ASSESSMENT OF GENDER DISCREPANCIES IN ADOPTION OF IMPROVED SESAME PRODUCTION PRACTICES AMONG RURAL FARMERS IN KOGI STATE, NIGERIA

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Abstract

This study assessed gender discrepancies in adoption of improved sesame production practices among rural farmers in Agricultural Zone A of Kogi State, Nigeria. A multistage sampling procedure was used to select a sample size of 160 respondents for the study. Primary data were collected and analysed using descriptive statistics and logistic regression. Results revealed clear socio-economic and institutional disparities between genders. Male farmers were younger (mean age = 44.4 years), more experienced, and had greater cooperative membership (87.9%) and extension contact (57.9%) than females (mean age = 51.4 years; 71.0% cooperative membership; 35.5% extension contact). Adoption patterns showed a gendered division of labour: males recorded higher adoption of input-intensive practices such as fertilizer use ($\bar{x}$ = 4.27), herbicide application ($\bar{x}$ = 3.36), and transportation ($\bar{x}$ = 3.25), whereas females showed higher adoption of management and post-harvest practices including harvesting ($\bar{x}$ = 4.23), weeding ($\bar{x}$ = 4.09), threshing and winnowing ($\bar{x}$ = 3.06), planting improved varieties ($\bar{x}$ = 2.94), and seed dressing ($\bar{x}$ = 2.77). Logistic regression results for female farmers indicated that the model explained 33.6% of adoption behaviour; age positively influenced adoption at 5% level (β = 1.180, p = 0.050), farming experience had a negative effect at 5% level (β = –0.877, p = 0.047), and income was the strongest determinant, significant at 5% and 1% levels. The study concluded that there were significant gender discrepancies in the adoption of improved sesame production practices in Agricultural Zone A of Kogi State, with male farmers dominating early-stage, physically demanding, and input-intensive practices, while female farmers led in post-planting, labor-intensive, and management-focused activities. Key constraints included high labour, pesticide, transportation, and credit costs, with women additionally facing limited access to machinery and finance. The study recommends gender-sensitive extension services and improved access to credit and inputs to enhance adoption and productivity.

Key words: *Assessment, discrepancies, adoption, Improved sesame production practices*

Introduction

Gender is defined by Food and Agriculture Organisation (FAO (2017) as the relations between male and female, both perpetual and material. Gender is not determined biologically, as a result of sexual characteristics of either women or men, but is constructed socially. It is a central organizing principle of societies, and often governs the processes of production and reproduction, consumption and redistribution' (FAO, 2017). Despite this definition, gender is often misunderstood as being the promotion of women only. However, as we see from the FAO definition, gender issues focus on women and on the relationship between men and women, their roles, access to and control over resources, division of labour, interests and needs. Gender refers to the characteristics of women, men, girls and boys that are socially constructed. This includes norms, behaviors and roles associated with being a woman, man, girl or boy, as well as relationships with each other (Gazali *et al.,* 2022). As a social construct, gender varies from society to society and can change over time (Ikwuakam *et al.,* 2016).

Muhammad *et al.* (2022) defined adoption as the degree of use of a new technology in a long run equilibrium when a farmer has full information about the new technology and its potential. Previous studies on adoption have shown that adoption of innovations or technology does not just happen and that it takes time and sequence of steps before the final results can be realised (Rogers, 2018). The studies further suggest that the series of sequence people may go through to adopt new technologies involve five stages. In the awareness stage, people know the existence of the new technology. This stage is very critical in adoption since it involves educating the person about the technology; the decision the person will take as to whether he or she will adopt the technology will depend on the understanding the individual will get from such training and this leads to the interest stage, where they collect additional information about the technology. At this stage the individual moves to the evaluation stage where they reflect on the advantages and disadvantages of the technology. They may then test the innovation usually on a small scale in the trial stage. The final stage will then come about at the adoption or acceptance stage where the individual start applying or using the technologies.

Sesame (*Sesamum indicum L.*) otherwise known as benisead, a member of the family padaliaceae, is one of the ancient oil seed known to mankind. Sesame plays a major role in human nutrition. Most of the sesame varieties are used for oil extraction and the rest are used for edible purposes (El-Khier *et al.,* 2015). Sesame is widely grown in the Northern and Central parts of Nigeria as a minor crop initially until in 1974 when it became a major cash earner in many northern states such as Kogi, Benue, Nasarawa, Jigawa, Kano, Katsina, Plateau and Yobe States and in Abuja, the Federal Capital Territory of Nigeria (NAERLS, 2017). Sesame is commonly grown by small-holder farmers in the major producing States of Benue, Nasarawa, Kogi and Jigawa States.

