



## Production Characteristics of Cocoyam Farmers in Enugu State

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### Abstract

#### Keywords:

Farmers,  
Cocoyam,  
Varieties,  
Production,  
Practices

The works assessed the production characteristics of cocoyam farmers in Enugu State, Nigeria. Questionnaire was used to elicit relevant information from a sample of 80 randomly selected respondents. Frequency, percentage and mean were used for analysis. The mean household size was 6 with the mean farming experience of 24.0 years. 47.5% had mean farm size of 2.3 hectares with average annual income of N30543.8. Production practices utilized by cocoyam farmers are use of organic fertilizer ( $\bar{x}=2.74$ ) and use of manual labour in land preparation ( $\bar{x}=2.99$ ). The information sources of farmers are friends ( $\bar{x}=2.26$ ), neighbour ( $\bar{x}=2.46$ ), co-farmers ( $\bar{x}=2.46$ ). Information needs of farmers were sourcing of farm inputs ( $\bar{x}=3.88$ ), sourcing of improved farm tools ( $\bar{x}=2.84$ ) among others. Production constraints were incidences of pests and diseases ( $\bar{x}=3.68$ ), lack of extension contact ( $\bar{x}=2.98$ ) among others while ways of improving production are use of disease resistant varieties ( $\bar{x}=2.95$ ), formation of farmers' cooperative societies ( $\bar{x}=2.44$ ), among others. The study recommended among others that research institutes, federal and state government should in partnership, develop weed, pest and disease resistant cocoyam varieties, subsidized farm inputs, and provide extension services to cocoyam farmers.

### 1. Introduction

Cocoyam is regarded as one of the most important staple crops in Asia, Pacific Islands, and Africa (Otegunrin et al., 2021). It is undoubtedly an important food crop across many countries in Africa particularly in Nigeria, Ghana and Cameroon (Eze, Korie, et al., 2016). Cocoyam is one of the food crops liked by many households in South-eastern Nigeria. According to Eze et al., (2016) it is the third most important staple root/tuber crop after yam and cassava in Nigeria and provides a cheaper yam substitute, especially during periods of food scarcity.

Cocoyam production in the state is favoured by the edaphic and climatic factors, which are the amount of rainfall, nature of soil, soil pH value and the amount of sunlight. In the view of Onyeka (2014) cocoyam requires annual rainfall of 1750 – 2500mm; it grows best in fertile and well drain sandy loamy soil. It can also be grown in paddies in wet land and areas using a systems similar to that of rice farm, with soil pH value of 4.2 – 7.5. Research conducted by the Food and Agricultural Organization (2014) stated that cocoyam can thrive when planted under direct sunlight and it can tolerate shade, it is often intercropped with perennial cash crops such as cocoa, bananas, oil palms, etc., especially at the early stage of these plantations based on its propagation and nature. Cocoyam production is generally found among small scale farmers where its production is undermined (Abdulrahman, Abdullahi and Muhammad, 2015). Hence, the production of cocoyam has not been given proper attention in many countries probably because of its incapability to earn foreign exchange and its unacceptability by the high-end consumer's income countries for both consumption and other purposes.

Cocoyam is widely consumed by people because of its nutritional content and other values. The root crop plays a major role in the livelihood of urban and rural dwellers because it is a significant source of income and dietary

calories, especially in times of food crises and economic stress (Boakye-Achampong et al., 2017). Cocoyam is postulated to have superior nutritional value over other major root and tuber staples of West Africa, especially in terms of their mineral composition (Calcium, Phosphorous and Magnesium) and protein digestibility (Lim, 2016). All major parts of cocoyam are edible. According to Eze et al., (2016) the corms and cormels of cocoyam are processed by boiling, baking or frying in the oil. It is processed into diverse products such as cocoyam chips (Achicha) in many parts of south-east of Nigeria especially in Enugu State.; flour is made from dried cormels and used for confectionary; the leaves are harvested, dried and used as vegetable during dry seas on while the fresh broad leaves are used for wrapping kolanut. It is particularly a major vegetable and source of income to farming households in Nigeria (Eze et al., 2016). Arena (2015) reported some of the health benefits of cocoyam which includes cancer prevention, boost vision, enhances learning, maintenance of dental health, low chances of developing diabetes, thickens hair, circulation stimulation, prevent bone loss, skin health, digestive health, cramps, blood pressure and heart health.

