



**FACTORS INFLUENCING WOMEN PARTICIPATION IN GINGER
PRODUCTION IN SAMARU KATAF AGRICULTURAL ZONE OF
KADUNA STATE, NIGERIA**

Abui, S. P., Babaji, A. U. and Bala, A. H.

Department of Agricultural Extension and Rural Development,

Abubakar Tafawa Balewa University, Bauchi

Corresponding Author's Email: sophiatkadani4@gmail.com, **GSM:** 07076909184

ABSTRACT

The study examined factors influencing women participation in ginger production in Samaru Kataf agricultural zone of Kaduna State, Nigeria. A multi stage sampling technique was used in selecting 255 respondents from the study area. Data were collected using structured questionnaire and analyzed using both descriptive and inferential statistics. The findings indicate that the average age of respondents was 41.02 years, with a majority (78.8%) being married and having an average household size of 11 members. A significant proportion (72.9%) attained tertiary education, and 62.7% were engaged in civil service alongside ginger farming. The average farm size was 0.7 hectares, and majority (69.41%) of the respondents earned between N100,000 - N500,000 annually. Additionally, 80.8% of respondents had access to credit, and 54.1% had regular contact with extension agents. The major benefits of ginger farming identified included increased income (74.1%), financial independence (76.5%), and enhanced food security (60.0%). Logit regression results showed that age ($p < 0.1$) and income ($p < 0.1$) positively influenced women's participation, whereas access to government subsidies negatively affected their involvement ($p < 0.01$). However, constraints to ginger production included disease and pest infestations (85.1%), limited access to manure (86.3%), high input costs (63.2%), and inadequate storage facilities (55.3%). Other challenges identified were land tenure issues (64.3%), adverse climatic conditions (70.6%), and unstable market prices (54.1%). The study concluded that ginger production plays a critical role in enhancing rural livelihoods and economic sustainability. The study recommended that government and financial institutions should enhance farmers' access to credit by reducing interest rates and simplifying loan processes, increased engagement of extension agents can enhance farmers' knowledge on improved productions.

Keyword: Women, Participation, Influence, Production, Gender

INTRODUCTION

The world's poor (80%) reside in rural areas and earn a living largely through agriculture, tending to crops and animals on smallholder farms. This is why different countries place high premium on agriculture and strive to develop and protect the sector, thereby guaranteeing sustainable food supply. In Nigeria over 75% of the population, mostly rural dwellers, are involved in agricultural activities yet accounting for less than 5% of the foreign exchange earnings, the sector remaining largely subsistence and underdeveloped (Adamu *et al.*, 2023). Agriculture is a crucial sector for human survival, and can be an important engine of growth and poverty reduction, but the sector is underperforming in many countries in part because women, who are often a crucial resource in agriculture and the rural economy, face constraints that reduce their productivity, (Food and Agriculture Organization (FAO), 2011). Penzu (2022), reported that the reasons why women do not participate in agricultural production is due to discrimination against them in the distribution of farm inputs, capital, land and information. Also women have less say, when it comes to decision making on household spending and the land on which the work, this agrees with Adamu *et al.* (2023) that women grow a substantial amount of food eaten by families, yet they still have less access to knowledge, technology, credit and land than man. Despite all these bottle necks, women in Kaduna State (Southern part) of Nigeria have taken to ginger production which is a cash crop, in order to have a transformational impact on their families and community's food security, nutrition, their overall wellbeing and to have financial freedom.