Sesame is an important component of Nigeria's agricultural export (Patrick *et al.,* 2016). It currently ranks second to cocoa in terms of export volume in Nigeria and is fast becoming prominent among non-oil exports because it is one of the few cash crops that can earn the country foreign exchange. Sesame seed has numerous health and industrial benefits and is widely used for baking, medicine, cosmetics, and animal feeds. It also has a high oil content of between 44 - 60 percent (Oladimeji *et al.,* 2014).

Sesame is one of the cash crops grown in Kogi State. It is a very popular crop among the rural farmers. Notwithstanding the good local and international market for its seed and oil, it's whose production system is generally characterized by the use of traditional method. Despite all attempts to increase production of sesame in Nigeria, the average farmer still produces only at a subsistence level, using traditional system of farming and low-yielding varieties.

Although adoption of improved agricultural technologies has been widely recognized as a key strategy for increasing productivity, improving income, and enhancing food security among smallholder farmers, there is limited gender-disaggregated empirical evidence on adoption of improved sesame production practices in Nigeria, particularly in Kogi State. Studies in Nigeria have shown that gender influences technology uptake, with male and female farmers differing in their adoption intensity due to variations in access to productive resources, information, and institutional support. For instance, Kamara *et al.* (2025) reported significant gender disparities in adoption of improved soybean management practices, where male farmers adopted more practices than their female counterparts due to better access to inputs and extension services. However, similar gender-focused investigations are scarce for sesame, despite its economic importance as a cash and export crop in northern Nigeria.

Existing studies on sesame production in Kogi State have predominantly focused on adoption of improved sesame varieties and general awareness of technologies rather than the full range of recommended production practices. For example, Obafemi *et al.* (2022) examined the gender dimension in adoption of improved sesame production varieties among farmers in Kogi State but did not comprehensively assess practices such as recommended planting methods, soil fertility management, pest and disease control, or post-harvest handling. Similarly, Adah *et al.* (2023) analyzed gender involvement in adoption of improved sesame production technologies in Of]u

Local Government Area, reporting awareness but without detailed analysis of specific agronomic practices across genders. While these studies contribute to understanding varietal adoption and overall technology awareness, they do not fully capture how male and female farmers differ in adoption of a broader set of recommended sesame production practices. This lack of detailed, gender-specific evidence on comprehensive production practices in Kogi State creates a knowledge gap that limits effective planning and development of inclusive sesame extension programmes.

Objectives of The Study

The broad objective of the study was to assess gender differentials in adoption of improved sesame production practices in the Agricultural Zone A area of Kogi State, Nigeria.

The specific objectives were to:

i. describe the socio-economic characteristics of male and female sesame farmers in the study area;
ii. ascertain gender differentials in adoption of improved sesame production practices in the study area;
iii. identify constraints to adoption of improved sesame production practices among male and female farmers in the study area.

Methodology

Kogi State is located in the Central region of Nigeria. The headquarters of Kogi State is Lokoja, which is situated at the confluence of rivers Niger and Benue, making the State to be popularly known as the Confluence State. The distance from Lokoja to the Federal Capital Territory, Abuja is approximately 193 kilometres (National Bureau of Statistics, NBS, 2015). Kogi State has four Agricultural Zones namely; Agricultural Zone A with headquarters at Aiyetoro-Gbede, Agricultural Zone B with headquarters at Anyigba, Agricultural Zone C with headquarters at Koton-Karfe and Agricultural Zone D with headquarters at Alloma. Agricultural Zone A was used for the study. The State is located between latitudes 6°30'N and 8°5'N and longitudes 5°51'E and 8°00'E.

