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Gender Roles of Farmers in the Production of African Black Beans (Vigna unguiculata) In Anambra and Enugu States Nigeria

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Abstract

The study assessed gender roles in the production of African black beans (akidi) in Southeast Nigeria. Specifically, it addressed the socio-economic characteristics of the farmers, agronomic practices, gender roles, constraints, and strategies for improving the production of African black beans (ABB). A multi-stage sampling procedure was used to select 192 ABB farmers for the study. Data were collected using a semi-structured interview schedule. Data were analysed using percentage and mean statistics. Results revealed that the average age of female and male respondents was about 44 and 41 years, respectively.

Men, women and youths played complementary roles in various operations in ABB production. Men (37.5%, 32.8%, 32.8% and 13.5%) and youths (32.8%, 33.9%, 34.9% and 10.9%) dominated heavy labour operations like land clearing, ploughing, harrowing and fertilizer application, respectively, while women (60.4%, 53.1%, 59.9%, 63% and 61.5%) dominated other operations like planting, harvesting, processing, storage and marketing respectively. Therefore, all genders are involved in ABB production in the area. Efforts should be made to target different genders in ABB production. This can be done through the dissemination of improved technologies in the various production operations. This will ensure that roles are not neglected, thereby enhancing the production of African black beans.

Keywords: *Gender roles in African black bean production, agronomic practices*

Introduction

The south-eastern part of Nigeria is known for the production of crops like cassava, rice, yam, etc. but the cultivation of African black bean has been reduced due to the domination of modern commercialized crops supported by their advanced seed supply and other supportive services (Musah *et* al., 2020). The African black bean (*akidi* in Igbo language) serves as food for a large number of people and constitutes a very important source of protein. It is referred to scientifically as *Vigna unguiculata* sub spp. Sessesquipedalis (Ifemeje et al., 2021). The immature pods are prepared by cooking them fresh and green, while the seeds are cooked and eaten when mature and dry. The seeds are a great source of protein, carbohydrates, iron, manganese, folate, phosphorus, potassium, and magnesium (Okechukwu-Ezike et.al., 2020). As a high-protein food source, it is rich in essential amino acids such as leucine, lysine, tryptophan, and arginine. Its high protein content makes it an alternative source of protein for food and industrial applications. It is used in the management of some degenerative health diseases, such as diabetes.

However, despite their high nutritional and health importance, African black beans are an underutilized legume (Chima *et* al., 2022). Although Nigeria plays a leading role in bean production, among the ten highest producers globally and number one in West Africa (Akah, 2021), the production, post-harvest technologies and extension services of African black beans are in poor condition. There are no marketplaces that encourage consumers to purchase the crops, so the majority of the consumers are not accustomed to using them. African black bean is part of a rich economic, social and cultural diversity and has the potential to play a much more important role than it does today in sustaining livelihoods and human wellbeing and in enhancing ecosystem health and stability (Akinola, *et* al, 2020).

According to Osuafor & Ude (2021), efficiency in the production of underutilized crops has neglected gender concerns, as males' and females' interest and capacity differentials were not put into question. Gender roles in the production of African black beans is important in identifying the crop's development possibilities. Gender-based concepts are used in agriculture to identify roles and differences between male and female farmers based on their experiences as members of the farming society. In rural farming societies in southeastern Nigeria, men and women have specific roles in contributing to agricultural activities. Certain functions are common to both males and females, even though gender differences differ widely across cultures. Actions to eliminate the underutilization of African black beans can only be effective with an understanding of gender-differentiated roles (Owolabi, 2020). It is for this reason that this research is being proposed to address the following research

questions: What are the agronomic practices involved in the production of African black beans by gender? What are the roles of men, women, and youths in the production of African black beans? What are the constraints faced by African black bean farmers in the production of the crop? And what are the possible strategies that can enhance the production of African black beans? Answers to these questions would give insights into gender-based disparities in the context of underutilized African black beans for protein availability and sustainability in the study areas.