Ginger (*Zingiber officinale Roscoe*) is a herbaceous perennial plant belonging to the Order Scitamineae and the family Zingiberaceae. It is a root crop and a typical herb extensively grown across the world for its pungent aromatic under-ground stem and rhizome which makes it an important export commodity in world trade (Amadi *et al.*, 2010). In the world, overall ginger is produced in almost 40 countries worldwide. It is popular in Asian and African countries. The top five nations for ginger production, according to 2019 statistics are; India (996,04mt), China (552,192 mt), Nigeria (375,305 mt), Nepal 293,094mt), and Indonesia (228,707mt) (FAO, 2019 as cited in Nation Master, 2020). Ginger's origin is not well established though it is generally thought to be a native of Asia. It was also cultivated in tropical regions of America and was introduced to Europe by Arab traders from India the first century AD. The Arabs also took the plant from India to East Africa in the thirteenth century while the Portuguese took it to West Africa and other part of the tropics in the sixteenth century likewise the Spice was known to Germany and France in the ninth century (Amadi *et al.*, 2010). Ginger was introduced to Nigeria in 1927 (KADP2000). Among the spices (pepper, ginger, onions, and chillies), it is the only one that is grown on a commercial scale for export (Mallam, 2015).

The study is necessitated by the perceived low participation of women in Ginger production. The role of women in agricultural production in Nigeria cannot be over emphasized. Various researchers conducted on the contribution of women to agricultural development in the country suggest that women contribution to the farm work is as high as between 60% and 90% of the total farm task performed (Ejehi *et al.*, 2018). This negative perception arises as a result of the ignorance of the policy makers to the enormous contribution of women to the food production in the country in particular and the economy as a whole. Also inadequate information on the level of women participation in agriculture is importance in the economy and hence led to their neglect in policy issues.

The broad objective of the study was to analyze the factors influencing women participation in ginger production in Samaru Kataf Agricultural Zone of Kaduna State, Nigeria.

The specific objectives of the study were to;

- i. describe the socio-economic characteristics of the respondents in the study area;
- ii. determine the factors influencing women participation in ginger production; and
- iii. identify the constraints faced by the respondents in ginger production in the study area.

RESEARCH METHODOLOGY

The Study Area

Kaduna state is a state in central northern Nigeria which is located between latitude 7°05" to 8°45" East and longitude 9°10" to 10°00" North. The state share boundaries with Niger state to the west, Zamfara, Katsina and Kano to the east and FCT Abuja and Nasarawa state to the south. The climate of the area is tropical continental with distinct seasonal regimes, oscillating between cool to hot dry and humid to wet (dry and wet seasons). The rainy season starts from April and ends in October with a mean annual rainfall of 2000mm. August and September are the wettest months and the annual average temperature ranges from 23°C to 28°C. The months of November to March are the dry season periods. Kaduna state is located at the center of Northern Nigeria. It has twenty three local government which include BirninGwari ,Chikun, Giwa, Igabi, Ikara, Jaba, Jema, Kachia, Kaduna north, Kaduna south, Kagarko, Kajuru,Kaura, Kubau, Kudan, Lere, Makarfi, Sabon Gari, Sanga,Soba, Zango-kataf and Zaria. It has over 59 tribes which include Bagyi, Hausa, Kataf, Jaba, Adara, Bajju etc. The state is the fourth largest state by landmass in Nigeria and has a land area of about 46,053kmsq and third in population of 6,066,560 people base on 2006 census figures as well by the national bureau of statistics (wikipedia) but the estimated population and projections of Kaduna state 2024 was 9,221,451

The main study area of this work is the Samaru Kataf Agricultural Zone of Kaduna State. This agricultural zone is made up of seven Local Government Areas such as; Jaba, Jema'a, Kachia, Kagarko, Kaura, Sanga and Zangon Kataf, but the study concentrate on five LGAs which comprises of; Jaba, Jema'a , Kachia, Kagarko, and Zangon Kataf Local Government Areas, of Kaduna State.

**Sampling Technique and Sample Size**

A multi stage sampling technique was used for the study. The first stage, involved a purposive selection of five Local Government Areas (LGAs) in Samaru Kataf Agricultural zone, which includes; Jaba, Kachia, Kagarko, Jema'a and Zangon Kataf. The selection is due to high concentration and intensity in ginger production by women in these areas. In the second stage, involved a purposive selection of three villages from each of the selected LGAs, this gave a total of 15 villages. The final stage, 10% of the sampling frame of women ginger farmers in each village were selected. A total of 255 women ginger farmers were used as the sample size for this study.