Kogi State has boundaries with nine (9) States namely; Federal Capital Territory (FCT) to the North, Nasarawa State to the North east, Benue State to the East, Enugu State to the South east, Anambra State to the south, Edo State to the south west, Ondo and Ekiti States to the west, Kwara State to the north west and Niger State to the North. Kogi State has a total population of about 4,205,546 people in 2014 (using the State projected growth rate) (NPC, 2017) and land area of about 30,354,74 square kilometres. The State has 2,774,700 hectares of land (NBS, 2015) but only about 0.5 million hectares are under cultivation (Kogi State Economic Empowerment and Development Strategy, (KOSEEDS) 2014). Kogi State is well supplied with river valleys and swamp lands for dry season farming. The major crops grown in the State are maize, yam, sesame, cassava, sorghum, rice, millet, cowpea, pigeon pea, groundnut, bambara nut, cocoyam, sweet potato, benniseed, melon, banana, plantain and cotton. Fruits and leafy vegetables such as okra, pepper, fluted pumpkin and spinach are also cultivated in the area. Major fruits produced in the State include orange, grape, lemon, tangerine, plantain/banana, mango, pineapple and pawpaw. Tree crops grown in the State include cocoa, cashew, oil palm, citrus, coffee and kola nut. Major animals reared are cattle, sheep, goats and poultry. Fishing is very common along the riverine areas.

The population for this study comprised all sesame farmers in the Agricultural Zone A area of Kogi State. A multistage sampling technique was used to select a sample size of 160 srespondents.

Stage 1: Three (3) Local Government Areas (LGAs) out of the six (6) LGAs that constitute Agricultural Zone A were purposively selected for the study due to the high level of sesame production in these LGAs. These were Yagba West, Yagba East and Mopamuro LGAs.

Stage 2: Three (3) communities were selected from each of the selected LGAs purposively. This was due to high number of sesame farmers in these communities. These communities include: Odo-ere, Ejiba and Egbe in Yagba West LGA; Makutu, Idofin and Ejuku in Yagba East LGA; and Effo, Amuro and Aiyeteju in Mopamro LGA. This made it nine (9) communities that were used for the study.

Stage 3: A total of 260 sesame farmers, comprising 175 males and 85 females, was obtained from the Kogi Agricultural Development Programme. Using a simple random sampling technique and the Taro Yamane formula, 107 male and 53 female farmers were selected, resulting in a total sample size of 160 respondents for the study. The sample size was determined using the Taro Yaman's formula at a 0.05 level of precision and the Bourley formula, as outlined in the sample frame presented in Table 1.

Taro Yemen's formula:

$$n = \frac{N}{1 + N(e)2}$$

Where:

n = the required sample size from the population under study

N = the whole population that is under study

e = the precision or sampling error which is usually 0.05

Burley's proportional distribution formula:

$$n_h = \frac{N_h}{N} \times n$$

Where:

n_h = sample size for the stratum *h*

N_h = population size for the stratum *h*

N = total population

n = total sample size

Table 1: Sample Size Selection plan

LGA	Rural Community	Male sesame farmers	Female sesame farmers	selected male sesame farmers	selected female sesame farmers	Total Sample Size
Yagba West	Odo-ere	20	10	12	6	**18**
	Ejiba	21	11	13	7	**20**
	Egbe	19	10	12	6	**18**
Yagba East	Makutu	21	8	13	5	**18**
	Idofin	17	9	10	6	**16**
	Ejuku	18	8	11	5	**16**
Mopamuro	Effo	20	10	12	6	**18**
	Amuro	21	8	13	5	**18**
	Aiyeteju	18	11	11	7	**18**
Total = 3	**9**	**175**	**85**	**107**	**53**	**160**

Source: Field survey (2025)

Method of Data Collection

Primary data were used for the study. The primary data were collected using a structured questionnaire to elicit information from the respondents. The primary data were collected on the socio-economic characteristics of male and female sesame farmers; gender differentials in the level of adoption of improved sesame production practices; the effects of socio-economic factors on the adoption of improved sesame production practices between male and female farmers; and constraints to the adoption of improved sesame production practices among male and female farmers in the study area.

Method of Data Analysis

Data were analyzed using both descriptive and inferential statistics. The objectives i, ii and iv were analyzed using descriptive statistical tools such as frequency and percentages. Objectives iii and iv were analysed using ordered logit regression model.

Model Specification

The Explicit Form of the Ordered Logit Regression Model used is expressed as:

$$Yi* = \beta 0 + \beta 1\ X1i + \beta 2X2i + \beta 3X3i + \beta 4X4i + \beta 5X5i + \beta 6X6i + \beta 7X7i + \beta 8X8i + \varepsilon i$$

Where:

Y = ordinal values. Respondent's level of adoption of rice production technologies

β0, s the intercept; β1,…,β8 are the coefficients to be estimated

a= Constant term

Y = Level of adoption of improved sesame production practices by male and female sesame farmers ((1 = low adoption, 2 = moderate adoption, 3 = high adoption).

