Rural Farmers Use of Agricultural Mechanization in Ahoada East Local Government Area Rivers State – Nigeria: Perception, Benefits

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Abstract

The study ascertained rural farmers' perception on the use of agricultural mechanization in farming activities in Ahoada East Local Government Area, Rivers State. A three-stage random sampling technique was used to select a total of 100 respondents from ten (10) communities for the study. Data were collected with the aid of a structured questionnaire and analyzed using frequency, percentage, mean. The findings revealed that majority of the respondents perceived that Agricultural mechanization requires training programmes ($\bar{x}$ = 3.77), is capital intensive ($\bar{x}$ = 3.44), is preferred to manual labour ($\bar{x}$ = 3.25),), increases agricultural productivity ($\bar{x}$ = 3.13), generates greater income ($\bar{x}$ = 2.94), Support services are required ($\bar{x}$ = 2.91), is only for the educated ($\bar{x}$ = 2.64), is usually for the rich farmers only ($\bar{x}$ = 2.63), is too difficult to handle ($\bar{x}$ = 2.55) and it boost employment ($\bar{x}$ = 2.55). The study further revealed a lots of benefits in the use of agricultural mechanization in farming activities, this includes; increase in productivity ($\bar{x}$ = 4.72), ensuring economic growth ($\bar{x}$ = 4.55), increase in income generation opportunities ($\bar{x}$ = 4.48), increase in stable development of food system ($\bar{x}$ = 4.45), Improving farmers livelihood ($\bar{x}$ = 4.37), ensuring food security ($\bar{x}$ = 4.31), ensuring steady supply of farm produce ($\bar{x}$ = 4.24), Reducing spoilage and wastage of farm produce ($\bar{x}$ = 4.19), reduction in time of operation ($\bar{x}$ = 4.17), eliminating drudgery ($\bar{x}$ = 3.99). Lack of capital ($\bar{x}$ = 3.71),illiteracy of the farmers ($\bar{x}$ = 3.42), land tenure system ($\bar{x}$ = 3.24), lack of maintenance and repairs ($\bar{x}$ = 3.16), scarcity of Machinery ($\bar{x}$ = 3.07), lack of trained machinery operators ($\bar{x}$ = 3.04), lack of access road to the farm ($\bar{x}$ = 3.03), shortage of spare parts ($\bar{x}$ = 2.96), and prevailing agronomic Practices ($\bar{x}$ = 2.90) are some challenges bedeviling the use of agricultural mechanization in the study areas. Hence, the study recommends that government should make agricultural mechanization available.

Key words: Agricultural, Mechanization, Perception, Benefits, Challenges

INTRODUCTION

Agricultural mechanization is the use of machinery and equipment, ranging from simple and basic hand tools to more sophisticated, motorized equipment and machinery, to perform agricultural operations. In modern times, powered machinery has replaced many farm task formerly carried out by manual labour or by working animals such as oxen, horses and mules (Malabo Montpellier Panel, 2018).

Africa currently spends a whopping $35 billion annually on food imports, according to the African Development Bank (AfDB), which projects that if the current trend continues, food imports could rise to $110 billion by 2050. Africa should be the breadbasket of the world, says AfDB president Akinwumi Adesina. “Technologies to achieve Africa’s green revolution exist but are mostly just sitting on the shelves. The challenge is a lack of supportive policies to ensure that they are scaled up to reach millions of farmers. Agricultural productivity in Nigeria is still tedium laden, hence only a few of the youths go into agriculture. Though it is obvious that there is a lot of prosperity in agriculture, yet the rate of the use of old equipment and the antecedent drudgery involved send many away from engaging in agriculture.

In Nigeria, agricultural workers make up a very small portion of the population, but agriculture employs anywhere between 50 percent and 90 percent of the population for farming in the developing countries (Oduwole, 2018). Various powers are used in different region depending on the choice of the farmer and the farm operation the farmer wants to carry out. The basic importance of the use of these implements is to maximize productivity thereby increasing the input to farming activities hence intensifying productivity in the agricultural sector and meeting the high demand of agricultural products. The technique is employed by farmers at different stages of production. According to Rijk (2019), machines are used in ploughing of land, crop production, planting, stumping, ridging, fertilizer application, weeding, harvesting among others. Other area where mechanization is applicable includes land clearing, tilling operation, harrowing, transportation, processing and storage. As a result of the adoption of agricultural mechanization, Mbanasor and Onwusiribe (2019), noted that the use of machines, greatly increase farm workers’ productivity.

Perception is the organization, identification, and interpretation of sensory information in order to represent and understand the presented information or environment. All perception involves signals that go through the nervous system, which in turn result from physical or chemical stimulation of the sensory system.