Despite the nutritional advantages of cocoyam and its potentials to poverty alleviation, its production and processing in Nigeria are faced with lots of problems. There is a declining trend in cocoyam production as well as a shortage of its supply in domestic markets as a result of a number of technical, socio-economic and institutional constraints, which need to be addressed (Abdulrahmet et al., 2015). In Nigeria, the importance of cocoyam to the livelihoods of millions of people has been under-estimated, under-reported and therefore poorly appreciated. Those who solely depend on the crop for survival-the most vulnerable groups-have neither the resources nor the voice to influence its future. The existence of constraints in cocoyam production have varying implications on subsector especially on small scale cocoyam producers. The most pertinent constraints hampering cocoyam production includes the incidence of diseases and weeds, climate change variation, lack of policy and research interventions for the promotion and growth of cocoyam, lack or shortage of suitable lands for production, high cost of labour, lack of credit or inadequacy of capital to invest, application of total weed killers and the lack of improved planting materials among others. Ekunwe et al., (2015) studied the socio-economic determinants of cocoyam production among women farmers. The study identified unavailability of land and inadequate finance as the two major constraints affecting producers of cocoyam. Its production is also influence by changing weather condition which is term climate change. Climate change and its anomalies come as a result of varying changes in weather parameters over time (Nzehet et al., 2015). These constraints, according to Acheampong et al., (2014) contribute to the current low production of the crop and delimit the process of upgrading cocoyam value chain. Constraints facing cocoyam producers bother on production (agronomic), marketing and socioeconomic issues. These constraints can be resolved or managed to a large extent by stakeholders (producers, government and para-statal institutions as well as development partners) and hence requires the utmost attention for a boost in cocoyam production in Nigeria. Hence, this study was carried out with the broad objective of ascertaining strategies for improving cocoyam production and processing among cocoyam farmers in Enugu State, Nigeria. Specifically, the study sought to describe the institutional and socio-economic characteristics of cocoyam farmers; determine the production characteristic of the farmer; identify the information sources on production and marketing of cocoyam; identify the information needs of farmers (production, marketing and entrepreneurial); identify constraints to cocoyam production; and strategies of improving cocoyam production.

## 2. Methodology

The study was carried out in Enugu State Nigeria. The state is one of the thirty-six states in Nigeria and is located between latitude 6.5 (60 30' N) and a longitude of 7.5 (70 30' E) (<http://en.wikipedia.org/wiki/EnuguState>). The state is bounded on the North-East by Ebonyi State, on the North by Benue and Kogi State, on the south by Abia State and on the west by Anambra State. It occupies an area of about 8,022,95km<sup>2</sup> (Ezike, 1998) and has a population of about 3,257,278 (Nigeria Population Commission, 2006). Enugu State is located in the humid tropical rain forest zone The area has favourable soil for agricultural activities. Thus, most of the inhabitants are either fulltime or part time farmers. They produce crops like cocoa yam, rice, yam, cassava, maize etc. They also engage in poultry production, small ruminants like goat, sheep and piggery production among others. The population of the study comprised all cocoa yam farmers in Enugu State, Nigeria. A multi-stage sampling technique was employed in selecting the respondents. In the first stage, two (2) senatorial zones (Enugu East and Enugu North) were selected out of the three zones in the state. In the 1st stage, one (1) local government area each was purposively selected from each of the selected senatorial zones based on the abundance of cocoa yam producers in the area namely Enugu East zone (Isi Uzo LGA) and Enugu North zone (Igboeze North LGA) giving a total of two (2) local government areas. Furthermore, in stage two, one (1) town community (Eha Amufu and Aji) were selected purposively from each of the selected local government areas because the predominance of cocoa yam production in the area, giving a total of two (2) town communities. In The 3<sup>rd</sup> stage, four (4) village communities were purposively selected from each of the selected town communities giving a total number of eight (8) village communities. Finally, in the 4th stage, ten (10)

