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Gender roles on the underutilization of pigeon peas (*Cajanus Cajan*) in South-East, Nigeria

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ABSTRACT

The study examined gender roles in pigeon pea production in southeast, Nigeria, to provide an understanding of the role gender plays in the underutilization of pigeon pea. It addressed the socio-economic characteristics of the respondents, their agronomic practices on the production of pigeon peas, gender roles in production practices of pigeon peas, constraints encountered by the respondents in the production practices of pigeon peas and possible strategies for improving the production practices of pigeon pea. The structured interview schedule was used in collecting data from (90) male and 102 female) pigeon pea farmers. The population study comprises farmers who are aware of pigeon peas in the state. A purposive sampling procedure was used in selecting respondents for the study. Thus, the total sample size for the study was 192 pigeon farmers. Statistical tools such as percentages, frequency, mean, and standard deviation were used in analyzing the data. Multistage sampling procedure, purposive sampling procedure and simple random method were employed in selecting respondents for the study, it was identified that in gender roles in the production of pigeons, the women and youth were more involved in the production of pigeon peas. The roles include watering (43.2%), weeding (30.7%), herbicide application (23.4%), marketing (50.5%), processing (28.6%), storage (34.9%) and farm preparation (33.9%), ploughing (37.5%), harrowing (30.7%), harvesting (28.1%), respectively. That is to say that gender has a great influence on the production of pigeon peas. The finding revealed the constraints perceived by the male respondents which were; non-availability of transport facilities, lack of knowledge on uses, unavailability of extension, and lack of access to credit. The constraints perceived by the female respondents were; non-availability of transport facilities, lack of market, lack of knowledge on uses, and lack of access to credit. The study revealed lack of access to credit and non-availability of transport facilities as the most serious constraint. A study on pigeon pea farming revealed that males handled physically demanding tasks while females focused on less strenuous activities. Both genders faced common challenges, with females highlighting a lack of credit access and males emphasizing transportation issues. To address these problems, the study suggests providing financial support through loans

and grants and educating farmers about available credit facilities. Strategies for improved pigeon pea production include better market connections, enhanced harvesting methods for males, and suitable technologies for females. Implementing these strategies can enhance pigeon pea farming practices.

Keywords: Pigeon, pea, Male, female, etc.

1. INTRODUCTION

According to the World Health Organization Gender refers to the characteristics of women, men, girls and boys that are socially constructed. This includes norms, roles, and relationships between groups of women and men. It varies from society to society and can be changed. Gender roles are roles that are played by both men and women and which are not determined by biological factors but by the socio-economic and cultural environment or situation Often, the biological differences between men and women are used to explain these different roles. Men's physical strength makes them more suited for harder jobs while women's qualities are supposed to make them suited for work involving detail and patience. Pigeon pea is an important source of essential nutrients such as proteins, carbohydrates, vitamins, and minerals. Pigeon pea is the most important pulse crop utilized as a food component in rain-fed agricultural conditions with the lowest costs, and it is the best source of protein supplements in typical cereal-based diets to fill the nutritional deficit.

Despite this, it is the world's least-used pulse crop (Abebe, 2022). Despite its attractive qualities and importance, pigeon pea is one of the underutilized crops. Underutilized crops are those that are overlooked by researchers, farmers, marketers, and consumers for a variety of reasons including agronomic, genetic, economic, environmental, and cultural factors. 'Underutilized crops' is a phrase commonly used to describe crop species whose nutritional or dietetic utility has not been fully documented or understood. For clarity, a food species may be underutilized in one region but not in another. The term 'underutilized' has been used among other several descriptions including "orphan", "minor", "new crops", and "neglected" to represent crop species that have potential but have fallen to disuse due to various reasons. Analyzing gender roles in pigeon pea production in Imo State and Enugu state is important. Pigeon pea plays an important role in household food security and nutrition and in improving soil fertility. Thus, understanding the roles of men and women in pigeon peas is critical in planning programs that seek to reduce poverty and malnutrition, and attain food security in Imo and Enugu state.