Methodology

The southeast comprises five states; Abia, Anambra, Ebonyi, Enugu, and Imo. The region lies in the humid tropical agro-ecological zone of Nigeria, within latitudes 04° 24'N to 07° 00'N and longitudes 05° 34'E to Longitudes 09° 24'E (Ugochukwu et al., 2011). The humid tropical ecology is characterized by two distinct seasons, namely the dry season, which starts from November to late March, and the rainy season, which starts from April to October with a short dry spell in August. It is mainly agrarian, and inhabitants depend more on land resources due to its dense population average of about 1000 people/$KM^{2.}$ The population of the area is estimated at 22.3 million people, who are predominantly of Igbo tribal extraction (NPC, 2007). Two states (Enugu and Anambra) were randomly selected from the five states in the southeast geopolitical zone of Nigeria. A multistage sampling procedure was used in the selection of respondents from Anambra and Enugu State, respectively. In the first stage, two (2) senatorial zones were randomly selected from each of the two states, giving a total of four (4) senatorial zones. Anambra South and Anambra Central zones were selected in Anambra State, while Enugu North and Enugu West senatorial zones were used in Enugu State. In the second stage, two (2) local government areas were randomly selected from each senatorial zone to give a total of eight (8) local government areas for the study. Furthermore, in the third stage, two (2) town communities were purposively selected from the selected local government areas because they are known for African black bean production, giving a total of eight (16) communities. Also, in the fourth stage, two (2) villages were randomly selected from each of the selected town communities, giving a total of thirty-two (32) villages. Finally, in the fifth stage, six (6) African black bean farmers were randomly selected from each of the villages.

A total of 192 respondents (98 females and 94 males) were selected, and the sample was stratified randomly to ensure gender representativeness. Youths were selected as African black bean farmers who were between 18 and 35 years of age. To collect data on the socio-economic characteristics, respondents were asked to indicate their sex (male or female), age (in years), marital status (married, single, widowed, or separated), educational level (primary, secondary or tertiary), and household size (in numbers), amongst others. Respondents were asked to tick Yes and No to the agronomics practices and roles according to their gender. Data on constraints affecting them and strategies needed were also collected and examined using a Likert-type scale and a 2.5 cut-off point Frequency, percentage, mean score, and standard deviation were the statistical tools used for analyzing the data.

Results and Discussion

Agronomic practices on production of African black bean

Source of seeds: Results in Table 2 show that the majority (72.4%) of the female respondents obtained seeds from the previous harvest, 69.4% from the open market, and 2% from fellow farmers. About 72% of the males obtained seeds from the previous harvest. This implies that the majority of the respondents obtained their seeds from their previous harvest. This is in line with the findings of Ahmad *et* al. (2022), which revealed that the majority of sorghum farmers from northern Nigeria obtain seeds from previous harvests.

Types of Land Preparation: Table 2 reveals that the majority (63.3%) of the female respondents prepared land in ridges. About 64% of the male respondents prepared land in ridges. This implies that the majority of the respondents prepare their land in ridges. This is in line with the findings of Nwokoro et al. (2022), which showed that maize farmers in Anambra State prepare their land in ridges manually.

Planting system: Table 2 shows that the majority (100%) of female and male respondents grow African black beans in a mixture with other crops, i.e., mixed cropping. African black bean, being a legume crop, helps fix nitrogen in the soil, and thereby improving soil fertility. Most importantly, farmers, especially small-scale farmers, resort to multiple cropping to guard against crop failure in such a manner that when one crop fails, another one may not fail (Tony *et* al. 2020).