farmers were randomly selected from the villages giving a total number of eighty (80) respondents for the study. Primary data were collected from the respondents using semi-structured interview schedules. The instruments for data collection were subdivided into six sections based on the objectives of the study. Information on the socio-economic characteristics were obtained by asking respondents to indicate their age (years), sex (male or female), marital status (single, married, divorced, separated and widowed), level of education (tertiary, secondary, primary and no formal education), farm size (half hectare, 1-2 hectares, 3-4 hectares and 5 hectares and above), farming experience (years), annual income (Naira), major occupation (farming, trading, civic services, retiree and artisanship), marketing channels (farm gate, local market, road side and urban market), sources of fund for farming (personal savings, commercial bank, cooperative society and family and friends), household size (number of people living under one roof and feed from the same pot), membership of social organization, and extension contact. To obtain information on the production characteristics of cocoyam farmers. Respondents were asked to state the extent in which they used a particular production practices on a three point likert type scale namely: highly used (3), for moderately used(2); and not used(1). The cut-off mean was 2. Any variable with a mean score  $\geq 2$  was regarded as a practice highly used while variable with mean score  $\leq 2$  was regarded as not used. To ascertain the sources of information on production and marketing of cocoyam. Respondents were asked to indicate the extent in which they source information from a list of information sources on a three point likert type scale namely: to a great extent (3), for to an extent (2); and no extent (1). The cut-off mean was 2. Any variable with a mean score  $\geq 2$  was regarded as a great source of information while variable with mean score  $\leq 2$  was not regarded as an information source. In order to elicit the information needs of farmers (production, marketing and entrepreneurial). Respondent were asked to rate their information needs on a four point likert type scales namely: highly need assistance (4); need assistance (3); somehow need assistance (2); and does not need assistance (1).The cut-off mean was 2.5. Any variable with a mean score  $\geq 2.5$  was regarded as need for assistance while variable with mean score  $\leq 2.5$  was regarded as no need for assistance. To collect information on the constraints militating against cocoyam production. Respondents were provided with a list of common cocoyam production constraints and were asked to rate their response on a likert type 5- point rating scale of strongly agreed (4), agreed (3), undecided (2), disagree (1) and strongly disagreed (0). The cut-off mean score was 2. Any variable with a mean score  $\geq 2$  was regarded as a major constraints while variable with mean score  $\leq 2$  was not regarded as minor constraints. In order to identify the strategies for improving cocoyam production. Respondents were provided with a list of possible strategies on improving cocoyam production and were asked to rate their response on a three point Likert scale with response options as not useful (1), useful (2) and very useful (3).The cut-off mean was 2 such that variable  $\geq 2$  was indicated as major strategy while variable with  $\leq 2$  was indicated as minor strategy for improving cocoyam production. Data were analyzed using frequency counts, mean and percentage scores.

### 3. Results and discussion

#### 3.1 The Socio-economic characteristics of respondents

Results in Table 1 show that the majority (53.8%) of the cocoyam farmers were female, which is in line with the findings of Mgbedike, Ugwumba, Obiekwe and Akubilo (2017), who found that cocoyam production is an enterprise dominated by women. Women farmers are the principal labour force on small holder farms and perform the largest share in land preparation, weeding, transporting, processing and marketing of cocoyam and related products. A greater proportion (31.5%) of the farmers were above 60 years, with the mean age of 47.1 years. This corroborates the findings of Davies *et al.*, (2014) who also reported that the majority of cocoyam farmers in South-Eastern Nigeria are between the mean age ranges of 41-50 years. This age group could be regarded as the economically active age group in which their energies could be utilized for productive purposes. Findings also showed that the majority (62.5%) of the respondents were married with a mean household size of approximately 6 people. Marital status is directly proportional to household size. Therefore, the household size of 6 suggest that there is availability of family labour for farm work. Obiekwe and Ugwumba (2016) opined that large household size is an added advantage for the availability of cheap labour where most of the family members live in the farming communities. Findings showed that the majority (47.5%) of the farmers completed primary education. Adesina and Baidu-Forson (2015) posited that education positively affects acceptance of technologies. Educated cocoyam farmers could have better access to agricultural information which is fundamental to innovative farm-level decision making compared to uneducated farmers. Evidence showed that the majority (97.5%) and more than half (51.2%) of the respondents too farming and trading as their primary and secondary occupation respectively. This implies that aside farming being their primary occupation, cocoyam farmers still sought for other means of generating income in order to argument household income. Results showed that majority (57.5%) of the respondents had above 16 years of farming experience, with a mean farming experience of 24.0 years. Boakye-Achampong (2016) stated that the higher one's age, the higher the

farming experience and hence production will increase however, up to a certain age limit. This implies that the cocoyam farmers in the study district had long years of farming experience which is an advantage to cocoyam production and farm productivity as a whole since it encourages masteries and prediction of outcome of work and efficiency in farming.