Table 1: Sampling Size Selection Plan

LGAs	Districts	Villages	Sampling Frame	Sample Size (10%)
Zangon Kataf	Zonkwa	Abet	150	15
		Yangan	100	10
		Marsa 1	140	14
Kachia	Kachia	Kachia	200	20
		Kwaturu	150	15
		Jaban kogo	250	25
Jama'a	Fadan Kagoma	Fadan Kagoma	136	14
		Fori	99	10
		Madari	150	15
Kagarko	Kagarko	Kubacha	250	25
		Aribi	170	17
		Dogon Kurmi	96	10
Jaba		Kwoi	300	30
		Dadu	200	20
		Nok	150	15
Total			2,541	255

Source: KADP, 2023

Method of Data Collection

Primary data were collected through the administration of structured questionnaire as the survey instrument with the help of trained enumerators. The questionnaire was divided into seven sections. Section A; this brought out information on the socio-economic characteristics of the respondents. Section B; extracted information on factors influencing adoption of recommended rice production practices. While Section C; this section provided information on constraints militating adoption of improved rice production technologies in Bauchi and Gombe States.

Method of Data Analysis

Data collected from the field were analyzed using both descriptive and inferential statistic.

Descriptive statistics

Descriptive statistics such as percentages mean, and frequency distribution were used to achieve objective i and iv.

Logit Regression Model

The binary dependent variable (participation vs. non participation) was regressed on variables like age, gender, access to extension services, and farm size. The results helped identify the most significant factors influencing women participation in ginger production. Logit regression model was used to achieve objective (iii) of this study. The explicit logit model is expressed as:

$$Y = b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} \dots (1)$$

Where:

Y = Participation in ginger production (1=Yes, 0 =No)

X₁ = income (naira)



X_2 =Age (years)

X_3 =Farming experience (years)

X_4 = Education (no formal Education=0, Qur'anic Education=1, Primary=2, Secondary Education=3, Tertiary=4)

X_5 = Household size (number)

X_6 = Farm size (hectares)

X_7 = Membership of cooperative (1= member 0= non member)

X_8 = Extension contact (no contact=0, forth nightly=1, monthly=2, quarterly=3, yearly=4)

X_9 = Value addition involvement in ginger (1= cleaning, 2= packaging, 3= processing into powder=4, others=5)

X_{10} = Access to information (1= Yes 0= No)

X_{11} = Access to technology/usage (1= Access, 0= no access)

X_{12} =Access to training (1= Yes, 0= No)

X_{13} = Access to farm inputs (1 = Yes, 0 = No)

$1 - 13$ = the coefficients for the respective variables in the Logit function

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

The socioeconomic characteristics of respondents refer to the social and economic attributes that define individuals or groups within a study or survey. These characteristics help in understanding the background, status, and behaviors of respondents and can influence their responses to research questions.

The result in Table 2 shows that about 34.51% of the respondents fell within the age bracket of 29-38 years, followed by 28.24% were within the age bracket of 39-48 years, while only 2.75% of the respondents were within the age bracket of 59 years and above. The mean age of 41.02 years suggests that ginger production in Samaru Kataf is predominantly undertaken by middle-aged individuals, who are in their active and productive age and are energetic in carrying out Agricultural activities. This result is in line with the findings of Adamu *et al.* (2023), who reported that the participation of middle-aged farmers in agriculture is crucial as they are more adaptable to modern farming techniques compared to older individuals. The result from the Table further revealed that the majority (78.8%) of the respondents were married, while only 2.4% were single, and 15.7% were widows. The high percentage of married individuals suggests that family responsibilities may influence women's participation in ginger production, either as a motivating factor for income generation or as a constraint due to household obligations. This aligns with the findings of Eze and Maduka (2022), who noted that married women are more likely to engage in farming due to household food security concerns and economic responsibilities.

