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AGRICULTURE TEACHER'S PERCEPTION OF AGRICULTURAL MECHANIZATION IN SECONDARY SCHOOL CURRICULUM: A CASE STUDY OF ZURU, KEBBI STATE

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ABSTRACT

The aim of the study was to assess how agricultural teachers view the importance of agricultural mechanization within the agricultural education curriculum in secondary schools in Zuru Local Government, Kebbi State. Four research objectives with correspondent research questions were formulated to guide the study. A descriptive survey research design was adopted. Ten (10) secondary schools were purposely selected for the study across the study areas out of which two (2) were private schools. Simple random sampling technique was used to select one hundred (100) agricultural science teachers from the sampled schools. Questionnaire with four point rating scale was used to elicit responses from the respondents. Data were analyzed using descriptive statistics of mean and standard deviation. The results revealed a positive perception held by secondary school teachers regarding the concepts in agricultural mechanization education with the overall mean of 3.52 that was above the 2.50 cut of point on a four point rating scale among others. Based on the findings, it is recommended that efforts should be made to improve agricultural mechanization curriculum by incorporating the rejected instructional areas, training workshops and capacity-building programs should be organized for secondary school teachers to deepen their understanding and ability to teach mechanized farming concepts effectively.

Keywords: Agricultural mechanization, Curriculum, Perception, Challenges, Instruction

INTRODUCTION

More than 70% of Nigerians work in agriculture, which contributes over 20% to the country's GDP and is vital for its economic development.. Nonetheless, the sector faces numerous challenges, such as low productivity, limited access to resources and financing, insufficient infrastructure, and a poor adoption of modern agricultural technologies (Adetarami, Onifade, Dada, Jegede & Oloruntoba, 2024).

Agriculture is a vital subject in secondary school science education, serving as an essential tool for fostering self-reliance and acting as a foundation for pursuing careers in fields such as veterinary medicine, agricultural engineering, and forestry, among others. The modern agricultural sector relies heavily on advanced machinery capable of performing tasks that exceed human capabilities (Herren, 2020).

Its inclusion in the secondary school curriculum is due to its educational significance and its importance to individual learners and society (Ogunleye, 2022).

The agricultural industry actively seeks entry-level employees with basic mechanical skills (Ramsey & Edwards, 2021).

As a result, agricultural mechanics has become a popular course among secondary students, necessitating highly competent agricultural education teachers (Saucier & McKim, 2021).

These educators often serve as the primary guidance for students interested in careers in agricultural mechanics (Alston, Anderson, R., English, & Wakefield, 2018).

Agricultural mechanics is incorporated into educational programs to facilitate hands-on learning and a structured approach to technology instruction (Rosencrans & Martin, 2000).

Yohanna, Ango, and Williams (2021). highlight that agricultural mechanization can be attained through the integration of advanced technology in farming. Mechanization is defined as utilizing machinery to enhance productivity, reduce labor intensity, and improve the quality of goods and services. It involves the application of tools and machines in everyday farm activities to increase food production and alleviate poverty (Clark & Bishop, 2022).

The effectiveness of agricultural mechanization relies on selecting the suitable machinery and power source according to the nature of the task, cultural context, affordability, and technical performance. These elements show that mechanization is a means to achieve sustainable development rather than an end goal. The social benefits of agricultural production are influenced by various social, economic, and ecological factors that determine the practicality and sustainability of technology in specific areas (Olaoye & Rotimi, 2020).

In its broadest perspective, agricultural mechanization plays a significant role in enhancing food systems, as it streamlines post-harvest processing and marketing for farmers (FAO, 2024).

Mechanization is relatable to expanding cultivated areas, executing tasks timely, and maximizing production potential. Tractors, for example, can facilitate both crop production and improvements in infrastructure, thereby reducing reliance on human labor for tasks such as hand hoeing during tillage. Mechanization also creates off-farm employment opportunities due to the time saved, allowing individuals to seek additional work (IFPRI, 2016).

