2) | | 1.78 | 6th |
| Decrease in the no of farm workers | 10(10.1) | 60(66.7) | 20(22.2) | | 1.89 | 5th |
| Reduced stress and pains as a result of crude farm tools | 30(33.3) | 60(66.7) | - | - | 2.05 | 3rd |
| Increase in farm income | 30(33.3) | 60(66.7) | - | - | 2.05 | 3rd |

**Source: Field Survey, 2023**

### 4.5 Constraints to the Usage of Agricultural Mechanization

The distribution of respondents according to the constraints to the usage of Agricultural Mechanization revealed that high cost of machineries was ranked first with Weighted Mean Score (WMS) of 2.0, this was followed by lack of training and technical expertise in farm machinery and low research and extension in mechanization and development of agricultural machines who were jointly ranked second with WMS of 1.8, unfavourable government policy ranked fourth with WMS of 1.5 while small farm size was ranked fifth with WMS of 1.1. The result implies that high cost of machinery was the major identified constraint to the usage of agricultural mechanization.

**Table 5: Distribution of Respondents by Constraints to the Usage of Agricultural Mechanization**

| Constraints to the Usage of Farm Mechanization | Major Constraint | Minor Constraint | Not a Constraint | WMS | Rank |
|---|---|---|---|---|---|
| Lack of training and technical expertise in farm machinery | 89(98.9) | 1(1.1) | - | 1.8 | 2nd |
| Low research and extension in mechanization and development of agricultural machines | 89(98.9) | 1(1.1) | - | 1.8 | 2nd |
| Unfavourable Government Policies and Interventions | 70(77.8) | 10(11.1) | 10(11.1) | 1.5 | 4th |
| Small farm sizes | 10(11.1) | 10(11.1) | 70(77.8) | 1.1 | 5th |
| High cost of farm machinery | 90(100.0) | - | - | 2.0 | 1st |

**Source: Field Survey, 2023**

## Conclusion & Recommendations

The study concludes that increased productivity and employment creation were the major mentioned benefits of mechanization among the respondents, timeliness of operation and ability to increase the farm size under cultivation were the major effects of farm mechanization while high cost of machinery was the major identified constraint to the usage of agricultural mechanization. The study hereby recommended that government should provide these machines at low cost to the farmers and also, they should also be trained on the usage and maintenance of these machineries.

## References

1. Ramya P. and Muruganandham V. (2016). Effect of agricultural mechanization on production, productivity and employment of labour. Shanlax International Journal of Commerce, 4 (3), 54-60
2. Shani B.B. (2020). The upsurge of farm mechanization and its impact on land occupancy system in Nigeria. Journal of Engineering Research & Reports, 18 (3), 36-45
3. FAO & UNIDO. 2008. Agricultural mechanization in Africa. Time for action: planning investment for enhanced agricultural productivity. Report of an expert group meeting jointly held by FAO and UNIDO in Vienna on 29–30 November 2007. Rome, FAO. 26 pp
4. Oudman, L. (1993): 'The Animal Draught Power Development Project in the Department of Agricultural Engineering', in C. L. Kanali et al. (eds) Improving Draught Animal Technology. Proceedings of the first conference of the KENDAT, University of Nairobi: 106-116.
5. Olukosi, J.O. Isitor, S.U. and Ode, M.O. (2006): Introduction to agricultural marketing and prices: principle and application. Living Book Series, GU publications Abuja, 115p

**CITE AS**
Mojisola O. A., Henry A., & Adewole W. A. (2023). Effects of Farm Mechanization on the Production of Arable Crop Farmers in Iseyin Local Government of Oyo State, Nigeria. Global Journal of Research in Agriculture & Life Sciences, 3(4), 9–14. https://doi.org/10.5281/zenodo.8217813