Consequently, the foregoing raises some pertinent questions such as: what are the socio-economic characteristics of pigeon pea farmers in the study area? What agronomical practices are carried out by men and women pigeon pea farmers? What are the gender roles involved in the production of pigeon peas? What are the constraints faced by pigeon pea farmers? And what are the possible strategies that can enhance the production of pigeon peas? Answers to these questions would give insights into gender-based disparities in the context of underutilized pigeon peas for protein availability and sustainability in the study areas. This study analyzed gender roles in the underutilization of pigeon peas in southeast Nigeria. The specific objectives were to ascertain the socio-economic characteristics of pigeon pea farmers, ascertain the agronomical practices involved in the production of pigeon peas, determine the gender roles in the production of pigeon peas, identify the constraints in the production of pigeon peas and, determine the possible strategies in improving production of pigeon pea.

2. METHODOLOGY

The study was carried out in the South Eastern region of Nigeria. Two states in the region were purposively selected for this study. They are Imo state and Enugu states. The population of the study comprised all male and female farmers that produce pigeon peas in Imo and Enugu State, Nigeria. The study used the multistage random sampling procedure in selecting the samples. 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. Imo West and Imo East zones were selected in Imo 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 stage three, two (2) town communities with high concentrations of pigeon pea production were purposively selected from the selected local government areas, giving a total of eight (16) communities.

Also, in the fourth stage, two (2) villages were purposively selected from each of the selected town communities, with a total of thirty-two (32) villages. Finally, in the fifth stage, six (6) pigeon pea farmers were randomly selected from each of the villages. A total of 192 respondents (102 females and 90 males) were selected and the sample was stratified randomly to ensure gender representativeness. Data for this study was obtained from both primary sources. The primary data was obtained through the use of

an interview schedule. The interview schedule aided in getting information on the socio-economic characteristics of the respondent, identifying the agronomic practices involved in the production of pigeon peas; determining gender roles involved in the production of pigeon peas ascertaining the constraints pigeon pea farmers face during the production of the crop and determining possible strategies to enhance the production of pigeon pea.

3. RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

Table 1 showed that a greater proportion of the female respondents (45.1%) and male respondents (37.8%) were between the ages of 20 and below years. The average age was 46.97 years and 47.46 years for the female and male respondents respectively. This indicates that they are still in their active years. According to (Sanusi et al., 2020). The result also revealed that 28.4% of female respondents completed primary school, 52.9% finished secondary school, 11.8% were graduates, 2.9% had no formal education and 3.9% had M.Sc. While for the male respondents, 57.8% completed secondary school, 23.3% attempted primary school, 13.3% were graduates, 2.2% had no formal education and 3.3% had an M.Sc. Pigeon pea production can be increased by an increased level of education of individual members of the household. According to Amadi et al., (2019), education can influence people to accept new technology and change their attitude to the desired technology. Also, the majority 70.4% of the female respondents and 63.3% of the male respondents had a household size of 5-8 members.

The mean household size of female respondents was 6.8 persons and 6.16 persons for male respondents. This implies that both categories of respondents had fairly large household sizes, thus these household members could provide labour for farm activities. This is in agreement with the findings of Biam and Tavershima, (2020) which revealed that a high percentage of rural farming households in Benue state had large household sizes and this indicates the availability of labour for their farm production. The majority 76.5% of the female respondents and 87.8% of the male respondents had been involved in pigeon pea farming for 1-20 years. The mean number of years for female and male respondents was 12.76 and 10.93 respectively. Table 1 also showed that for the female respondents, 76.5% realized between 200000 naira and below from pigeon pea farming in the last year, 12.7% realized between 201000-400000 naira, 1% realized 401000-600000 and 1.9% realized above 600000. For the male respondents, 76.7% realized within 200000 naira and below from pigeon pea farming 21.1% realized between 201000-400000 naira and 2.2% realized between 401000-600000 naira.