X_1 = Age (years)

X_2 = Level of educational (Years of schooling)

X_3 = Methods of farm land acquisition (1 = Inheritance, 2 = Lease, 3 = Gift, 4 = Purchased, 5 = Borrowed)

X_4 = Cooperation association membership (number of Years)

X_5 = Income from sesame (in naira)

X_6 = Household size (Number of persons)

X_7 = Sesame farming experience (years)

X_8 = Extension contact (Number of visits by extension agents)

εi = error term

Results and Discussion

Socioeconomic Characteristics of Respondents

Table 2 shows that most male farmers (47.7%) were within 41–50 years age group, while most female farmers were in the 51–60 years category. The mean ages were 44.4 years for males and 51.4 (37.4%) years for females, indicating that female sesame farmers in the study area were generally older than their male counterparts. This could reflect gender dynamics in farming, where men may take over land at a younger age, while women continue farming at older ages due to household responsibilities and engagement in post-harvest operations. This result disagrees with Rukwe and Zubairu (2019) who investigated determinants of technical efficiency of sesame production in Kurmi Local Government Area of Taraba State, Nigeria and found the mean age of both male and female sesame farmers to be 42 years.

Table 2 also shows that majority (66.4%) of male and female (64.5%) farmers had secondary education. A slightly higher proportion of females had tertiary education (28.0%) compared to males (26.2%), while non-formal education was negligible. This indicates that both male and female farmers possessed sufficient educational background to understand and adopt improved sesame production practices, although the slight variation may influence access to technical information and extension services. This result agreed with Rukwe, and Zubairu (2019) who investigated determinant of technical efficiency of sesame production in Kurmi Local Government Area of Taraba State, Nigeria, and Found that about 90.2 % of the respondents were literate at least, having one form of formal education or the other.

Household size: Household size averaged 8 persons for both genders, with most households falling in the 6–10 persons. This suggests that both male and female farmers have comparable labor availability from family members for farm operations. The finding is in line with Garba *et al.* (2018) who carried out a study on comparative analysis of economics of sesame production between improved sesame seed adopter and non-adopter farmers in Jigawa State, Nigeria and reported that most (77.6%) respondents had less than 11 members per family.

Experience in sesame farming: Experience in sesame farming was slightly higher among males, with 72.0% having 11–20 years of experience, while a higher proportion of females (25.2%) were within the 1–10 years category. The mean farming experience was 16.9 years for males and 15.4 years for females, suggesting that males may have more exposure to modern practices, but females also possess substantial experience in the crop. The finding agrees with Mohammed *et al.* (2022), who found that 63.3% of the farmers had between 6 -15 years farming experience.

Cooperative society membership: Regarding cooperative society membership, a higher proportion of males (87.9%) belonged to cooperatives compared to females (71.0%). Similarly, the average years of cooperative membership were slightly higher for males (7.4 years) than females (6.4 years), indicating that males may have better access to collective resources, input support, and extension information through these networks. The finding is in line with Garba *et al.* (2018) who carried out a study on comparative analysis of economics of sesame production between improved sesame seed adopter and non-adopter farmers in Jigawa State, Nigeria and reported that majority (81.8%) were members of farmers' organizations.

Extension contacts: Extension contact also reflected gender disparities. More male farmers (57.9%) had contact with extension agents compared to females (35.5%), and males recorded more regular visits. This gap suggests that women may have limited access to extension services, which could affect their adoption of improved sesame practices. Abu, *et al*. (2020) carried out a study in Doma and Lafia Local Government Area of Nasarawa State. Their finding disagrees on the result male respondents' access to extension services and agrees on the female respondents' access to extension services in Agricultural Zone A of Kogi State. Their finding revealed that most (61.3%) of the respondents had no access to extension services.

Method of land acquisition: Land tenure patterns were similar for both genders, with inheritance being the most common form of land acquisition (52.3% for males; 53.3% for females), followed by lease and gift. This shows that both men and women rely primarily on inherited land for sesame cultivation, although males may still have more control over larger plots.