Method and frequency of weed control: The majority (100%) of female respondents used the manual method of weeding, and 1% used the mechanical method of weeding (Table 2). Of the male respondents, 98.9% used the manual method of weeding, 4.3% used the chemical method, and 1.1% used the mechanical method for controlling weeds on their farms. Also, for the female respondents, 49% weeded their African black bean farms twice, while 46.9% weeded three times in a growing season and 3.1% weeded once. For the male respondents, 59.6% weeded their African black bean farms twice, 38.3% weeded three times, and 2.1% weeded once in a growing season. The average number of weeds per growing season was two, suggesting that the production of African black beans is relatively labour-intensive. The manual method of weeding has been reported to be expensive, labour-intensive, and strenuous (Imoloame et al. 2021), and this may discourage youths from engaging in the production of African black beans.

Table 2: Agronomic practices on the production of African black bean

Variables	Female% n=98	Males% n=94
Sources of seed*		
a) Own previous harvest	72.4	72.3

b) Fellow farmers	2.0	8.5
c) Open market	69.4	63.8
d) Ministry of Agriculture/ADP	-	1.1
. Land preparation		
(a) Mound	34.7	31.9
(b) Ridge	63.3	63.8
(c) Bed	2.0	5.3
. Planting/cropping system		
i. African black bean grown in mixture with other crops	100.0	100.0
. Weeding method*		
(a) Manual	100.0	98.9
(b) Mechanical	1.0	1.1
(c) Chemical	-	4.3
. Number of times of weeding during planting		
(a) Once	3.1	2.1
(b) Twice	49.0	59.6
(c) Three times	46.9	38.3
. Type of fertilizer used*		
(a) Organic fertilizer	91.8	92.6
(b) Inorganic fertilizer	10.2	10.6
. Period of fertilizer application*		
i. Before planting	88.8	86.2
ii. Before and after planting	4.1	8.5
. Staking	77.6	74.5
.Seasons of production		
i. Rainy season	98.0	95.7
ii. Both dry and rainy season	2.0	4.3
. Method of harvesting *		
a) Harvesting African black beans when mature but not ripe in pods	-	2.1
b) Harvesting African black beans when partially ripe in pods	14.3	20.2
c) Harvesting African black beans when fully ripe in pods	95.9	90.4

Source: Field survey, 2022. "*Multiple responses"

Types and time of fertilizer application: Data in Table 2 reveal that of the female respondents, 91.8% used organic fertilizer, while 10.2% used inorganic fertilizer in African black bean production. Of the male respondents, 92.6% used organic fertilizer, while 10.6% used inorganic fertilizer for African black bean production. The majority (88.8%) of the female respondents indicated that they applied fertilizer to African black beans before planting, while 4.1% indicated that it was done before and after planting. Of the male respondents, 86.2% indicated that they applied fertilizer before planting, while 8.5% indicated that they applied fertilizer before and after planting. This shows that although the majority of the respondents applied organic fertilizer for African black bean production, a greater proportion of them applied it once before the crop was planted. According to Muluney (2022), marriage tends to increase the rate at which farmers take care of their households, thus increasing farmer's participation in the use of organic fertilizer.

Staking: Entries in Table 2 show that the majority (77.6%) of the female respondents staked their African black beans. While 74.5% of male respondents staked their African black bean. Staking gives each plant the ability to grow without bending to the point where it breaks the plant and stops growth. This is in line with the findings of Elesho, Aderemi, Aluko, Aderemi (2021), which show that staking helps in increasing the quantity yields and growth of fluted pumpkins.

Season of production: Data in Table 2 shows that the majority (98%) of female respondents grew African black beans during the rainy season, while 2% grew them in both dry and rainy seasons. Of the male respondents, 95.7% grew African black beans during the rainy season, while 4.3% grew them in both the dry and the rainy seasons. The finding suggests that African black bean is a crop that is grown mainly during the rainy season in the area. This is related to the fact that much importance is not placed on these crops which discourages irrigated production. Because major stakeholders placed less importance on underutilized crops, production of such crops is usually done traditionally, with little or no technological improvement. This is in agreement with the findings of Kolapo, Omopariola, Adeoye and Kolapo (2020), which shows that most of the farmers in Southeast Nigeria make use of traditional methods in the production and processing of African Locust Beans