Table 1 Socio-economic characteristics of respondents

Socio-economic characteristics	Male Percentage (%) (n=90)	Mean ($\bar{x}$)	Female Percentage (%) (n=102)	Mean ($\bar{x}$)
Age				
10-20	1.1	-	1.0	-
21-40	37.8	-	45.1	-
41-60	41.1	47.46	28.4	46.97
61-80	13.3	-	17.6	-
81-100	6.7	-	7.8	-
Educational level				
Primary school	23.3	-	28.4	-
Secondary school	57.8	-	52.9	-
Graduate	13.3	-	11.8	-
No formal education	2.2	-	2.9	-
M.Sc.	3.3	-	3.9	-
Marital status				
Single	21.1	-	24.5	-
Married	72.2	-	54.9	-
Widowed	6.7	-	20.6	-
Household size				
1-4	25.6		13.0	-
5-8	63.3	6.16	70.4	6.18

9-12	11.1		16.7	-
Years engaged in pigeon pea farming				
1-20	87.8	10.93	76.5	12.76
21-40	7.8	-	23.5	--
41-60	4.4	-	1.0	-
Amount realized from pigeon pea farming				
0-200000	76.7	128688.89	76.5	144851.49
201000-400000	21.1	-	12.7	-
401000-600000	2.2	-	1.0	-
Above 600000	-	-	1.9	-

Source: Field survey, 2022.

Agronomic practices on the production of Pigeon pea

Selection and source of seeds

Data in Table 2 showed that a greater proportion (47.1%) of the female respondents and 43.3% of males select their seeds based on colour and 36.3% and 36.7% of females and males respectively select based on availability. It also showed that the majority (66.1%) of the female respondents obtained their seeds from the open market, 45.1% from fellow farmers and 21.6% from their previous harvest. Of the male respondents, 52.2% obtained their seeds from their open market, 47.8% from fellow farmers, and 24.4% from their previous farms.

Land preparation

The study revealed that a greater proportion (63.1%) of the female and 64.4% of the male respondents prepared theirs in ridges. This is in line with the findings of Nwokoro et al., (2022) which showed that maize farmers in Anambra state prepare their lands in ridges manually.

Weeding method and frequency

Data in Table 2 showed that a greater number (56.9%) of female and 43.3% of male respondents used manual method of weeding. Also, for the female respondents, 64.7% weeded their pigeon pea farms twice, while 19.6% weeded three times in a growing season and 17.6% weeded once. Of the male respondents, 79.9% weeded twice, 17.8% weeded three times and 5.6% weeded once in a growing season.

Types of fertilizer used

Data in Table 2 revealed that of the female respondents, 34.3% used organic fertilizer, while 15.7% used inorganic fertilizer in pigeon pea production. Of the male respondents, 23.3% used organic fertilizer, while 14.4% used inorganic fertilizer.

Application method of organic and inorganic fertilizer

Table 2 showed that the majority (14.7%) of the female respondents applied organic fertilizer to their farms by broadcasting, while 20.6% applied organic fertilizer by incorporation during ploughing and 18.6% applied it by band method. Also, for the inorganic fertilizer, 8.8% of the female respondents applied it by band method, 73.5% applied it by incorporation during ploughing and 2% applied it by broadcasting. For the male respondents, 8.9% applied organic fertilizer by broadcasting, 15.6% applied it by incorporation during ploughing and 14.4% applied it by band method. Also, for the inorganic fertilizer, 17.8% of the male respondents applied it by band method, 2.2% applied it by broadcasting and 80% applied it by incorporation during ploughing. This finding is in line with that of Offiah et al., (2020) which revealed that maize farmers in Anambra state indicated the use of adequate organic fertilizer on their farmland.

Method and techniques of harvesting

Table 2 showed that 50% of the female respondents harvested pigeon pea when fully ripe and 44.4% of the male respondents were fully ripe. Also, 100% of the female and 90% of the male respondents harvested pigeon peas manually. The majority of the respondents harvested their produce manually. This is in line with the findings of Danbaba et al., (2019) that revealed harvesting of rice in Nigeria is still done manually.

