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Male and Female Involvement in the Adoption of Improved Sesame Production Technologies in Ofu Local Government Area of Kogi State, Nigeria

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Abstract
The study analysed gender involvement in the adoption of improved sesame production technologies in Ofu Local Government Area of Kogi State, Nigeria. Using a multistage sampling technique, 120 respondents were selected for the study. Data analyses were achieved using percentage, mean statistics (M), and sigma scoring methods. Findings showed that farmers were aware (M=5.874) of and adopted (M =5.541) improved sesame production technologies. One hundred per cent of males and 66.79% of females respectively were involved in ploughing with a hoe; 82.5% of males and 61.9% of females respectively harrowed, while 26.3% of males and 14.3% of females ploughed after the first rain. Lack of access to credit facilities (M=2.84), high cost of farm inputs (M=2.71), high cost of fertilizers (M=2.65), poor extension contact (M=2.55), poor storage facilities (M=2.49), poor access roads (M=2.48) were rated as serious challenges to producing sesame. Although, most of the sesame producers were aware of and adopted improved production technologies, the adoption rate was higher among the male than female sesame farmers. Farmers should form themselves into well-managed cooperatives to access good quality inputs from certified merchants and credit facilities to invest in farming.

Keywords: Adoption, gender, production technologies.

Introduction

Sesame (*Sesamum indicum* L.) also known as sesamum or beniseed belongs to the family *Pedaliaceae* and is one of the oldest oil seeds globally known to mankind (Obafemi et al., 2022). It is regarded as the queen of oilseeds due to its high oil content, delicious nutty aroma, and flavour and is traditionally classified as a health food (Myint et al., 2020). Sesame plays a significant nutritional role in humans. Oil is being processed from most of the sesame seeds and the rest are used for edible purposes (Ajibade et al., 2021). Sesame, apart from health, has several industrial uses which include baking, pharmaceuticals, cosmetics and animal feeds (Achille et al., 2020). Sesame seed contains a lot of fats, proteins, carbohydrates, fibres and several minerals beneficial to man (Muhammed et al., 2022). It also has the highest oil content (46-64%) and dietary energy (6355 k calkg^{-1}) (Kaul et al., 2020).

Nigeria presently produces approximately 573,000 MT of sesame and 9.52% of global production (Myint et al., 2020). Sesame is presently grown in approximately 26 states, with Jigawa, Nassarawa, Benue and Taraba States as leading producers, including Kogi State (Muhammed et al.,2022), and the expectation is to increase the production due to good prices obtained by farmers and also to meet the demand of the world. Sesame is prominent among

Nigeria's agricultural exports (Adesoji, 2019), and is second in position to cocoa and fast becoming famous among non-oil exports that earn Nigeria sumptuous foreign exchange (Obafemi et al., 2022). Taking cognizance of the several benefits of the crop and its products, the demand for it continued to increase which is a huge advantage for Nigeria (Ajibade et al., 2021). As a result of this situation, any quantity of the commodity taken to the market is easily sold (Ikwuakam et al., 2023). According to the Nigeria Export Promotion Council (NEPC, 2020), there is increasing demand for sesame seeds for export to foreign nations such as Japan, Turkey and Europe; which yields for Nigeria a lot of foreign exchange. Available records reveal that Nigeria exported in the first quarter of 2022, sesame valued at ₦24.34 billion to China, ₦11.11 billion to Japan, ₦9.44 billion to Vietnam, ₦2.35 billion to Turkey and ₦2.19 billion to Greece (Ashinze, 2022). The growing demand for sesame seeds has stimulated Nigeria to increase its production efforts to satisfy the international demand for the product. To realize this trend, farmers are being encouraged to grow sesame in all the nation's agro-ecological zones.

The failure of sesame farmers to meet demand in the state despite encouraging them has become worrisome. The need for farmers to adopt improved production practices becomes worthwhile and sacrosanct. Adoption, according to Mou et al. (2019) is the measurement of implementation by the farmers as well as a vital indicator of agricultural development. It involves the process of change in the social system which is continuous such as changes in farm technologies, patterns of human behaviour, and changes in farming patterns, including changes in sesame production geared towards an increase in yield devoid of much drudgery. Udemezue et al. (2024) pointed out that the adoption of a new agricultural practice or innovation requires that the farmer be aware of the practice, become interested, evaluate it, try it, and then take steps of acceptance for use. Although several studies have been done on the analysis of resource use efficiency in sesame production in Nigeria (Achille et al., 2020; Usman, 2019), such studies have not looked at the male and female adopters of improved sesame production technologies in Ofu Local Government Area of Kogi State, Nigeria. The quintessence of gender roles in this work is to bring out the focus of support for equal participation of women and men in agricultural production to eliminate the food crisis and promote and sustain enhanced agricultural production output in the country. It is worthy of note that some issues and challenges about participation in production are gender specific. Based on the above background, this study was designed to analyse gender involvement in the adoption of improved sesame production technologies in Ofu LGA of Kogi State, Nigeria. The study specifically sought to:

(i) determine the level of awareness of improved sesame production technologies;
(ii) determine the level of adoption of sesame production technologies;
(iii) ascertain the level of gender involvement in improved sesame production technologies; and
(iv) identify constraints to the adoption of improved sesame production technologies.