Perception is not only the passive receipt of these signals, but it is also shaped by the recipient's learning, memory, expectation, and attention. Sensory input is a process that transforms this low-level information to higher-level information (e.g., extracts shapes for object recognition). The process that follows connects a person's concepts and

expectations (or knowledge), restorative and selective mechanisms (such as attention) that influence perception.

These different modules are interconnected and influence each other in adopting the use of agricultural mechanization (Amadi, & Ekezie, 2018). According to Ndubuisi (2019), agriculture remains the only means of ensuring food sufficiency in any country. To ensure food sufficiency in Nigeria efforts must be made to improve the sector. And the only way to achieve this is to encourage commercial farming through mechanization. Despite the demerits of mechanization, its benefits supersede the demerits. Here under are a few of the benefits of agricultural mechanization:

Agricultural mechanization will improve agricultural production in Nigeria. This will boost the availability of food. And decrease hunger in the country. With the application of engineering principles, there will be season less or non-seasonal production of food, maturation periods of crops will be reduced due to improved agriculture and agricultural seed production and irrigation, there will be sufficiency of food for the teaming population of the country. Mechanized farming system would improve the foreign exchange earning potential of the country. Excess farm produce (cash crops) as a result of commercial farming would be exported to other countries.

The benefits of agricultural mechanization are enormous and may include increasing productivity; timeliness of operation; reduces health hazard due to manual or over labour drudgery; supplements human power several folds for heavy jobs; it saves time; encourages large scale farming; promotes specialization of available manpower; create employment for youths.

Onyema (2020) and Odigboh (2020) reported that despite the heavy benefits in agricultural mechanization, mechanization of the Nigerian agricultural system is constrained by many factors.

The land tenure system in Nigeria to an extent discourages farmers from acquiring enough land for large scale farming. This is due to the fact that the land ownership act encourages fragmentation of farm land, thus hinders agricultural mechanization, it is only commercial agriculture that supports mechanization.

If estimate is anything to go by, we have it that about 60 percent of Nigerian farmers is illiterates. This makes it difficult for them to adopt modem farming techniques or operate the machine even when it is available.

For decades the government has continuously neglected the agricultural Sector. Funds were not provided for purchase of agricultural equipment. And even when such considerations are made, the political class embezzles the money for personal use. The inconsistent government policies make many farmers not to know how to invest in machinery and consequently mechanization.

Onyema (2020), and Odigboh (2020), reported that despite the heavy benefits in mechanization techniques, Nigeria farmers has access to only less than one percent of this conventional power, thereby attributing it to land tenure system, scarcity of machinery, illiteracy of the farmers, lack of maintenance technicians, inconsistent government policies, poor infrastructure, poverty and inaccessibility to credit, shortage of spare parts, prevailing agronomic practice, lack of trained machinery operators among others. Therefore sought to ascertain the perception, benefits and challenges of agricultural mechanization use in the study area. The specific objectives of the study were to

i. describe the perception of the rural farmers about agricultural mechanization in the study area;
ii. ascertain the benefits of agricultural mechanization use;
iii. identify the major challenges of agricultural mechanization use by rural farmers in the study area.

Methodology

The study was conducted in Ahoada East is a local government of Rivers State, Nigeria. It is located between Latitude 5.0833º North and Longitude 6.6500º East with an estimated population of about 340, 567 inhabitants based on the proposed 3% annual population growth (NPC, 2021). Christianity and traditional religion are the widely practiced faiths in the area while majority of the population are farmers.

A Multistage sampling, involving purposive and random sampling techniques, was used to select a sample size of 100 respondents for the study. The first stage involved grouping Ahoada East into two (2) clans. Second stage involved random selection of six (6) communities from Upata clan, and four from Akoh clan making it ten (10) selected

communities based on their prevalence on farming activities. Thirdly, 10 crop farmers were randomly selected from these communities to give sample size of 100 respondents from the one hundred and fifty (150) registered crop farmers for the study area Agricultural Development Project, (2023).

Primary date for this study was collected through use of structured questionnaires which were administered to the crop farmers.

Data obtained from the study was analyzed using the mean rating score. Objective i. which examined the perception of the rural farmers about agricultural mechanization was achieved using 4-point Likert scale of Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1, with a criterion score ≥ 2.50. This imply that mean score 2.50 and above indicates a strong perception. Objective ii. Which ascertained the benefits of agricultural mechanization to rural farmers was achieved using 5-point Likert scale of Strongly Agree (SA) = 5, Agree (A) = 4, Disagree (D) = 3, Strongly Disagree (SD) = 3, and Undecided (UD) = 1, with a criterion score ≥ 3.00. This imply that mean score of 3.00 and above indicates a strong benefit. Objective iii which identified the challenges of agricultural mechanization use was achieved using a 4-point rating scale with the option; Very High Extent (VHE) = 4, High Extent (HE) = 3, Low Extent (LE) = 2, and Very Low Extent (VLE) = 1, with a criterion score ≥ 2.50. Mean score of 2.5 and above indicates a major challenge of agricultural mechanization in the rural area.