Table 2 Agronomic practices of on production of Pigeon pea

Variables	Male % N=90	Female % N=102
Selection of seeds		
High yielding varieties	13.3	14.7
Disease resistance varieties	12.2	12.7
Deep-rooted varieties	5.6	7.8
Based on size	4.4	4.9
Based on shape	5.6	4.9
Based on color	43.3	47.1
Availability	36.7	36.3
Less cost	18.9	20.6
Source of seed/seedling		
Own previous harvest	24.4	21.6
Fellow farmers	47.8	45.1
Open market	52.2	66.1
Land preparation		
Mound	2.2	-
Ridge	64.4	63.1
Bed	32.2	24.5
Weeding method		
Manual weeding	43.3	56.9
Mechanical weeding	2.2	2.0
Chemical weeding	61.1	49.0
Number of times weeded		
Once	5.6	17.6
Twice	79.9	64.7
Three times	17.8	19.6
Months of weeding		
June	4.4	8.8
July	80	79.4
August	74.4	73.5
September	18.9	17.6
October	33.3	28.4
November	54.4	48.0
Type of fertilizer used		
Organic fertilizer	23.3	34.3
Inorganic fertilizer	14.4	15.7
Application method of organic manure		
Broadcasting	8.9	14.7
Band	14.4	18.6
Incorporate during ploughing	15.6	20.6
Application method of inorganic fertilizer		
Band	17.8	8.8
Broadcasting	2.2	2.0
Method of harvesting		
Harvesting pigeon peas when mature but not ripe	1.1	0
Harvesting pigeon peas when partially ripe	7.8	8.8
Harvesting pigeon peas when fully ripe	44.4	50.0

Harvesting techniques		
Harvesting with knife	11.1	7.8
Harvesting by hand	100	100
Harvesting using pruners	-	2.0
Harvesting using clippers	-	1.0
Incorporate during ploughing	80.0	73.5

Source: Field survey, 2022. Multiple responses

Gender roles in production practices of African black bean

Data presented in Table 3 showed that 3.1% of women, 13% of men and 33.9% of youths indicated that they prepare the farm for pigeon pea cultivation. This implies that youths were more involved in farm preparation than men and women. Also, 9.4% of women, 25.5% of men and 37.5% of youths engage in ploughing to loosen and turn the soil before the cultivation of pigeon peas. Ploughing is a method to loosen or turn the soil before sowing or planting the seed. The study revealed that 7.3% of women, 30.7% of men and 30.7% of youths indicated that they engaged in harrowing to further break the soil into smaller fragments for better soil aeration before pigeon pea cultivation. This implies that men and youths engage more in harrowing than women. Ploughing and harrowing is a heavy labour task hence men and their sons with inherent physics do most of the job. It further revealed that 23% of women, 30.2% of men and 25% of youths were involved in sowing.

Also, 43.2% of women, 12.5% of men and 26% of youths indicated that they engaged in watering pigeon pea crops. This finding is in line with that of who found women in Bayelsa to be more involved in the watering of crops. The study revealed that 30.1% of women, 6.3% of men and 13.5% of youths were involved in weeding. The findings show that they were all involved in weeding but with women 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. Furthermore, 23.4% of women, 19.3% of men and 22.9% of youths engaged in herbicide application. The data in Table 5 showed that harvesting was carried out by all i.e., women (12.4%), men (32.3%) and youths (16.1%), with men having an edge.

The study showed that 34.9% of women, 69.4% of men and 16.1% of youths were involved in the storage of pigeon peas. This finding suggests that men and youths were less involved in storage compared to women who were largely involved in it. This finding is in contrast with the findings of Iwuchukwu and Udegbunam, (2017) which suggest men and youths were largely involved in storage activities. Results in Table 3 revealed that 28.6% of women, 28.1% of men and 18.8% of youths engaged in the processing of pigeon peas. This finding reveals that women are more involved in processing youths. Lastly, the study revealed that 50.5% of women, 9.9% and 16.1% of youths were involved in the marketing of pigeon peas. This finding suggests that a higher percentage of women were involved in pigeon pea marketing as compared to the percentage of men and youths. This finding is in line with that of Falola et al., (2020) that revealed a high percentage of rural women in Kwara state were involved in agricultural marketing than men.