The result from Table 2 below also depicted that household sizes range from 1 to 30 members, with an average size of 11 people. The largest group (43.14%) of the respondents had between 1-10 members, closely followed by those with 11-15 members (42.35%). Larger households may provide additional labor for ginger farming, which is labor-intensive. This is consistent with the study by Adamu *et al.*, (2023), which found that larger households contribute positively to farm productivity due to the availability of family labor. The result also shows that a significant proportion (43.13%) of the respondents operate on small farm sizes of 1-2 hectares, while only 11.76% had farms larger than 6 hectares. The mean farm size of 3.73 hectares indicates that ginger production in the area is dominated by smallholder farmers, which aligns with findings of Usman and Bello (2023) that small-scale farmers dominate Nigeria's agricultural sector, often facing challenges such as limited access to inputs and markets.

The result of the educational level of the respondents is also depicted in Table 2 below which shows that majority (72.9%) of the respondents had tertiary education, while 26.7% had secondary education, and only 0.4% had Quranic education. The high level of formal education suggests that women involved in ginger production in Samaru-Kataf are well-educated, which could enhance their ability to adopt modern farming techniques and financial management skills. This is also in line with



the findings of Nwankwo *et al.* (2023), who opined that higher educational attainment among farmers increases the likelihood of technology adoption and improved productivity. Furthermore, Table 2 shows that majority (62.7%) of the respondents were civil servants, while 20% are involved in ginger farming as their primary occupation, and 16.9% engage in marketing. The dominance of civil servants suggests that many women participate in ginger farming as a secondary income source. This supports the argument by Eze and Maduka (2022) that part-time farming among civil servants is common in Nigeria due to economic diversification and job security concerns.

Table 2: Distribution of Respondents based on the Socio-economic Characteristics (n =255)

Socio-economic Characteristics (Age)	Frequency	Percentage	Mean
19-28	41	16.07	
29-38	88	34.51	
39-48	72	28.24	41.02 yrs
49-58	47	18.43	
59 and above	7	2.75	
Marital status			
Married	201	78.8	
Single	6	2.4	
Divorced	8	3.1	
Widow/widower	40	15.7	
Household size			
1-10	110	43.14	
11-15	108	42.35	11
16-20	7	2.74	
21-30	30	11.76	
Farm size			
1-2	110	43.13	
3-4	7	2.74	
5-6	108	42.35	3.7ha
7-8	30	11.76	
Education Level			
Quranic	1	.4	
Secondary	68	26.7	
Tertiary	186	72.9	
Occupation			
Civil servant	160	62.7	
Ginger farming	51	20.0	
Marketing	43	16.9	
Artisan	1	.4	
Farming experience			
1-10	49	19.2	
11-20	68	26.7	19yrs
21-30	108	42.4	
31- above	177	69.41	

The result in Table 2 above further revealed that the respondents had an average farming experience of 19.07 years, with 42.4% having 21-30 years of experience. The respondents had a reasonable experience in ginger farming suggests that women in the area had accumulated knowledge about cultivation practices, which may enhance productivity. This aligns with research by Ibrahim and Musa (2023), which found that farmers with over 15 years of experience tend to have better risk management strategies in agriculture. e with stringent bank requirements.

Factors Influencing Women Participation in Ginger Production

The result below shows the Logit regression results in Table 5 which analyze various factors influencing women's participation in ginger production. The model's pseudo R-squared value of 0.172



suggests that the independent variables moderately explain variations in participation. The chi-square statistic (56.421, $p < 0.01$) indicates that the model is statistically significant.

The result from the Table shows that coefficient for age (0.019) is positive and statistically significant at the 10% level ($p = 0.057$), suggesting that older women are slightly more likely to participate in ginger production. This aligns with findings of Malapit *et al.*, (2019), who noted that experience and risk tolerance increase with age, making older women more engaged in farming.