Table 1. Socio-economic characteristics of respondents

Variables	Frequency ( N=80 )	Percentage (%)	Mean
Gender			
Male	37	46.3	
Female	43	53.8	
Age			
<30	13	16.5	
30-39	20	25.2	
40-49	12	15.1	47.1
50-59	10	12.6	
>60	25	31.5	
Marital status			
Single	14	17.5	
Married	50	62.5	
Divorced	2	2.5	
Widow	14	17.5	
House hold size			
1-3	13	16.3	
4-6	30	37.8	6.0
7-9	32	40.0	
>10	5	6.4	
Level of education			
None	9	11.3	
Primary education	38	47.5	
Secondary education	29	36.3	
Tertiary education	4	5.0	
Primary occupation			
Farming	78	97.5	
Trading	1	1.3	
Civil service	1	1.3	
Secondary occupation			
Farming	20	25.0	
Trading	41	51.2	
Civil service	4	5.0	
Retiree	2	2.5	
Artisanship	13	16.3	
Years of farming experience			
<5	8	10.0	
6-10	16	20.0	
11-15	10	12.5	
>16	46	57.5	24.0

Source: Field survey 2021

### 3.2 Institutional characteristics of the respondents

Information on the institutional characteristics of the respondents is contained in Table 2 which shows that the majority (48.8%) of the respondents belonged to religious society. Idiong *et al.*, (2014) posited that membership of social organizations affords the farmers the opportunity of sharing information together on modern farming practices. This implies that cocoyam farmers have the opportunity of interacting with other farmers resulting in better access to productive information and consequent increase in farm productivity and income. Findings showed that a good proportion(78.8%) used their personal savings to fund their cocoyam enterprise. This could be probably because

cocoyam farmers lack access to farm credit and could not meet up with the demands of money lenders. Additionally, this might be as a result of them farming at the subsistence level in which their business plan will not attract loans or credit. Therefore, they resort to personal savings as means to purchase farm inputs which could discourage them in cocoyam farming. Results showed that the majority (47.5%) of the farmers cultivated up to 1-2 hectares of land. The mean farm size of cocoyam farmers were 2.3ha. This shows that cocoyam farmers were small scale farmers who farm at the subsistence level and this explains the low annual income of most of them. These small sizes of farm land leads to small net yield which will result to minimal sales and thus low income. This result lay credence to the fact that the majority (83.1%) respondents had annual income less than N50000 thousand. The mean annual income was (N30543.8%). Abdulrahman, Abdullahi and Muhammad (2015) noted that cocoyam farmers are generally small scale producers whose production has been undermined by low income. This implies that cocoyam farmers are low income earner because they cultivate cocoyam at subsistence level and hence do not have enough income to cater for their needs and the needs of their family.

Table 2. Institutional characteristics of respondents

Institutional characteristics	Frequency (N=80)	Percentage (%)	Mean
Membership of social organization			
Yes	70	87.5	
Type of social organization			
Farmer group	1	1.3	
Political	24	30.0	
Cooperative society	6	7.5	
Religious group	39	48.8	
Source of capital			
Personal savings	63	78.8	
Commercial bank	1	1.3	
Cooperatives society	5	6.3	
Family and friends	11	13.8	
Have extension agent visited			
Yes	16	20.0	
Number of Extension visit			
<2	14	17.5	
2	1.3	1.3	0.2
Farm size			
Half hectare	12	15.0	
1-2 hectares	38	47.5	
3-5 hectares	25	31.3	2.3
>5 hectares	5	6.3	
Annual income (N)			
<50000	66	83.1	
51000-100000	10	12.6	30543.8
101000-150000	3	3.9	
151000-200000	1	1.3	

Source: Field survey, 2021

### 3.3 Production characteristics of cocoyam farmer

Entries in Table 3 showed the mean distribution of production characteristics of cocoyam farmer. The major production practices of cocoyam farmers include: use of organic fertilizer ( $\bar{x}=2.74$ ), use of inorganic fertilizer ( $\bar{x}=2.13$ ), use of manual labour like hoe or cutlass in land preparation ( $\bar{x}=2.99$ ), early planting of cocoyam ( $\bar{x}=2.40$ ), use of both organic and inorganic fertilizer ( $\bar{x}=2.38$ ), use of manual means to control weed ( $\bar{x}=2.98$ ), use of manual labour for harvesting ( $\bar{x}=3.00$ ), use of subsistence system of production ( $\bar{x}=2.73$ ), storing inside a pit and covering them with leaves and soil ( $\bar{x}=2.49$ ), use of smoke for drying ( $\bar{x}=2.66$ ) and use of manual labour for processing of cocoyam ( $\bar{x}=2.88$ ). Findings showed that cocoyam farmers use crude implements in carrying out their cocoyam production and disease resistance variety of cocoyam are not being utilized. Most of their activities are done manually which make them subsistence farmer leading to low productivity and not be able to meet up with demand. Mgbedike, Ugwumba, Obiekwe and Akubilo (2017) posited that the expansion cocoyam production has enormous potential to