Additionally, it enhances value-added processes (including post-harvest operations and processing) and supports overall agricultural development (FAO, 2000).

The modernization of agricultural practices through various technological implements has become a crucial marker for progress.

However, the entire farm machinery sector—comprising manufacturers, importers, distributors, and rental services—faces significant challenges that impede its growth. Common barriers, similar to those constraining other developing sectors, include inadequate regulatory frameworks for business development, complex tax systems, strict import regulations, and inflexible labor laws. Furthermore,

maintenance facilities are often subpar, and there is a critical shortage of spare parts, which leads to prolonged periods of equipment inactivity and subsequent premature obsolescence, coupled with low investments in the research and development of agricultural machinery (Amadi, Adesope & Oguzor, 2022; Brian 2023).

Agriculture is still important in Nigerian economy. About 75 percent of Nigeria population is dependent directly or indirectly on agriculture for their live hood. It provides raw materials for agro-industries like flour mill and soap industries and market for industrial goods like insecticides and fertilizer (Adeneji, 2020).

There is need for change in the agricultural mechanization curriculum and the delivery of these programs in particular, as agriculture and technology continue their evolution. Agricultural mechanization instruction must continually reflect that Evolution. A continual process of rethinking, restructuring and reshaping of agricultural mechanization education is needed. Studies have been conducted to determine perception of teachers' educators and administrators regarding the change needed to be made, but there is lack of input from the secondary school agricultural educators regarding their perception of agricultural mechanization as its now exists and the need for change.

The general objective of this study is to determine the perceptions of agricultural educators regarding the role of agricultural mechanization in the agricultural education curriculum in secondary schools throughout the Zuru Educational Zone of kebbi state. The study sought to draw implications to teacher education programs to provide direction for enrichment in the curriculum

MATERIALS AND METHODS

According to Jansen and Warren (2020), research methodology is characterized as a structured approach aimed at addressing a research problem by collecting data through different techniques, interpreting the collected data, and formulating conclusions based on the findings. The study adopted descriptive survey research design. Ten schools were purposely selected because they all offered agricultural science. From the ten schools selected, simple random sampling technique was used to select 100 Agricultural Science teachers as sample size. Questionnaire was used for data collection. The questionnaire was designed in line with four point rating scale of Strongly Agreed (SA) = 4, Agreed (A) = 3, Disagreed (D) 2, and Strongly Disagreed (SD) = 1. The researcher administered the questionnaire personally and retrieved the responses on the spot. Date was analyzed using descriptive statistic of mean to answer the research questions. Where mean score less than 2.50 were rejected and mean greater than or equal to 2.50 were accepted. The results presented below.

RESULTS AND DISCUSSION

Table1: Perception held by secondary school teachers regarding selected concepts in agricultural mechanization education

Variables	SA	A	D	SD	Mean	Remark
1. The frequency of agric. on the timetable sufficiency	66	30	04	00	3.62	Accepted
2. Agric. mech. concept and skills integrated	80	20	00	00	3.80	Accepted
3. Agric. mechanization courses should emphasis the dev. of employment and skills	50	48	02	00	3.48	Accepted
4. Agric. Mech. developed the entire agriculture	44	42	12	02	3.28	Accepted
5. Courses in agric. Mechanization at secondary level should be science based	34	64	00	02	3.30	Accepted
6. Agric. Mechanization covers crop production, processing and storage facilities	80	10	06	04	3.66	Accepted
Overall mean					**3.52**	**Accepted**