Estimated annual sesame income and total income: Estimated annual sesame income and total income revealed some differences. Most male farmers (72.0%) earned between 1,000–500,000 Naira from sesame, while the majority of females (75.7%) fell in the same category. However, in the higher income brackets, more males earned above 1,500,000 Naira (22.4%) compared to females (16.8%). Similarly, total annual income showed that a higher proportion of females (29.0%) earned above 1,500,000 Naira, reflecting their engagement in other economic activities besides sesame farming. The result disagrees with Muhammed *et al.* (2022) in their study in the Southern Agricultural Zone of Nasarawa State. They revealed that most (46.7%) of the respondents earned below N50,000 per annum.

These results also indicated that, while both sexes earn comparable income from sesame, males may earn more from input-intensive operations, whereas females may supplement income through other farm or household-related activities. The result disagrees with Muhammed *et al.* (2022) in their study in the Southern Agricultural Zone of Nasarawa State. They revealed that most (46.7%) of the respondents earned below N50,000 per annum.

Table 2: Socio-economic Characteristics of Respondents in the Study Area (n=160)

Variables	Male Frequency	Male %	Female Frequency	Female %
Age (years)				
21-30	0	0.0	0	0.0
31-40	32	29.9	29	27.1
41-50	51	47.7	38	35.5
51-60	24	22.4	40	37.4
Mean age	44.4 years		51.4 years	
Level of education				
Non-formal	0	0.0	3	2.8
Primary	8	7.5	5	4.7
Secondary	71	66.4	69	64.5
Tertiary	28	26.2	30	28.0
Household size (No. of persons)				
1-5	22	20.6	20	18.7
6-10	70	65.4	69	64.5
Above 10	15	14.0	18	16.8
Mean household size	8		8	
Sesame farming experience (years)				
1-10	14	13.1	27	25.2
11-20	77	72.0	66	61.7
Above 20	16	15.0	14	13.1
Mean farming experience	16.9 years		15.4 years	
Cooperative society membership				

Variables	Male Frequency	Male %	Female Frequency	Female %
Yes	94	87.9	76	71.0
No	13	12.1	31	29.0
Years of cooperative society membership (years)				
Non-members	13	12.1	31	29.0
1-5	21	19.6	29	27.1
6-10	54	50.5	40	37.4
Above 10	19	17.8	7	6.5
Mean years	7.4 years		6.4 years	
Extension contacts				
Yes	62	57.9	38	35.5
No	45	42.1	69	64.5

Number of extension visits (times)				
No contacts	45	42.1	69	64.5
1-3	52	48.6	12	11.2
4-6	10	9.3	23	21.5
Above 6	0	0.0	3	2.8
Mean visits	2 visits		2 visits	
Land tenure				
Inheritance	56	52.3	57	53.3
Lease	23	21.5	24	22.4
Gift	10	9.3	15	14.0
Purchased	17	15.9	11	10.3
Borrowed	1	0.9	0	0.0
Estimated annual sesame income (Naira)				
1,000-500,000	77	72.0	81	75.7
501,000-1,000,000	3	2.8	5	4.7
1,001,000-1,500,000	3	2.8	3	2.8
Above 1,500,000	24	22.4	18	16.8
Mean	N453,388.43		N479,714.29	
Estimated total annual income (Naira)				
1,000-500,000	35	32.7	37	34.6
501,000-1,000,000	41	38.3	38	35.5
1,001,000-1,500,000	30	28.0	1	0.9
Above 1,500,000	1	0.9	31	29.0
Variables	**Male Frequency**	**Male %**	**Female Frequency**	**Female %**
Mean	N896,694.21		N770,857.14	

Source: Field survey (2025)

Gender Discrepancies in Adoption of Improved Sesame Production Practices

Table 3 shows distinct gender differentials in the level of adoption of improved sesame production practices. Male farmers recorded higher level of adoption than females in field preparation and input-intensive activities, including the use of fertilizer (males $\bar{x}$ = 4.27 verses females $\bar{x}$ = 0.65), herbicide application ($\bar{x}$ = 3.36 verses $\bar{x}$ = 2.14), and transportation ($\bar{x}$ = 3.25 verses $\bar{x}$ = 2.87). This indicates that men dominate practices that require access to resources, technical knowledge, and physical labour.