bridge the widening demand and supply gap for the product, and also advancing farmers' income and standard of living. As population growth induced pressure on land continues to skyrocket, the position of cocoyam in ensuring household food security cannot be overemphasize. Therefore, adequate recognition should be given to cocoyam, and efforts to should be made by government to increase the production of cocoyam by promoting the adoption of modern production techniques.

Table 3. Production characteristics of cocoyam farmer

Practices	Mean	Standard Deviation
Use of organic fertilizer	*2.74	.4705
Use of inorganic fertilizer	*2.13	.7004
Use of disease resistance variety of cocoyam	1.05	.2710
Use of machine like tractor or plough in land preparation	1.03	.1571
Use of manual labour like hoe or cutlass in land preparation	*2.99	.1118
Early planting of cocoyam	*2.40	.6483
Late planting of cocoyam	1.86	.6313
Use of both organic and inorganic fertilizer	*2.38	.7855
Use of chemical to control weed	1.08	.3824
Use of manual means to control weed	*2.98	.1571
Use of both chemical and manual means to control weed	1.20	.4611
Use of manual labor for harvesting	*3.00	.0000
Use of machine for harvesting	1.00	.0000
Use of subsistence system of production	*2.73	.5731
Use of commercial system of production	1.99	.5845
Use of wooden platforms with corms arranged in irregular rows and covered with dry grass for storage	1.18	.5223
Use of trenches made in dry and shaded areas and covered with dry grass and soil for storage	1.23	.5731
Storing inside a pit and covering them with leaves and soil	*2.49	.8267
Heaping the corms under a shade and covering them with leaves and soil	1.68	.8682
Leaving them un-harvested in the farm till when needed or till the next planting season	1.06	.3316
Use of sun for drying	1.86	.5899
Use of smoke for drying	*2.66	.6353
Use of machine for processing of cocoyam	1.46	.6151
Use of manual labour for processing of cocoyam	*2.88	.3689

Cut-off mean=2 and above

Source: Field survey, 2021

### 3.4 Production features of cocoyam farmers

#### 3.4.1 Source of cocoyam seed

Result in Table 4 reveals that greater proportion (67.5%) of the respondents got their cocoyam seed from market, (28.7%) got theirs from storage, (2.5%) got theirs from farmers group while (1.3%) got theirs from NGOs. This implies that cocoyam farmers spent more money in procuring their cocoyam seed from the market which will increase the cost of production. Efforts should be made by government and non-governmental organizations in providing improved cocoyam seeds for farmers which will reduce their production constrains and maximize farmers' profit.

#### 3.4.2 Source of land

Result in Table 4 reveals that greater proportion (82.5%) acquired their land through inheritance/owned while (17.6%) acquired their own through rent. The distribution revealed that majority of the farmers cultivated land inherited from their parents. This is a reflection of the land tenure system (inheritance/owned) that is very common in Nigeria.

#### 3.4.3 Amount incurred in buying cocoyam seed

Result in Table 4 reveals that greater proportion (89.9%) of farmers incurred cocoyam seed less than N20000 while (10.1%) of farmers incurred cocoyam seed of N20000 and above. The mean amount was (N6865.0). This revealed that most farmer incurred cocoyam seed less than N20000. This might bring about decrease in productivity

since farmers spend small amount of money procuring inferior cocoyam seeds due to their socio-economic status and lack of access to credit facilities.

#### 3.4.4 Scale of production

Result in Table 4 reveals that greater proportion (62.5%) of farmers had the scale of 1-5 bags, (25.0) had the scale of 6-10 bags, (7.5%) had the scale of 16 and above while (5.0%) of farmers had the scale of 11-15 bags. The mean scale of production was 1.6 bags. This implies that the yield of cocoyam is very low compared to the demand which were as a result of negative impact of climate change.