The result further reveals that income has a coefficient of 0.000 and is statistically significant at the 10% level ($p = 0.062$), indicating a negative relationship between income and participation in ginger production. This suggests that women with lower income levels are more likely to engage in ginger farming, possibly as a means of livelihood and economic empowerment. This is in line with the findings of Nwankwo *et al.* (2023) who also found that women in rural Nigeria engage in agriculture primarily to supplement household income.

The result also shows that access to government subsidies had a significant negative coefficient (-0.827, $p = 0.000$), indicating that women with better access to subsidies are less likely to participate in ginger production. This unexpected result may suggest inefficiencies in subsidy distribution, where funds and resources may not effectively reach or benefit small-scale women farmers. Usman and Bello (2023) found that bureaucratic bottlenecks and corruption often hinder the effectiveness of agricultural subsidy programs in Nigeria.

The result shows that factors such as farming experience, household size, access to inputs, information, and new technologies show no significant influence to women participation in ginger production in the study area.

Table 3: Factors Influencing Women Participation in Ginger Production (n =255)

Participation in ginger production	Coef.	St. Err.	t-value	p-value
Age	0.019	0.01	1.90	0.057*
Income	0.15	0.24	0.625	0.500*
Farming experience	0.053	0.053	0.99	0.324
Household size	-0.043	0.064	-0.66	0.507
Access to farm input	0.053	0.185	0.29	0.775
Access to Information	0.249	0.178	1.40	0.161
Access to Government subsidies	-0.827	0.221	-3.74	0.000***
Access to new Technologies	-0.164	0.183	-0.90	0.37
Constant	1.846	0.756	2.44	0.015*
Pseudo r-squared	0.172			
Chi-square	56.421***			

Source: Field Survey, (2024)

* $p < 0.05$; *** $p < 0.001$

Constraints Faced by Women in Ginger Production in the Study Area

The results from Table 6 highlight various constraints faced by women in ginger production, with a threshold mean value of 3.00 used to determine the severity of each constraint. Factors with a mean value below 3.00 indicate more severe constraints, while those above 3.00 are relatively less challenging. The most significant challenges identified include disease and pest infestation (mean = 1.9922), inadequate access to manure (mean = 1.8980), and lack of information on production techniques, pest outbreaks, and market prices (mean = 2.2196). These findings align with Nwankwo *et al.*, (2023), who emphasized that small holder women farmers struggle with limited access to agricultural extension services, which affects productivity and resilience against pest and disease outbreaks.

Access to land (mean = 3.2235) and lack of adequate capital (mean = 2.9647) were identified as moderate constraints. The land tenure system (mean = 2.4314) was also reported as a limiting factor, reinforcing the findings of FAO (2023), which noted that women in Nigeria face significant



barriers to land ownership due to customary and legal restrictions. Limited land access reduces the scale of production, making it difficult for women to expand and commercialize their ginger farming activities. Similarly, Nwankwo and Adebayo (2022) found that access to credit is a critical determinant of women's agricultural productivity, as limited funding restricts the ability to invest in improved seeds, fertilizers, and mechanization.

Market-related constraints also emerged as significant issues, with lack of attractive market prices (mean = 2.6549) and inadequate processing technology (mean = 2.4000) affecting income generation. The high cost of inputs, such as fertilizers and improved seeds (mean = 2.5647), further exacerbates the financial burden on women farmers. These findings are supported by Usman and Ibrahim (2023), who reported that price fluctuations and weak market linkages hinder rural women's profitability in agricultural value chains. Additionally, Penzu (2022) highlighted that limited processing facilities force farmers to sell raw ginger at lower prices, reducing their overall earnings.

Transportation challenges (mean = 2.3059) and inadequate storage facilities (mean = 2.7451) also contribute to post-harvest losses, impacting income stability. Sodangi (2020b) emphasized that poor rural infrastructure, including bad roads and lack of storage centers, increases spoilage rates and limits access to profitable markets. Addressing these constraints requires policy interventions such as improving women's access to land, affordable credit, extension services, and storage infrastructure to enhance productivity and income generation in ginger farming.