Methods of harvesting: Table 2 shows that 95.9% of the female respondents harvested African black beans when fully ripe in pods, and 14.3% harvested them when partially ripe in pods. For the male respondents, 90.4% harvested African black beans when fully ripe in pods, 20.2% harvested when partially ripe in pods, and 2.1% harvested when mature but not ripe in pods. This implies that the majority of the respondents harvest the crop when it is fully ripe in pods. This is in line with the report of Mazhitova et al. (2023), which states that harvesting of leguminous crops starts when the pods are brown and ripe in the lower tier of stems.

Gender roles in production practices of African black beans

Land clearing: The data presented in Table 3 show that 5.7% of women, 37.5% of men, and 32.8% of youths indicated that they cleared the land for African black bean cultivation. This finding is in line with the land tenure system in the study area which vests ownership and authority over land on men. Amadi et al. (2020), also reported that men did most of the land clearing for cassava production in Imo State, Nigeria, and this may be due to the high energy needed for land clearing.

Ploughing: The data in Table 3 reveal that 4.7% of women, 32.8% of men, and 33.9% of youths engage in ploughing to loosen and turn the soil before the cultivation of African black beans. This finding suggests that the responsibility of ploughing rests mainly on men, and youths due to its tedious nature, with women playing fewer roles. This is in agreement with the findings of Bako *et* al. (2022), which revealed men contributed more to the ploughing of the land in maize farming in Kogi State, Nigeria.

Harrowing: Entries in Table 3 show that 4.7% of women, 32.8% of men, and 34.9% of youths indicated that they engaged in harrowing to further break the soil into smaller fragments for better soil aeration before African black bean cultivation. This implies that men and youths engage more in harrowing than women. This is in line with the findings of Bako *et* al. (2022), which showed men contributed more to the harrowing of the land in Kogi State.

Sowing/planting: Data in Table 3 showed that 60.4% of women, 12.5% of men, and 11.5% of youths were involved in the sowing of African black bean seeds. The finding suggests that women are majorly involved in the sowing and planting of African black bean seeds. This finding is in agreement with the findings of Amadi *et* al. (2019), who found women to be more engaged in most cassava planting operations in Imo State, Nigeria.

Watering: From the data in Table 3, 14.1% of women, 5.2% of men, and 13% of youths indicated that they engaged in the watering of African black bean crops. The findings showed that women and youth are more involved in watering than men. This finding is in line with that of Odube et al. (2019), who found women in Bayelsa to be more involved in the watering of crops.

Weeding: Results in Table 3 revealed that 31.8% of women were involved in weeding, while 15.1% of men and 31.8% of youths, respectively, were also involved in weeding. The finding suggests that they were all involved in weeding, with youths in the majority. This finding is contrary to that of Bako *et* al. (2022), which revealed that males provided 70.7% of the labour for weeding, while females provided 29.3% of the labour for weeding.

Herbicide application: Data in Table 3 showed that 4.7% of women, 6.3% of men, and 1.6% of youths engaged in herbicide application. This finding suggests that herbicide application is mainly the prerogative of men and women, with few youths taking part in it. This is in line with the findings of Amadi *et* al. (2019).

Harvesting

The data in Table 3 revealed that harvesting was carried out by all, i.e., women (53.1%), men (15.6%), and youths (19.3%), with women having an edge. This finding is in line with that of Amadi *et* al. (2019), that the harvesting of cassava in Imo State was carried out by all (men, women, and youths), with women having a slight edge.