Table 3 Gender roles in production practices of Pigeon Pea

Variables	Men %	Women %	Youths %
Farm preparation	13	3.1	33.9
Ploughing	25.5	9.4	37.5
Harrowing	30.7	7.3	30.7
Sowing/planting	30.2	12.0	25.0
Watering	12.5	43.2	26.0
Weeding	6.3	30.7	13.5
Herbicide application	19.3	23.4	22.9
Fertilizer application	32.3	21.4	16.1
Harvesting	23.4	13.5	28.1
Storage	9.4	34.9	27.6
Processing	28.1	28.6	18.8
Marketing	9.9	50.5	16.1

Source; field survey 2022

Constraints Encountered pigeon pea production practices

Table 4 shows the major constraints of pigeon pea production practices as perceived by female and male respondents. For the male respondents, they are as follows: Negative attitude of consumers ($\bar{x}$=3.05), time of growth habit ($\bar{x}$=3.02), low income ($\bar{x}$=3.01), lack of improved seed ($\bar{x}$=2.73), lack of access to credit ($\bar{x}$=2.73), unavailability of seed and planting material ($\bar{x}$=2.63), lack of knowledge on production value ($\bar{x}$=2.62), lack of awareness of nutritional value ($\bar{x}$=2.57), Competition from modern crop ($\bar{x}$=2.51), lack of market ($\bar{x}$=2.50) and Pest problem ($\bar{x}$=2.50s). For the female respondents; lack of improved seed ($\bar{x}$=3.10), time of growth ($\bar{x}$=2.98), lack of market ($\bar{x}$=2.85), lack of access to credit ($\bar{x}$=2.81), Low income ($\bar{x}$=2.80), lack of awareness ($\bar{x}$=2.78), lack of knowledge on production and value ($\bar{x}$=2.74), lack of knowledge on uses ($\bar{x}$=2.72), unavailability of seeds and planting materials ($\bar{x}$=2.67), Non-availability of transport facilities ($\bar{x}$=2.59), pest problem ($\bar{x}$=2.58), and loss of traditional knowledge ($\bar{x}$=2.51). All these imply that the respondents encounter many constraints in pigeon pea production, which affects the production and utilization of the crop.

Table 4 Constraints encountered in pigeon pea production

	Male		Female	
	Mean ($\bar{x}$)	SD	Mean ($\bar{x}$)	SD
Non-availability of transport facilities	1.83	1.73	2.60	1.32
Lack of improved seeds	2.73	0.88	3.15	3.90
Lack of awareness of nutritional values	2.58	0.92	2.78	1.03
Unavailability of seed and planting materials	2.63	0.98	2.68	0.99
Lack of market	2.50	1.01	2.85	0.98
Lack of knowledge of production and value	2.62	1.05	2.75	1.08
Competition from modern crop	2.51	0.99	2.09	1.09
Lack of access to credit	2.73	1.14	2.81	1.10
Negative attitude of consumers	3.06	2.46	2.75	1.04
Unavailability of extension services	2.41	1.13	2.44	1.15
Time of growth habit	3.02	1.09	2.98	1.14
Bad appearance and taste	2.03	0.99	1.92	1.02
Pest problem	2.50	1.01	2.59	0.94
Lack of propagation techniques	1.72	0.91	1.75	0.93
Scarce knowledge of cultural practices	2.22	0.87	2.34	0.91
Lack of attractive traits	2.26	0.89	2.31	0.91
Low income	3.01	0.79	2.80	0.77
Loss of traditional knowledge	2.21	1.00	2.52	1.12
Lack of knowledge of uses	2.46	1.21	2.73	1.28