#### 3.4.5 Reason for production

Result in Table 4 reveals that greater proportion (76.3%) of farmer cultivated cocoyam for food and income while (23.8%) of farmers cultivated for food only. This corroborates the findings of Boakye-Achampong, Ohene-Yankyera, Aidoo and Sorensen (2017) who noted that the root crop plays an important role in the livelihood of rural, peri-urban and urban dwellers because it is a major source of income and dietary calories, especially in times of food crises and economic uncertainties. This implies that cocoyam plays a key role in household food security and livelihood options by providing nutritious food for the producers as well as income generation.

#### 3.4.6 Marketing channel

Result in Table 4 reveals that greater proportion (92.5%) of farmer sales their products in the local market, (6.3%) do not sale while (1.3%) sale their produce at the road side market. This is in line with Shewaye (2016) who posits that the market outlet choice is an important farm household-specific decision by farmers to sell their produce through different channels for the purpose of generating higher returns. Therefore, the preference of the place of sale used by cocoyam farmers is seen from the fact that a greater percentage sale in the local market for the convenience of the market, to avoid the hurdle of transport, bad road and other exigencies and to generate higher income.

#### 3.4.7 Cocoyam processing

Result in Table 4 reveals that greater proportion (96.3%) processed their cocoyam by cooking and drying while (3.7%) processed by cooking. This shows that most farmers processed their cocoyam by cooking and drying. This in line with the findings of Ayogu, Ike, Ogbonna, and Gregory (2015) who noted that cocoyam can also be smoked dried and stored to be consumed during its scarcity as "Achicha" in Nsukka agricultural zone. Cooking and drying of cocoyam is quintessence to increase the shelf life of cocoyam for further processing.

#### 3.4.8 Marketing function

Result in Table 4 shows that a greater proportion (81.3%) of the cocoyam farmers sales their produce based on the season, (6.3%) is determined by the quality of produce, (5.0%) by the quantity of produce in the market, (3.8%) is determine by the number of buyer, (2.5%) of farmer do not sale while (1.3%) is determined by the venue of transaction. The result revealed that the sales of cocoyam seed by cocoyam farmers are majorly determined by the season of cocoyam. This might be as a result of higher profit margin they will get when sold in the season of cultivation as many farmers would like to purchase in order to cultivate their land.

#### 3.4.9 Problems in marketing cocoyam

Result in Table 4 shows that a greater proportion (46.3%) of cocoyam farmers had problems of poor transportation network, (35.0%) had problem of high costs of transportation, (17.5%) had no problem in marketing cocoyam while (1.3) had problem of poor pricing system. The result revealed that most cocoyam farmers are faced with the problem of poor transportation network. This implies that they might end up eating their produce at home due to bad roads that lead to market thereby leading to scarcity of cocoyam in peri-urban and urban markets.

Table 4. Production features of cocoyam farmers

Characteristics	Frequency(N=80)	Percentage	Mean
Source of cocoyam seed			
NGOs	1	1.3	
Markets	54	67.5	
Farmers group	2	2.5	
Storage	23	28.7	
How you acquire land			
Inherited/owned	66	82.5	
Rented	14	17.6	
Amount of cocoyam seed (N)			
<20000	72	89.9	
20000 above	8	10.1	6865.0
Scale of production			
1-5 bags	50	62.5	
6-10 bags	20	25.0	1.6
11-15 bags	4	5.0	
16 and above	6	7.5	
Reason for production			
Food only	19	23.8	
Food and income	61	76.3	
Marketing channel			
Local market	74	92.5	
Road side market	1	1.3	
From storage	5	6.3	
Cocoyam processing			
Cooking	3	3.7	
Cooking and drying	77	96.3	
Marketing function			
Season	65	81.3	
Quality of produce	5	6.3	
Number of buyer	3	3.8	
Quantity of produce in the market	4	5.0	
Venues of transaction	1	1.3	
Not for sale	2	2.5	
Problems in marketing			
Poor transportation network	37	46.3	
High cost of Transportation	28	35.0	
Poor pricing system	1	1.3	
None	14	17.5	