Table 3: Gender roles in production practices of African black bean

Variables	Women %	Men %	Youths %
Land clearing	5.7	37.5	32.8
Ploughing	4.7	32.8	33.9
Harrowing	4.7	32.8	34.9
Sowing/planting	60.4	12.5	11.5
Watering	14.1	5.2	13.0
Weeding	31.8	15.1	31.8
Herbicide application	4.7	6.3	1.6
Harvesting	53.1	15.6	19.3
Processing	59.9	3.1	10.9
Storage	63.0	6.3	4.7
Marketing	61.5	13.0	12.0
Fertilizer application	8.9	13.5	10.9

Source: Field survey, 2022

Processing: Results in Table 3 reveal that 59.9% of women, 3.1% of men, and 10.9% of youths engaged in the processing of African black beans. This finding reveals that women are more involved in processing than men and youth. In their study, Muhammad et al. (2022), found that females dominated the processing activities of grains in northern regions of Nigeria.

Storage: Entries in Table 3 show that 63% of women, 6.3% of men, and 4.7% of youths were involved in the storage of African black beans. This finding suggests that men and youths were less involved in storage compared to women, who were largely involved in it. Doss et al. (2019), stated that agricultural livelihood opportunities that are open to youth will be partly ascertained by the agricultural and economic demographics in which they live and their access to productive assets and resources, especially technology.

Marketing: Data in Table 3 reveal that 61.5% of women, 13% of men and 12% of youths were involved in the marketing of African black beans. This finding suggests that a higher percentage of women were involved in African black bean marketing as compared to the percentage of men and youths. This finding is in line with that of Falola *et* al. (2020), that a higher percentage of rural women in Kwara State were involved in agricultural marketing than men.

Fertilizer application: Table 3 shows that 8.9% of women, 13.5% of men, and 10.9% of youths were involved in fertilization application. This finding implies that men (13.5%) and youths (10.9%) were more involved in fertilizer application than women. This finding is in line with Bako *et* al. (2022), that male respondents contributed more to fertilizer application than female respondents.

Constraints in African Black Bean Production

Table 4 shows the major constraints to African black bean production practices as perceived by female and male respondents. For the female respondents, lack of access to affordable credit ($\bar{x}$=3.70), lack of improved seeds ($\bar{x}$=3.58), and low income ($\bar{x}$=3.53) were indicated as major constraints.

For the male respondents, they are as follows: Lack of access to affordable credit ($\bar{x}$=3.70), Lack of improved seeds ($\bar{x}$=3.52), pest problem ($\bar{x}$=3.52), low income ($\bar{x}$=3.46).

Table 4: Constraints encountered in African black bean production practices

Constraints	Female		Male	
	Mean ($\bar{x}$)	SD	Mean ($\bar{x}$)	SD
Lack of improved seeds	3.58*	0.52	3.52*	0.50
Lack of awareness of nutritional value	3.28*	0.69	3.38*	0.61
Unavailability of seeds and planting materials	3.20*	0.73	3.29*	0.71
Lack of market infrastructure	2.85*	0.90	2.68*	0.92
Lack of knowledge on processing and value addition	2.82*	0.74	3.15*	0.62
Competition from modern crop	2.82*	1.45	2.94*	1.23
Lack of access to affordable credit	3.70*	0.61	3.70*	0.53
Negative attitude of consumers	2.13	0.83	2.17	0.90
Unavailability of extension services	3.33*	0.67	3.37*	0.64
Bad appearance and taste	1.82	0.83	1.94	0.83
Pest problem	3.48*	0.69	3.52*	0.58
Lack of knowledge of other propagation techniques	2.13	0.95	2.29	0.98
Scarce knowledge on cultural practices	2.48	0.99	2.60*	0.99
Low income	3.53*	0.52	3.46*	0.62
Loss of traditional knowledge	3.29*	0.79	3.32*	0.61
Lack of knowledge on uses	3.34*	0.73	3.30*	0.64