Table 4: Distribution of Respondent based on Perceived Constraints to Ginger Production in the Study Area (n=255)

Constraints	Strongly agreed	Agreed	Undecided	Disagreed	Strongly disagreed	Mean
Disease and pests are a major problem in ginger farming	97 (38.0)	120 (47.1)	1 (0.4)	17 (6.7)	20 (7.8)	2.9922
Access to adequate land is a big constraint in my ginger farming	37 (14.5)	41 (16.1)	27 (10.6)	128 (50.2)	22 (8.6)	4.2235
Lack of adequate capital hinders production in large scale	49 (19.2)	64 (25.1)	35 (13.7)	61 (23.9)	46 (18.0)	3.9647
Land tenure system hinders large scale production of ginger	93 (36.5)	71 (27.8)	18 (7.1)	34 (13.3)	39 (15.3)	3.4314
Climatic problems (shortage of rain etc) causes poor harvest	29 (11.4)	151 (59.2)	17 (6.7)	34 (13.3)	24 (9.4)	3.5020
Inadequate access to manure affects the yield of ginger	99 (38.8)	121 (47.5)	11 (4.3)	10 (3.9)	14 (5.5)	2.8980
Inadequate processing technology affects the income of ginger	47 (18.4)	106 (41.6)	64 (25.1)	29 (11.4)	9 (3.5)	3.4000
Lack of attractive market price affects the income from ginger	63 (24.7)	75 (29.4)	34 (13.3)	53 (20.8)	30 (11.8)	3.6549
Lack of information on: (production, new technology, pest and disease outbreak, market price) affects the yield of ginger	64 (25.1)	123 (48.2)	28 (11.0)	28 (11.0)	12 (4.7)	3.2196
High cost of inputs (fertilizer, improved seeds, chemicals, etc) are serious constraints in ginger production.	42 (16.5)	119 (46.7)	36 (14.1)	24 (9.4)	34 (13.3)	3.5647
Inadequate storage facilities leads to serious losses thereby affecting income realized.	44 (17.3)	97 (38.0)	34 (13.3)	40 (15.7)	40 (15.7)	3.7451
Lack of transportation is a big constraint in ginger farming	66 (25.9)	116 (45.5)	23 (9.0)	29 (11.4)	21 (8.2)	3.3059

Source: Field survey, (2024) Note: threshold mean value = 3.0 Values in parenthesis were percentages

CONCLUSION AND RECOMMENDATION

The study concluded that women's participation in ginger production is influenced by socio-economic variables such as age, access to resources, and income levels. While women play a significant role in various stages of the value chain, their involvement is often limited by unequal access to land, finance, and decision-making opportunities. Interestingly, the study also suggests that government subsidies, which are intended to support agricultural productivity, may inadvertently discourage broader participation and innovation when they are poorly targeted or mismanaged.

Based on the study findings, the following recommendations were made:

- Financial institutions should enhance access to affordable credit, by reducing the percentage charged on loans so as to reduce reliance on cooperatives.



- ii. More frequent extension visits and farmer training programs should be conducted to improve knowledge and adoption of improved ginger farming techniques.
- iii. Efforts should be made to create stable market prices for ginger through cooperative marketing strategies and government interventions.
- iv. Investments in modern processing and storage technologies should be encouraged to minimize post-harvest losses and enhance value addition.

REFERENCES

Adamu, Y., Bello, S., & Musa, R. (2023). Demographic factors influencing agricultural productivity in Nigeria. *African Journal of Agricultural Economics*, **15**(2): 45-60.

Adedapo, A.O., & Adedokun, A.O. (2019). Factors influencing the choice of Record Keeping Among Poultry Farmers in Ekiti State, Nigeria. *Ife Journal of Agriculture*, **31**(1): 234-245.