Source: Field survey 2021

### 3.5 Sources of information on production by the respondents

Entries in Table 5 showed the mean distribution of sources of information by cocoyam farmers. The information sources used by cocoyam farmers include: personal experience ( $\bar{x}=3.00$ ), neighbour and co-farmers ( $\bar{x}=2.46$ ), and friends ( $\bar{x}=2.26$ ). This corroborates the findings of Raungpaka and Savetpanuvong, (2017) noted that small scale farmers are more likely to share information among themselves. Acheampong *et al.*, (2017) continued by noting that cocoyam farmers in their study scenario relied on personal experience, friends and family for most of their farming information. This implies that cocoyam farmers rely on interpersonal channels and personal experience as their major sources of information on cocoyam production. They consult their friends and neighbours more than they did to agricultural extension agents and other formal sources of information probably because they think the former has no ulterior motives towards their production. Due to the threats of land insecurity and the fact that farmers would need to maximize returns on the land they cultivate, they have a higher probability of contacting available information sources with more preference for sources they see to be more reliable (Emmanuel, Owususekyere, Owusu, and Jordaan, 2016).



Table 5. Sources of information on production

Information	Mean	Standard deviation
Friends	*2.26	.8073
Neighbours	*2.46	.7453
Co-famers	*2.46	.7621
Co-operatives society	1.15	.4240
Farmers forum	1.09	.3960
Leaflets	1.11	.3556
Local leader	1.21	.5441
Radio	1.82	.7758
Television	1.19	.4798
Internet	1.15	.4528
Personal experience	*3.00	.0000
NGO workers	1.09	.3258
Extension workers	1.06	.3316
Social media such as facebook, instagram, watsApp, twitter etc	1.21	.5669

Cut-off mean=2 and above

Source: Field survey, 2021

Table 6. Type of information received

Type	Frequency (N=80)	Percentage (%)
Received any useful information from extension agents		
Yes	17	21.3
The type of information received from extension agent		
How to source farm credit?	1	1.3
How to source farm inputs?	14	17.5
How to source appropriate marketing channel	2	2.5
Received information on		
Home management, family health and care practices	5	6.3
Innovation on cultural practices and technical known-how for cocoyam production	7	8.8
Need assistance from extension agents	5	6.3
Yes	80	100.0

Source: Field survey 2021

### 3.6 Information need of respondents

Result in Table 6 shows that only (21.3%) of the farmers received useful information from extension agents. Extension agents play a key role in providing useful production and marketing information for farmers in order to take them from where they are to where they ought to be in terms of sustainable wellbeing and livelihood. However, the extension agent-farmer ratio is exceedingly abysmal in Nigeria. Inadequate funding of extension system in the study district has limited farmers access to extension advisory services thereby leading to low farm productivity and thus low annual income.

### 3.7 Type of information received

#### 3.7.1 Type of information received from extension agent

Result in Table 6 shows that a greater proportion (17.5%) received information on how to source farm inputs, (2.3%) on how to source appropriate marketing channel while (1.3%) received information on how to source farm credit. Cocoyam farmers rely on extension agents as source of information on regarding quality farm inputs. Procuring improved cocoyam seeds and agrochemicals from reputable dealers play a major role in improving farm productivity.

#### 3.7.2 Received information on

Result in Table 6 shows that a greater proportion (8.8%) of farmer received information on family health and care practices, (6.3%) from home management and innovation on cultural practices and technical known-how for

cocoyam. This implies that cocoyam farmers lack information on cocoyam production since the percentage of information received are low. This might as well as bring about decrease in cocoyam productivity.

### 3.7.3 Need assistance by extension agents

Result in Table 6 shows that all (100.0%) of cocoyam farmers need assistance from extension agents. Cocoyam farmers lack technical production and marketing strategies that would enable them to scale and expand their farm enterprise. Therefore, government should beef-up extension advisory services targeting cocoyam farmers in the study area that will provide area-specific and actionable solutions to farmers' production and marketing needs.

### 3.8 Specific information need of respondents

Entries in Table 7 showed the mean distribution of information need by cocoyam farmers. The following was the information needed by cocoyam farmers: sourcing of farm inputs like fertilizer, improved cocoyam seeds, herbicides and pesticides ( $\bar{x}$ =3.88), sourcing of improved farm tools like tractor hiring services, knapsack etc ( $\bar{x}$  = 2.84), sourcing of appropriate marketing channel ( $\bar{x}$ =3.39), sourcing of farm credit ( $\bar{x}$ =3.09), home management practices ( $\bar{x}$ =2.90), family and health care services ( $\bar{x}$ =3.54), assisting in the expansion of the scale of production of crop ( $\bar{x}$ =3.88), receiving information on appropriate cultural practices of growing cocoyam ( $\bar{x}$ =3.90), information on storage and processing of cocoyam ( $\bar{x}$ =3.55) and information on record keeping, annual evaluation of production, sales of produce ( $\bar{x}$ =3.34). Information they said is power. Agricultural information is requisite for sustainable and equitable development of cocoyam production. The finding shows that cocoyam farmers need information in all aspect of their cocoyam production. This implies that if cocoyam farmers should be provided with information in all this area, they will have efficient and effective cocoyam production which will increase their income. This agrees with the finding of Abdul-Salam and Phimister (2015) that access to information makes agricultural production systems more efficient. This efficiency is achieved because when farmers have relevant, reliable, and useful information, they can make the right decisions which will then enable them to get the best out of their limited resources.