Results and Discussion

Perception of Rural Farmers on Farm Mechanization Use in the Study Area

Table 1 revealed that majority of the respondents agreed to the perception that it requires training programme ($\underline{x}$ = 3.77). This is followed by It is capital intensive ($\underline{x}$ = 3.44), It is preferred to manual labour ($\underline{x}$ = 3.25),), It increases agricultural productivity ($\underline{x}$ = 3.13), It generates greater income ($\underline{x}$ = 2.94), Support services are required ($\underline{x}$ = 2.91), It is only for the educated ($\underline{x}$ = 2.64), It is usually for the rich farmers only ($\underline{x}$ = 2.63), It is too difficult to handle ($\underline{x}$ = 2.55), Boost employment ($\underline{x}$ = 2.55), Too complex to my liking ($\underline{x}$ = 2.27), Has lots of risk and drawbacks ($\underline{x}$ = 2.31), It damages my environment ($\underline{x}$ = 2.24), It is not culturally suitable ($\underline{x}$ = 1.98), No much difference exist between mechanization and manual labour ($\underline{x}$ = 1.93), respectively were some of the perception of the farmers about Agricultural mechanization in the study area.

This could mean that when farmers resolve positively to the use of agricultural mechanization in the study area, there will be massive production of agricultural goods that will meet the food demand of customers in the market and even on the long storage and preservation of farm produce is ensured. This collaborates with the findings of Lamdi & Akande (2013), Lawal (2013), Mbanasor & Onwusiribe (2014), they stressed that farmers have different perception on agricultural mechanization. These includes; it is capital intensive, too difficult to handle, it boosts employment, it increases agricultural productivity, etc.

Table 1 shows the perception of the rural farmers on farm mechanization Use

Perception of Farmers (n=100)	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Sum**	**Mean** $(\underline{x})$	**Remark**	**Ranking**
It requires training programme	84	11	3	2	377	3.77	Agree	1st
It is capital intensive	51	43	5	1	344	3.44	Agree	2nd
It is preferred to manual labour	45	37	16	2	325	3.25	Agree	3rd
It increases agricultural productivity	51	23	14	12	313	3.13	Agree	4th
It generates greater income	39	20	37	4	294	2.94	Agree	5th
Support services are required	32	27	41	0	291	2.91	Agree	6th
It is only for the educated	30	17	40	13	264	2.64	Agree	7th
It is usually for the rich farmers only	28	31	17	24	263	2.63	Agree	8th
Boosts employment	43	6	14	37	255	2.55	Agree	9th
It is too difficult to handle	41	6	20	33	255	2.55	Agree	9th
Has lots of risks and drawbacks	4	29	61	6	231	2.31	Disagree	10th
Too complex for my liking	8	30	43	18	227	2.27	Disagree	11th

It damages my environment	9	37	23	31	224	2.24	Disagree	12th
It is not culturally suitable	11	14	37	38	198	1.98	Disagree	13th
No much differences exist between mechanization and manual labour	4	23	35	38	193	1.93	Disagree	14th
Grand Mean						**2.50**		

Source: *Field Survey, 2023.* **Criterion Mean:** ≥ 2.50

Benefits of agricultural mechanization use among rural farmers in the study area.

Table 2 revealed that majority of the respondents ($\underline{x}$ = 4.72) agreed that agricultural mechanization ensures high level of productivity others include;), ensures economic growth ($\underline{x}$ = 4.55), increases income generating opportunities ($\underline{x}$ = 4.48), increases stable development of food System ($\underline{x}$ = 4.45), improved farmers livelihood ($\underline{x}$ = 4.37), ensures food security ($\underline{x}$ = 4.31), ensures steady supply of farm produce ($\underline{x}$ = 4.24), reduce timeliness of operation ($\underline{x}$ = 4.17), reduces spoilage and wastage of farm produce ($\underline{x}$ = 4.19), eliminate drudgery ($\underline{x}$ = 3.99), respectively were agreed to as some of the benefits rural farmers gets as a result of the use of Agricultural mechanization in the farming process.

This study is complimented by Lamdi & Akande (2023), Lawal (2023), Mbanasor & Onwusiribe (2019), among other scholars stressed that agricultural mechanization is beneficial in that it boost increase in food production, reduces drudgery, improves timeless and precision operation, increases sustainable development of food system resulting in improve income, ensures increase in productivity among other numerous benefits.