Akpan, N.S. (2015) *Women and rural development in Nigeria*: some critical issues for policy consideration. *Social sciences*, **4**(5): 110-118.

Akram, M., Ibrahim, S. M., Khan, U., Mohhiuddin, E., Abdul Sami, A. M., Ali Sha, S. M., Khalil, A. and Ghazala, S. (2011). *Zingiber officinale Roscoe (A Medical Plant)*. *Pakistan Journal of Nutrition* **10**(4): 399 – 100.

Aliyu, R., Ibrahim, M., & Ado, A. (2018). *Assessment of gender participation in ginger (Zingiber officinale) production in Kaduna State, Nigeria*. *International Journal of Agricultural Economics and Rural Development*, **6**(2): 45–52.

Amadi, C. O., Nwauzor, E. C., Nuhu, K. and Christy, P. (2010). Evaluation of ginger cultivars for flowering and fruiting under high altitude of Jos, Plateau. *Annual Report, National Root Crops Research Institute, Umudike*, 2010: 134 – 136.

Asumuga, G.N., J.E. Njoku and F.I. Nweke (2003) “Marketing System and Spatial Price Differentiation of Ginger in Nigeria. *African Journal of Root and Tuber Crops*, **4**(2): 1-7.

Ayodele, T. J., Sambo, B. E. (2014). Ginger (Zingiber officinale Roscoe) production efficiency and constraints among small scale farmers in Southern Kaduna, Nigeria. *Journal of Agricultural Science*, **6**(8): 141-48.

Case, D.O. & Given, M.M. (2016). Looking for Information: *A survey of Research on Information seeking Behavior* 4Th ed. Amsterdam: Emerald Group Publishing Limited.

Doss, C., 2010. If Women Hold up Half the Sky, How Much of the World's Food do they Produce? *Background paper prepared for the State of Food and Agriculture* 2010.

Ejehi, M. E., Madu, T. U., Lenka, D.M. & Mbadiwe, M. N. (2018). *Gender analysis of involvement in ginger production among farmers in Abia and Imo States, Nigeria*. *Nigerian agricultural journal*, **49**(1): 240-246

Eze, P., & Maduka, U. (2022). Agriculture as a secondary source of income among Nigerian civil servants. *Journal of Agribusiness*, **17**(4): 78-92.

production in Jaba local government area, Kaduna State, Nigeria. *Advances in Applied Science Research*, **4**(5): 85-90.

Food and Agriculture Organization (2011). The State of Food and Agriculture. FAO Publication. Rome. 2011:1-160. *International Fund for Agricultural Development* (2005). Extension delivery system in rural areas. Report 2005, Rome.

Hailemichael G. and Tesfaye K (2008). The effects of seed rhizome size on the growth, yield and economic return of ginger (Zingiber officinale Rosc.). *Asian Journal of Plant Science*, **7**: 213-217.

Ibrahim, S., & Musa, D. (2023). The role of farming experience in agricultural risk management: Evidence from Nigerian farmers. *Agricultural Research Journal*, **9**(2): 134-150.

Ihuoma, A. A., 2018 “Impact of Ginger Production on Poverty Alleviation in Kaduna State, Nigeria.” *IOSR Journal of Economics and Finance (IOSR-JEF)*, **9**(3): 37- 48. Investment Board Nepal (2018), Agriculture Sector Profile, Environment friendly, wood free paper ICC Complex, New Baneshwor, Kathmandu, Nepal



Isife, B. I., and Abert C. O., (2009): —Issues in developing a natural policy on agricultural extension services in Nigeria: *The perception of extension professionals*|| *Agricultural Journal* **4**: 22-26

Jackson, C. (2005) Strengthening Food Policy Through Gender and Intra household Analysis Impact

Makarau, S. B., Damina, A., Daneji, M. I. and Garba, A. O. (2013). Socio-Economic factors influencing the adoption of ginger (*Zingiber Officinale*) Farming technologies in Samaru zone of the Kaduna state agricultural development project (Kadp). *International Journal of Humanities and Social Science Invention*, **2**(7): 39-44.