Methodology

The study was conducted in Ofu LGA of Kogi State. Ofu LGA has a land area of 1,680km^2 and a population of 258,100; and lies within coordinates $7^0$20'N and $7^0$05'E (Wikipedia, 2024). The area enjoys both rainy and dry seasons which begin from April to October and November to March respectively.

The study population comprised all sesame farmers in Ofu LGA of Kogi State. A multistage sampling procedure was used in selecting a sample of 120 respondents for the study. In stage one, six districts were purposively selected from the LGA. In stage two, one village from each of the six districts was randomly selected. The six villages selected were: Ugwolawo, Ofejiji, Ochadamu, Okele, Ejule and Ofakaga. In stage three, twenty (20) sesame farmers were

purposively selected from each village giving a total sample size for the study to be one hundred and twenty (120) respondents. Out of 120 respondents, 63 and 57 were female and male respectively. A structured questionnaire was used for data collection for the study.

Respondents' levels of awareness and adoption of improved sesame production technologies were determined using the Sigma scoring method and any mean score value below 5.0 was regarded low level of awareness and adoption of improved sesame production technologies. Respondents' levels of gender involvement in improved sesame production technologies as well as activities that are gender specific were ascertained using frequency counts and percentages. Constraints to the adoption of improved sesame production technologies were identified using a mean score from a 3-point Likert-type scale of very serious, serious and not serious and a benchmark of 2.0 was used as a decision rule for acceptance or rejection.

Results and Discussion

Awareness of Improved Sesame Production Technologies

Table 1 shows that most of the respondents with a sigma score of 5.874 were aware of improved sesame production technologies. This finding confirmed a high level of awareness. The awareness could be attributed to an increase in demand for sesame and its products in the country, which might lead to information diffusion on how to increase production. In a similar study, Sabo and Dia (2019) indicated that awareness was high due to improved vegetable production technology information such as weeding, seed source, disease management, pest control, harvesting, market information and fertilizer use. On the contrary, Bello et al. (2022) reported that the respondents' awareness level of biosafety practices was low. Orkaa and Ayanwale (2020) reported that awareness and knowledge of innovation among others were positive factors that influenced farmer decisions to adopt the improved methods of farming.

Table 1: Level of awareness of improved sesame production technologies.

Research Item	Sigma Score
Awareness	5.874
Not aware	2.08

Source: Field Survey, 2023

Adoption of Improved Sesame Production Technologies

Table 2 shows that most of the respondents with a sigma score of 5.541 adopted improved sesame production technologies, implying a high level of adoption of the technologies. In line with this finding, Kaul et al. (2020) reported that the yield of sesame was higher in front-line demonstrations with the adoption of a high-yielding variety as compared to the local check. This increased yield of demonstration plots from check plots was attributed to the use of all the farming technologies such as sowing time, fertilizer application, and plant protection measures according to the recommended package of technologies. Tekeste, et al (2023), also underscored the importance of improved production practices and the adoption of enhanced agricultural technologies is a technique for boosting productivity in the agricultural sector, alleviating poverty and ensuring food security. Nwaobiala et al. (2022), also confirmed that the adoption of innovative packages disseminated to farmers via agricultural mounted programmes had resulted in improved farming practices, geared towards uplifting farmers' livelihoods and ensuring food security.

Table 2: Farmers' levels of adoption of improved sesame production technologies

Research Item	Sigma Score
Adopted	5.541
Not adopted	2.544

Source: Field Survey, 2023

Farmers' Involvement in Improved Sesame Production Technologies by Sex

Table 3 shows that both male and female sesame farmers adopted all the recommended technologies of sesame production except ploughing with a tractor which had 0.0% for females and just 3.5% for males. The results also revealed that 100.0% of male and 66.7% of female respondents were involved in ploughing with hoe; 82.5% of male and 61.9% of females were involved in harrowing, while 26.3% and 14.5% of male and female respondents, respectively were involved in ploughing after the first rain. This implies that respondents in the study area depended on crude implements for their pre-planting operations. These methods are strenuous and may lead to easy tiredness and less area coverage. Hence, Bandhiya et al*.* (2023) and Noorani et al*.* (2023) pointed out that modern farm equipment or mechanized methods in cultivating sesame crops bring forth a multitude of advantages, encompassing heightened efficiency, diminished labour requirements and enhanced yield uniformity as well as making farm work faster than man labour and animal driven.