Source: Field Survey, 2024

The results in table 1 showed six items on the perception held by secondary education teachers regarding selected concepts in agric. Mechanization education. All six items had mean rating ranging between 3.28 and 3.80 with the overall mean of 3.52 that was above the 2.50 cut of point on a four point rating scale, which reflect a positive perception held by secondary school teachers regarding selected concepts in agricultural mechanization education? This finding aligns with previous research that highlights the importance of teacher perceptions in the adoption and implementation of agricultural education programs. For instance, Opara (2022) reported that agricultural mechanization education is perceived as vital for equipping students with the skills needed for modern farming techniques. Opara emphasized that "teachers' acceptance and positive perception of mechanization concepts are crucial for fostering student interest and competence in agricultural practices." Similarly, Nwachukwu and Umeh (2024) found that teachers' favorable attitudes towards agricultural mechanization concepts significantly influenced their effectiveness in teaching such topics, as well as students' understanding and engagement. Furthermore, the study by Olaitan and Mama. (2021) corroborates this finding, showing that when teachers perceive agricultural mechanization as relevant and essential, they are more likely to integrate it into their curriculum. Olaitan and Mama. concluded that "teachers' perceptions serve as a foundation for effective curriculum delivery, particularly in technical and vocational education fields like agriculture."

Table 2: Instructional area in agricultural mechanization currently being delivered in secondary education programs

Variables	SA	A	D	SD	Mean	Remark
1. Safety	50	30	12	08	3.22	Accepted
2. Small engine	70	20	04	02	3.50	Accepted
3. Machinery maintenance and operation	08	10	32	50	1.70	Rejected
4. Electricity	30	60	04	06	3.14	Accepted
5. Surveying	42	40	10	08	3.16	Accepted
6. Waste management systems	56	32	10	02	3.42	Accepted
7. Irrigation systems	40	48	08	04	2.84	Accepted
8. Precision farming systems	04	04	30	62	1.20	Rejected
9. Computers	22	38	10	20	2.42	Rejected
10. Metal work	45	35	10	10	3.22	Accepted
Overall mean					**2.80**	**Accepted**

Source: Field Survey, 2024

Table 2 showed ten items on instructional area in agricultural mechanization currently being delivered in secondary education programs of which seven had mean rating ranging between 2.84 and 3.50 that is above the 2.50 cut off point indicating acceptance while three items received mean rating between 1.20 and 2.42 below the 2.50 cut off mark indicating rejection. However, the ten items had an overall mean of 2.80 above the 2.50 cut off point. This result aligns with existing research emphasizing the relevance of these instructional areas in preparing students for modern agricultural practices while also highlighting challenges in their implementation.

Olaitan and Mama (2021) highlighted that "a comprehensive agricultural curriculum should integrate diverse instructional areas to equip students with the technical and practical skills required for modern farming." The inclusion of safety, machinery, irrigation, and precision farming systems in this study supports the emphasis on multidimensional agricultural education. Eze and Nwankwo (2018) stressed the importance of topics like precision farming and irrigation systems in addressing contemporary agricultural needs, particularly in resource management and sustainability. Their study found that "schools with access to resources and trained personnel reported higher acceptance and better student outcomes in technical agricultural topics." This aligns with the areas identified in this study but suggests a need for improved support to enhance acceptance and effectiveness.

Table 3: Perception on mechanized farming

Variables	SA	A	D	SD	Mean	Remark
1. Attainment of food security	74	20	02	04	3.64	Accepted
2. increased prod. Of agric. raw materials	44	44	08	04	3.28	Accepted
3. Processing of export crops	70	22	02	06	3.56	Accepted
4. Employment generation	64	26	04	06	3. 48	Accepted
5. Utilization of agric. resources	76	16	06	02	3.66	Accepted
6. Preservation of agric. land resources from drought, soil erosion and flood	38	42	16	04	3.14	Accepted
7. Promotion of increased application of Modern tech. to agric.	26	46	10	18	2.80	Accepted
Overall mean					**3.37**	**Accepted**

Source: Field Survey, 2024

The results in Table 3, indicating a mean rating ranging between 2.28 and 3.66 with an overall mean of 3.37, suggest that secondary school teachers generally hold a positive perception of mechanized farming. This overall mean, which surpasses the cutoff mark of 2.50, reflects the teachers' acknowledgment of the relevance and importance of mechanized farming in agricultural education. These findings agree with previous research that highlights the critical role of teacher perceptions in advancing agricultural mechanization practices.