Conversely, female farmers had higher level of adoption in post-planting and labour-intensive activities. These include appropriate harvesting (females $\bar{x}$ = 4.23 verses males $\bar{x}$ = 3.22), weeding ($\bar{x}$ = 4.09 verses $\bar{x}$ = 2.59), threshing and winnowing ($\bar{x}$ = 3.06 verses $\bar{x}$ = 2.57), planting of improved sesame varieties ($\bar{x}$ = 2.94 verses $\bar{x}$ = 2.03), and seed dressing ($\bar{x}$ = 2.77 verses $\bar{x}$ = 1.09). Women also had higher adoption in specialized or management-related practices such as fungicide application ($\bar{x}$ = 1.79 verses $\bar{x}$ = 0.61), insecticide use ($\bar{x}$ = 1.90 verses $\bar{x}$ = 0.10), single super phosphate application ($\bar{x}$ = 1.46 verses $\bar{x}$ = 0.04), use of tractors ($\bar{x}$ = 1.56 verses $\bar{x}$ = 0.26), and recommended spacing distance ($\bar{x}$ = 1.37 verses $\bar{x}$ = 0.24). This suggests that women are more

involved in post-planting management and detailed agronomic practices.

Some practices recorded almost equal adoption levels between genders, such as land preparation (males $\bar{x}$ = 3.97 verses females $\bar{x}$ = 4.01) and use of manure ($\bar{x}$ = 4.10 verses $\bar{x}$ = 4.20), showing shared responsibility for certain essential practices. The results revealed that men dominate early-stage, physically demanding, and resource-intensive practices, while women lead in post-planting, labour-intensive, and management-focused activities, highlighting a clear gendered division of labour in sesame production.

A similar gender disparity appears in the findings of Adah *et al.* (2024), who observed that in Kogi State, while a majority of both genders used herbicides (80.8% of males vs. 71.9% of females), the adoption of fungicides and pesticides was notably lower particularly among women (40.4% of males vs. 25.4% of females), even though female involvement in threshing remained very high (93.7% vs. 87.7% for men). Altogether, this underscore persisting structural inequities in access to certain agricultural innovations, amidst considerable gains in women's adaptive and participatory roles in production cycles especially in post-harvest and organic components. A similar gender disparity appears in the findings of Adah *et al.* (2024), who observed that in Kogi State, while a majority of both genders used herbicides (80.8% of males vs. 71.9% of females), the adoption of fungicides and pesticides was notably lower particularly among women (40.4% of males vs. 25.4% of females), even though female involvement in threshing remained very high (93.7% vs. 87.7% for men).

Table 3: Gender Differentials in the Level of Adoption of Improved Sesame Production Practices (n=160)

Variables	Male Mean	Female Mean
Use of fertilizers	4.27*	0.65
Appropriate land preparation	3.97*	4.01*
Use of herbicides	3.36*	2.14
Transportation	3.25*	2.87
Appropriate harvesting	3.22*	4.23*
Weeding	2.59	4.09*
Threshing/winnowing	2.57	3.06*
Planting of improved sesame varieties	2.03	2.94
Seed dressing	1.09	2.77
Use of manure	4.10*	4.20*
Spraying with fungicides (5 weeks after sowing to control diseases)	0.61	1.79
Use of tractors for land preparation	0.26	1.56
Use of recommended spacing distance (75cm x 20 – 30 cm)	0.24	1.37
Spraying of insecticides (during the post-flowering period to control pests)	0.10	1.90
Application of single super phosphate before planting	0.04	1.46

Source: Field survey (2025) multiple responses allowed

Decision rule: Any mean ≥ 3.0 means high adoption, any mean < 3.0 means low adoption

Note: * = High adoption

Constraints to Adoption of Improved Sesame Production Practices among rural males Female Farmers

Table 4 highlights distinct but overlapping challenges faced by male and female sesame farmers in adopting improved production practices: male farmers report high costs of labour ($\bar{x}$ = 3.59), transportation ($\bar{x}$ = 3.55), pesticide expenses ($\bar{x}$ = 3.45), and inadequate access to credit ($\bar{x}$ = 3.44) as their most severe constraints. Female farmers, meanwhile, cite high transportation costs ($\bar{x}$ = 4.31), absence of machinery ($\bar{x}$ = 4.17), limited credit access ($\bar{x}$ = 4.03), elevated pesticide costs

($\bar{x}$ = 3.57), labour cost ($\bar{x}$ = 3.43), and inadequate packaging and measurement ($\bar{x}$ = 3.03) as key barriers.