Source; Field survey, 2022 Cut-off mean=2.5

Possible strategies for improving the production of Pigeon pea

Table 5 shows the possible strategies for improving the production practices of pigeon peas as perceived by female and male respondents. For the male respondents, the major possible strategies are as follows: Promote better links between growers and marketers ($\bar{x}$=3.14), Studies on price and processing ($\bar{x}$=3.03), research on most suitable technologies ($\bar{x}$=2.97), Public awareness materials ($\bar{x}$=2.87), Seminars ($\bar{x}$=2.83), community participation ($\bar{x}$=2.80), documenting traditional knowledge ($\bar{x}$=2.78) and research on better method of harvesting ($\bar{x}$=2.73). For the female respondents, the major possible strategies are as follows; Promote better links between growers and marketers ($\bar{x}$=3.12), document traditional knowledge ($\bar{x}$=3.03), Seminars ($\bar{x}$=2.95), research on better method of harvesting ($\bar{x}$=2.79), Public awareness materials ($\bar{x}$=2.73), community participation ($\bar{x}$=2.70) and affecting crops (2.70). All the strategies suggested by the respondents, if adopted can lead to an improvement in pigeon peas production athe nd also development and sustainability of production technologies, thereby leading to a decrease in the crop's underutilization (Waleed et al., 2021).

Table 5 Strategies for improving pigeon production

	Male		Female	
	Mean ($\bar{x}$)	SD	Mean ($\bar{x}$)	SD
Promote better links btw growers and marketers	3.14	0.76	3.13	0.88
Public awareness materials	2.88	0.93	2.74	0.95
Seminars	2.83	0.88	2.95	0.78
Investioftion on restrictions aff the existing use	2.40	0.83	2.47	0.91
Documenting traditional knowledge	2.79	0.89	3.04	0.69
Studies on price and processing	3.03	0.88	2.94	0.99
Affecting crops	2.42	1.15	2.56	1.18
Research on flavour flavour and appearance	1.80	0.81	1.85	0.96
Research on the most suitable technologies	2.98	0.85	3.05	0.788
Research on better methods of harvesting	2.73	0.82	2.79	0.81
Community participation	2.80	0.95	2.71	0.80

Source; Field survey off mean=2.5

4. CONCLUSION & RECOMMENDATIONS

This study showed that although both male and female farmers were involved in pigeon pea production. The study revealed that the youth were more involved in the practices that required a greater level of physical exertion e.g., farm preparation, ploughing, harvesting and harrowing, while the females participated more in the less strenuous practices like sowing, watering, herbicide application and marketing among others. Both the males and females considered the non-availability of transport facilities, lack of access to credit and lack of knowledge of use as part of the most serious constraints experienced by them. However, females ranked lack of access to credit as the most serious while males ranked non-availability of transport facilities first. Both males and females considered "promoting better links between growers and marketers" and "affecting crops" as possible strategies for improving production and post-harvest practices of pigeon peas.

The other strategy that made the top 3 on the list of possible strategies for males was "research on a better method of harvesting" and for females, it was "research on most suitable technologies". The recommendations based on the findings of this study are the study revealed lack of access to credit and the non-availability of transport facilities as the most serious constraints. To tackle this, the government and other agricultural regulatory bodies could issue out loans and grants that could help boost the financial ability of the respondents as the underlying issue in the two constraints is lack of money. Additionally, extension workers should make the effort to enlighten the less informed farmers on the credit facilities already available to them. The study revealed some strategies that could improve the production and post-harvest practices of pigeon peas. The researcher recommends that these strategies be implemented and that strict adherence be applied to potentially improve pigeon pea agricultural management.

Informed consent

Not applicable.

Ethical approval

The ethical guidelines for plants & plant materials are followed in the study for collection & identification.

Conflicts of interests

The authors declare that there are no conflicts of interests.

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Data and materials availability

All data associated with this study are present in the paper.

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