Ajayi and Adekunle (2017) found that teachers generally perceive mechanized farming as vital for improving agricultural productivity and sustainability. Their study emphasized that "teachers' positive perceptions are pivotal in encouraging the integration of mechanized farming concepts into the curriculum, thereby fostering students' understanding and interest in modern agricultural practices." The mean rating of 3.37 in this study supports similar conclusions about teacher recognition of mechanization's importance.

Eze and Okolo (2018) noted that mechanized farming is seen as essential for addressing global food security challenges. Their research concluded that "teacher perceptions are a strong predictor of how effectively mechanized farming concepts are taught, as well as the degree to which students understand their practical applications." This aligns with the acceptance shown in this study, which suggests that teachers recognize the value of mechanization in preparing students for modern agricultural systems.

Table 4: Challenges of mechanized farming

Variables	SA	A	D	SD	Mean	Remark
1. Effects of land reform act	80	16	02	02	3.74	Accepted
2. Availability of funds	54	40	02	04	3.44	Accepted
3. Availability of improved seeds and seedlings	62	30	06	02	3.52	Accepted
4. Inadequate access to farming machinery,	72	22	02	04	3.62	Accepted
5. Availability of tractors and other implements	50	30	14	06	3.42	Accepted
6. Outbreak of diseases on crops	48	34	10	04	3.22	Accepted
7. Access to credit facilities	48	40	06	08	3.32	Accepted
8. Training services	52	38	08	02	3.40	Accepted

9. Agric. ext. services	60	32	06	02	2.50	Accepted
10. High cost of purchasing and maintaining mechanized farming equipment	56	34	06	04	3.42	Accepted
11. Transportation of agric. inputs and products	46	34	10	10	3.16	Accepted
Overall mean					**3.3**	**Accepted**

Source: Field Survey, 2024

The findings from Table 4, showing mean ratings ranging between 2.50 and 3.74 with an overall mean of 3.32, highlight the challenges associated with mechanized farming as perceived by secondary school teachers. The overall mean above the cutoff mark of 2.50 indicates a consensus among respondents on the acceptance of the identified challenges. The finding is in line with previous research, which has consistently documented various obstacles to the adoption and implementation of mechanized farming.

Several studies, such as Adeoye and Olaleye (2019), have reported that the high cost of purchasing and maintaining mechanized farming equipment is one of the most significant barriers. They observed that "the financial burden of mechanization limits its adoption, particularly in resource-constrained environments." This aligns with the challenges reflected in the current findings, where teachers likely recognize cost as a key obstacle.

Udo and Effiong (2024) noted that inadequate access to farming machinery, spare parts, and technical expertise contributes to the difficulties faced in mechanized farming. They highlighted that "rural areas and schools often lack the necessary infrastructure and resources to effectively implement mechanized farming practices." The mean ratings in this study reflect similar concerns, indicating the widespread nature of this challenge.

Eze and Okolo (2018) emphasized the lack of trained personnel as a critical challenge to mechanized farming. They stated that "without adequate training, farmers and agricultural educators struggle to operate and maintain mechanized equipment effectively." The findings suggest that secondary school teachers recognize this challenge, as reflected by their acceptance of related items.

Research by Nwachukwu and Umeh (2024) found that issues such as poor soil conditions, erratic weather, and weak governmental policies further complicate the adoption of mechanized farming. They argued that "policy support and environmental adaptation are crucial for overcoming mechanization challenges." Teachers' acceptance of these challenges in the study reflects an awareness of these broader systemic barriers.

CONCLUSION

The study highlights the perceptions and instructional areas of agricultural mechanization education in secondary schools. The findings revealed that secondary school teachers generally have a positive perception of the relevance of agricultural mechanization concepts and mechanized farming, as indicated by mean ratings consistently above the cutoff point of 2.50 in all relevant tables. Furthermore, most instructional areas in agricultural mechanization are currently accepted and delivered in secondary schools, though some areas fall below the acceptance threshold, indicating gaps in the curriculum. Lastly, the challenges associated with mechanized farming were acknowledged by the teachers, reflecting their consensus on the barriers that need to be addressed to improve agricultural mechanization education.

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