High Cost of Labour: Male farmers identified labour expenses as a significant hurdle highlighting the challenge of securing and affording hired labour, likely due to worker scarcity or elevated wages in the agricultural sector. Women also reported labor costs as a constraint, but to a slightly lesser extent, possibly because they may rely more on family labor or benefit from lower-paid labor among women. This observation aligns with findings by Agada *et al.* (2020), who also identified high labor costs as a notable constraint in sesame farming in Gwer West, Benue State.

High Transportation Cost: Both male and female farmers identified high transportation costs as a major constraint typically stemming from long distances between farms and markets, poor road infrastructure, and the expense of moving goods from rural to urban areas. While transport challenges affect all farmers, women involved primarily in local markets may be slightly less impacted by these costs. Agada *et al.* (2020), in their study of youth participation in sesame farming in Gwer West Local Government Area, Benue State, also highlighted poor transportation systems scoring a mean of 1.44 as a serious constraint for producers

High Cost of Pesticides: Male farmers identified the price of pesticides as a major challenge high input costs can significantly erode profitability, making sustained high yields difficult without increased financial outlay. Female farmers appear even more affected by these costs, which may reflect their limited access to affordable agrochemicals or credit facilities compared to men. This echoes findings from Yahaya *et al.* (2022), who reported that nearly half (48.4%) of sesame farmers in Bade Local Government Area, Yobe State, cited the high cost of agrochemicals as a major production barrier.

Inadequate Credit Facilities: Both male and female farmers face limitations due to insufficient access to credit, which hampers their ability to invest effectively in farm inputs and technologies. For male farmers, this constraint while impactful is not the most severe challenge. Female farmers, however, encounter a more acute version of this issue, as the result suggest they face greater obstacles in securing credit. These gender-based disparities often stem from systemic barriers such as lack of land ownership, insufficient collateral, and discriminatory practices within financial institutions. Supporting this, Rukwe *et al.* (2020) found that poor access to credit was one of the most serious constraints for sesame production among smallholder farmers in Southern Taraba State, with 88.1% of respondents reporting no credit access.

Non-Availability of Machinery: A notable constraint faced specifically by female farmers is the lack of access to agricultural machinery. This issue underscores how female farmers remain disproportionately tied to manual labour due to limited opportunities to leverage mechanized farming methods. The high average score for this challenge reflects its severity, highlighting that machinery could significantly reduce drudgery and enhance efficiency in tasks like planting, harvesting, and post-harvest processing. Yahaya *et al.* (2022), in their study of sesame producers in Yobe State, Nigeria, likewise identified the absence of machinery as a major barrier reported by an overwhelming 71.7% of respondents.

Poor Packaging and Measurements: Female farmers reported that inadequate packaging and inconsistent measurements undermine the marketing and commercial value of their sesame produce. Although this constraint is relatively less critical compared to other challenges, it still plays a meaningful role in eroding product quality and compliance with market specifications. This disagrees with the study by Adole (2016), who in a cost benefit analysis among smallholder sesame farmers in Benue State, found that 76.7% of respondents attributed poor market pricing to faulty measurement practices and lack of modern cleaning facilities, underscoring the economic impact of these issue

Table 4: Constraints to the Adoption of Improved Sesame Production Practices among and Female Farmers

Variables	Male Mean	Female Mean
High cost of labour	3.59*	3.43*
High transportation cost	3.55*	4.31*
High cost of pesticides	3.45*	3.57*
Inadequate credit facility	3.44*	4.03*
Inadequate extension service delivery systems	2.39	2.67
Poor packaging and measurements	1.66	3.03*
Pest problems	1.46	2.10
Disease problems	1.41	1.89
Land tenure problem	0.95	1.91
Inadequate transportation infrastructure	0.71	2.03
Inconsistent government policies	0.61	2.19
Price fluctuation	0.53	1.80
Unavailability of Adequate Quantity of sesame seeds	0.45	2.66
Theft of produce	0.14	1.36
Non-availability of machines	0.10	4.17*

Source: Field survey (2025) multiple responses

Decision rule: Any mean ≥ 3.0 means serious constraint, any mean < 3.0 means not a serious constraint

Note: * = Serious constraint

Conclusion and Recommendations

The study concluded that there were significant gender differentials in the adoption of improved sesame production practices in Agricultural Zone A of Kogi State, with male farmers dominating early-stage, physically demanding, and input-intensive practices, while female farmers led in post-planting, labor-intensive, and management-focused activities.

The study recommends gender secretive extension service delivery and adoption of improved seasame practices.

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