The results also show that 29.8% and 19.0% of male and female respondents, respectively used improved seed varieties such as E8, NCRI-BEN-02m etc. Again, while 75.9% and 79.4% of male and female respondents, respectively planted their seeds from June ending to early July, very few farmers both male and female used improved plant gaps of either 60cm apart on flat land or 15cm on ridges. Results also show that 63.2% and 36.5% of male and female respondents, respectively applied NPK 15:15:15 fertilizers, while very few respondents (28.1% male and 7.9% female) used herbicides and 40.4% male and 25.4% female, respectively used fungicides and pesticides to control diseases and pests. Harvesting was done from 90-130 days by 87.7% of males and 90.5% of females, using either sickle or knife (82.5% male and 79.4% female), while threshing of capsules using tarpaulin was done by males (87.7%) and female (93.7%). Storage in a clean and roofed store by male (64.9%) and female (84.1%) was adopted.

Low adoption of improved seeds, plant spacing, and use of herbicides/fungicides and pesticides could be attributed to the purchase of seeds from uncertified seed sellers instead of standard seeds merchants, poor extension contacts, and the exorbitant cost of those technologies. This corroborates the finding of Tekeste et al.(2023) who in their study of the adoption of improved varieties of wheat, teff and maize, reported that 79.7% and 20.3% of smallholder farmers used certified and non-certified seeds respectively, owing to non-supply at the right time, unaffordable price etc. The low adoption could also be due to the exorbitant cost of inputs and sometimes their unavailability and poor extension contact (Adie et al., 2020; Muhammed et al., 2022; and Myint et al., 2020). Generally, it was found that either a male or female was the dominant decision maker for the adoption of improved sesame production technologies.

Table 3: Level of male and female involvement in improved sesame production technologies

Production Technologies	Male (n=57) *Percentage	Female (n=63) *Percentage
Ploughing with hoe	100.0	66.7

Ploughing with tractor	3.5	0.0
Ploughing after first rain	26.3	14.3
Harrowing	82.5	61.9
Use of improved seed varieties (e.g. E8, NCRI-BEN-02m, Yandev-55)	29.8	19.03
Planting June ending to early July	75.9	79.4
Plant gap of 60cm apart on flat land	21.1	15.9
Plant gap of 15cm apart on ridges	31.6	12.7
Application of NPK 15:15:15 fertilizers (2bags/ha)	63.2	36.5
Use of herbicides (e.g scapter 0.20kg/ha, Galex 2.5:2.5L/ha)	28.1	7.9
Hoe weeding at 3 and 9 weeks after planting	96.5	100.0
Diseases and pest control using fungicides/pesticides	40.4	25.4
Harvest after 90-130 days when 50% of capsules change to yellow in colour from green	87.7	90.5
Harvest with sickle or knife only	82.5	79.4
Threshing of capsules using Tarpaulin	87.7	93.7
Store in a clean and roofed house	64.9	84.1

Source: Field Survey, 2023. (*)=multiple responses.

Constraints to the Adoption of Improved Sesame Production Technologies

Table 4 shows that lack of access to credit facilities, high cost of farm inputs, high cost of fertilizers and poor extension contacts were very serious problems, while the rest constraints were serious as they all had mean scores above the benchmark of 2.0. This finding is in tandem with that of Myint et al*.* (2020), Adie et al. (2020), Bello et al*.* (2022) and Muhammed et al. (2022), who reported that lack of credit facilities, lack of contacts with extension personnel, poor access to improved planting materials, among others constrained effective participation of farmers in production. Also, Okonji and Awolu (2020) reported that farmers were faced with challenges such as bad road networks, inadequate credit, high interest rates on credit and non-availability of collateral in adopting improved maize production technology.

Table 4: Constraints to adoption of improved sesame production technologies

Constraints	Mean
High cost of farm inputs	2.71
Lack of sufficient land	2.39
High cost of fertilizers	2.65
Poor extension contact	2.55
Poor access roads to farms	2.48
Poor storage facilities	2.49
Lack of access to credit facility	2.84
Lack of government assistance	2.52
Marketing problems	2.36
Pests and Diseases Factors	2.07
High cost of agrochemicals	2.32

Source: Field Survey, 2023

Conclusion and Recommendations

Most of the sesame farmers were aware of and adopted improved production technologies, but the adoption rate was higher among the male sesame farmers than their female counterparts. The use of machinery was not practised in the area due to high cost and unavailability. The farmers were also faced with other problems such as lack of credit facilities, and the high cost of agrochemicals among others.

Farmers should form cooperatives to access good and quality inputs from standard and certified merchants; output markets, as well as good credit facilities to invest in farming. The government should place subsidies on sesame production inputs, to enable farmers to purchase them with ease.

The government and related agencies should create awareness of the need for women farmers to imbibe improved sesame production technologies. Also, rural feeder roads should be constructed and those in deplorable conditions be repaired as they will facilitate the distribution of the produce to urban markets and places of utilization. As a matter of necessity, the government should improve and extension service delivery to sesame farmers, as they cannot do well without it.

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