***Mean scores greater than or equal to the cut-off point.**
Source: Field survey, 2022

The findings suggest that female and male African black bean producers in the research area encountered a variety of constraints or challenges that could limit their

participation in African black bean cultivation. Lack of access to affordable credit and low income could be a substantial barrier that restricts farmers' participation in African black bean production. According to the findings of Offiah *et* al. (2020), inadequate capital is a major constraint for crop farmers. Also, African black bean farmers in the study area could spend a lot of time and money trying to procure seeds and planting materials needed for African black bean cultivation due to their unavailability. The unavailability of extension services is a huge constraint on the promotion of underutilized crops. Extension services, which should be credible and reliable providers of agricultural information and technologies for enhanced African black bean production methods, were unavailable to the farmers. This will limit the production of the crop. On the other hand, a lack of awareness of the nutritional value of African black beans means that the crop will be neglected and underutilized. The lack of market infrastructure poses a constraint encountered in African black bean production. Improving the market infrastructure is essential for achieving effective marketing of the crop (Alao *et* al., 2020). According to Agulanna (2020), the cultivation of underutilized crops is economically enriching, and their consumption is a good source of food and nutrition.

Possible strategies for improving the production of African black bean??

Table 5 shows the possible strategies for improving the production practices of African black beans as perceived by female and male respondents. The results revealed documenting traditional knowledge ($\bar{x}$=3.89) and seminars ($\bar{x}$=3.54), research on pests and diseases affecting crops ($\bar{x}$=3.47) as perceived strategies by the female respondents for improving the production of African black bean while seminars ($\bar{x}$=3.39), documenting traditional knowledge ($\bar{x}$=3.51), research on pests and diseases affecting crops ($\bar{x}$=3.51) was indicated as the strategies for enhancing the production of African black beans. All the strategies suggested by the respondents, if adopted, can lead to an improvement in African black bean production and also the development and sustainability of production, thereby leading to a decrease in the crop's underutilization (Waleed *et* al. 2021).

Table 5: Possible strategies for improving the production practices of African black bean

Strategies	Female Mean ($\bar{x}$)	SD	Male Mean ($\bar{x}$)	SD
Promote better links between growers and marketers	3.17*	0.99	3.31*	0.83
Public awareness materials	3.43*	0.54	3.29*	0.62
Seminars	3.54*	0.52	3.39*	0.57
Investigation on restrictions affecting use	3.29*	0.92	3.36*	0.80
Documenting traditional knowledge	3.89*	4.15	3.51*	0.64
Studies on price and processing	2.79*	0.94	2.95*	0.97
Research on pest and diseases affecting crops	3.47*	0.71	3.51*	0.65
Research on taste, flavour and appearance	2.40	0.92	2.61*	0.87
Research on most suitable technologies	2.57*	0.96	2.71*	0.81
Research on better method of harvesting	3.46*	0.60	3.36*	0.62
Community participation	3.35*	0.68	3.34*	0.61

Source: Field survey, 2022

Conclusion and Recommendations

Men, women and youths played complementary roles in various operations involved in African black bean production. Men and youths dominated in heavy labour

operations such as farm preparation, ploughing, harrowing and herbicide application, while women dominated in other operations like planting, weeding, harvesting, marketing, etc. Also, gender gaps in underutilized African black bean production exist in the study area. Hence, it is recommended that to address the gender gaps that exist in African black bean production, male and female African black bean farmers in the area should be allowed unrestricted access to productive resources as a way of exploiting their potential in African black bean production through the establishment of gender-based African black beans development programs. Extension workers should provide adequate training/seminars/workshops should be given to youths to encourage them and allow youths greater access to and control of finances for African black bean production. Policy issues targeted at increasing African black bean production in the state should advocate for more involvement of the males in the production of the crop. Local governments should address the needs of producers of either sex. Interventions in underutilized African black bean farming should also be targeted towards the farm families since all members are in the crop production activities. The government should enact policies and initiate programs aimed at attracting youth to African black bean production. Extension should also target the farmers and provide specific training on the various technologies aimed at improving the production of the crop. This will ensure that the production and consumption of African black beans are enhanced to improve the food and nutrition security of citizens. It will also provide job opportunities and income generation for the teaming youth population.

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