Malapit, H., Quisumbing, A., Meinzen-Dick, R., Seymour, G., Martinez, E.M., Heckert, J., Rubin, D., Vaz, A. and Yount, K.M., (2019) *Gender Agriculture Assets Project Phase 2 (GAAP2)* Study Team. Development of the project-level women's empowerment in Agriculture Index (pro-WEAI). *World Development*, **122**: 675-692.

Mallam, J. (2015). *Socio-economic assessment of farmers' response to agricultural extension service delivery on ginger production in Kaduna State, Nigeria*. A dissertation submitted to the school of postgraduate studies. Ahmadu Bello University: Zaria.

Mbanasor, J. A., Nwachukwu, I. N. & Agwu, N. M. (2015). Impact of climate change on the productivity of cassava in Nigeria. *Journal of agriculture and environmental science*, **4**(1): 138- 147.

Mohammadi M. (2019) *Oxidative Stress and Polycystic Ovary Syndrome* : A Brief Review. *Int J Prev*

Nwankwo, I., Chukwu, P., & Okeke, J. (2023). Smallholder farmers and mechanization challenges in Nigeria. *Journal of Rural Development*, **17**(4): 92-110.

Onwusiribe, C. N., Mbanasor, J. A. & Agwu, N. M. (2018). *Competitiveness of Nigeria ginger export: 1961-2016*. Nigeria agricultural journal, **49**(1): 15-21.

Penzu, (2022). *Types of Diaries*. File:///c:/Users/HP/Download/Types of Diaries, Examples, Ideas and Tips.Penzu.htm

Sodangi, I. A. (2020b). *Evaluation of the performance of ginger (*Zingiber officinale Rosc.*) germplasm in Kaduna State, Nigeria*. *Science world journal*, **15**(3): 124-126.

Statistix (1985). Statistix 10 data analysis software for researchers. www.statistix.com Retrieved 26/9/2020

Thrive Agric (2020). *Ginger production in Nigeria*. www.investsmall.com

Sunuga, O. S., Baines, R.N., Conway, J. S., & Naylor, R. K (2020). Effect of Small Holder Social Economic Characteristics of On-Farming Household Food Security in Northern Nigeria. *Journal of Economics and Sustainable Development*, **II**(4): 140-150.

Tekana, S.S. and Oladele, O.I.(2011). Impact analysis of Taunga irrigation scheme on household welfare among farmer s in the North-West province, South Africa. *Journal of Human Ecology*, **36**(1): 69-77.

Thompson, T.P., and J. Sanabria. 2010. The division of labour and agricultural innovation in Bangladesh: dimensions of gender. International Center for Soil Fertility and Agricultural Development (IFDC), Alabama, USA.

Usman, A., & Ibrahim, Y. (2023). Challenges and prospects of rural women's participation in agricultural markets in Northern Nigeria. *Journal of Agricultural Policy*, **16**(1): 88-102.

World Bank (2012) *World Development report: Gender Equality and Development*. The World Bank, Washington D.C.

Yadeta, W., Habte, D., and Kassa, N. (2020). Dairy Farm Record Keeping with Emphasis on its importance, Methods, Types, and Status in some Countries. *International Journal of Research Studies in Biosciences (IJRSB)*. **8**(4): 16-25.

Zarmai, J. U., Okwu, O. J., Dawang, C. N. & Nankat, J. D. (2014). A Review of Information Needs of Farmers: *A Panacea for the Food Security and Poverty Alleviation*. *Journal of Economics and Sustainable Development*, **5**(12): 9-15. www.iister.org

Zhang, X., X. Fu and J. Yang. 2005. *The Vegetable Supply Chain of Supermarkets in Sichuan, China. Project Report*. The Hague: Agricultural Economics Research Institute.