That means when farmers resolve to the use of agricultural mechanization in the study area, there will be massive production of goods that will meet the food demand of consumers in the

market and even on the long storage and preservation of farm produce is ensured as there is sophisticated farm implement used for the preservation of food to avoid spoilage and wastage in the study area.

Table 2 shows the benefits agricultural mechanization use in farming activities

Variables n = (100)	Strongly agree	Agree	Disagree	Strongly disagree	Undecided	Total	Mean ($\underline{x}$)	Remark
Ensuring a high level of productivity	360	112	0	0	0	472	4.72	Agreed
Ensuring food security	215	192	21	2	1	431	4.31	Agreed
Reduce timeliness of operation	185	192	33	6	1	417	4.17	Agreed
Ensuring a steady supply of farm produce	205	180	36	2	1	424	4.24	Agreed
Ensuring economic growth	285	164	6	0	0	455	4.55	Agreed
Improving farmers livelihood	250	168	15	2	2	437	4.37	Agreed
Eliminating drudgery	205	140	36	12	6	399	3.99	Agreed
Reducing spoilage and wastage of farm produce	270	116	18	8	7	419	4.19	Agreed
Increasing income generation opportunities	310	124	9	2	3	448	4.48	Agreed
Increasing stable development of food system	310	112	15	6	2	445	4.45	Agreed
Grand Mean							**4.35**	

Source: Field survey, (2023) **Criterion mean = 3.0**

Challenges of agricultural mechanization use of rural farmers

Table 3 revealed that majority of the respondents ($\underline{x}$ = 3.71) agreed to Lack of capital as a factor militating against mechanization. This was followed by Illiteracy of the farmers ($\underline{x}$ = 3.42), Land tenure system ($\underline{x}$ = 3.24), Lack of maintenance and repairs ($\underline{x}$ = 3.16), Scarcity of Machinery ($\underline{x}$ = 3.07), Lack of trained machinery operators ($\underline{x}$ = 3.04), Lack of access road to the farm ($\underline{x}$ = 3.03), Shortage of spare parts ($\underline{x}$ = 2.96), and Prevailing agronomic Practices ($\underline{x}$ =

2.90), respectively are some of the challenges identified bedeviling agricultural mechanization in the study area. This study agrees with the study of Odigboh (2020), Onyema (2020), Lamidi & Akande (2023), among other scholars affirmed that, lack of maintenance and repairs, high capital requirement, land tenure system, scarcity of machinery, shortage of spare parts, illiteracy of the farmers among other factors are some of the challenges bedeviling agricultural mechanization in the study areas. Lamidi et al (2023) lamented that these factors have been accused as the major setback to development and use of this modern agricultural technique in Nigeria.

Table 3 Challenges of agricultural mechanization use among rural farmers

Variables n = (100)	Very high extent	High extent	Low extent	Very low extent	Total	Mean($\underline{x}$)	Remark
Land tenure system	160	138	24	2	324	3.24	Agreed
Scarcity of machinery	124	144	36	3	307	3.07	Agreed
Shortage of spare parts	96	153	44	3	296	2.96	Agreed
Illiteracy of farmers	248	60	32	2	342	3.42	Agreed
Lack of trained machinery operators	112	156	32	4	304	3.04	Agreed
Prevailing agronomic practice	84	159	42	5	290	2.90	Agreed
Lack of access road to the farm	140	108	52	3	303	3.03	Agreed
Lack of maintenance and repair	144	132	40	0	316	3.16	Agreed

Lack of capital	312	48	10	1	371	3.71	Agreed
Lack of awareness	216	96	22	3	337	3.37	Agreed
Grand Mean					**3.19**		

Source: Field survey, 2023 **Criterion mean = 2.5**

Conclusion

Based on the findings of the study, it was concluded that agricultural mechanization use poses a lot of benefits which include increased productivity, reduces time spent in the farm, preserve the quality of production, and reduces spoilage and wastage of farm produce. The major challenges of agricultural mechanization use identified in the study area includes; land tenure system, scarcity of implements, lack of capital to hire machines, lack of trained machinery operators among other factor are challenging areas that makes farmers in the study areas not to be using agricultural mechanization in their farming process.

Recommendation

Based on the findings of the study, it was recommended that

1. Agricultural machineries' should be made available and affordable to rural farmers to enable them have easy access to farm machinery which will be used in carrying out their farm operations.

2. There should be a well-organized workshop for farmers where they would be trained on how to operate different farm implements and at various farm operations which Implement to be used to carry out such operation.

3. Rural farmers should be given a free access to acquisition of land to scale up their farming venture. More so ready market where farm equipment spare parts will be purchased should be ensured as this is one of the major challenges farmer's faces.

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