Table 7. Information need of respondents

Information needs	Mean	SD
Sourcing of farm inputs like fertilizer, improved cocoyam seeds, herbicides and pesticides	*3.88	0.4017
Sourcing of improved farm tools e.g tractor hiring services, knapsack etc	*2.94	1.1401
Sourcing of appropriate marketing channel	*3.39	0.9070
Sourcing of farm credit	*3.09	1.2548
Home management practices	*2.90	1.1540
Family and health care services	*3.54	0.6549
Assisting in the expansion of the scale of production of crop	*3.88	0.4017
Receiving information on appropriate cultural practices of growing cocoyam	*3.90	0.3019
Information on storage and processing of cocoyam	*3.55	0.7779
Information on record keeping, annual evaluation of production, sales of produce	*3.34	0.7453

Cut-off mean=2.5 and above

Source: Field survey, 2021

### 3.9 Constraints to cocoyam production

Entries in Table 8 showed the mean distribution of constraints to cocoyam production. The following was the major constraints faced by cocoyam farmers: poor access to land ( $\bar{x}$ =2.46), incidence of pests and diseases ( $\bar{x}$ =3.68), weed problem ( $\bar{x}$ =2.44), lack of extension contact ( $\bar{x}$ =98), lack of improved cultivars of cocoyam ( $\bar{x}$ =3.50), lack of government support ( $\bar{x}$ =3.90), high cost of labour ( $\bar{x}$ =3.53), high cost of farm input ( $\bar{x}$ =3.85), non existence of cooperative societies in my area ( $\bar{x}$ =3.01), poor access to information ( $\bar{x}$ =2.83), poor state of feeder roads ( $\bar{x}$ =2.29), shortage of planting materials ( $\bar{x}$ =3.75), lack of access to credit facilities ( $\bar{x}$ =3.50), lack of mechanized farming ( $\bar{x}$ =3.56), lack of sufficient farming experience to tackle climate exigencies ( $\bar{x}$ =3.46), lack of collateral to secure available credit facilities ( $\bar{x}$ =2.91), poor access to fertilizers ( $\bar{x}$ =3.80) and negative impact of climate change ( $\bar{x}$ =3.64). Cocoyam farmers indicated that the major constraints they face is the incidence of pest and diseases. Taro Leaf Blight of cocoyam has been identifies as the majors disease affecting cocoyam in the area. This is in line with findings of Ayogu (2015) who found that Taro Leaf Blight (TLB), which is caused by the fungus-like Oomycete is the utmost endemic disease of cocoyam that pose a major threat on cocoyam production. Incidence of pest and diseases could be linked to the effect of climate change which also affects the yield of cocoyam products. There is need to develop pest and disease resistance variety of cocoyam as this would reduce the cost of production through

reduction of money spent in the purchase of pesticides. Respondents narrated that lack of cooperative societies made it difficult to build professional relationship with fellow farmers thereby necessitating the existence of only informal relationship among cocoyam farmers. Lack of cooperative society may results from internal politics and corruption of leaders. Okoli (2018) posited that weak financial strength of the society, fraud and financial malpractice, poor management of the society, lack of basic infrastructure are major constraints faced by cooperative societies. Farm inputs such as agrochemicals and improved cocoyam seed are inputs needed by cocoyam farmers to improve their productivity, but the cost of this inputs are too exorbitant to extent that it has reduced their productivity. Shortage of planting materials has also contributed to decrease in cocoyam productivity as cocoyam is gradually going to an extinct. Access to credit facilities is imperative for sustainable expansion and intensification of farm. Lack of access to credit facilities results to low productivity as commercial and rural developments banks in Nigeria may find it difficult to grant loans to small scale producers because they have little security (assets/collateral) to guarantee repayment of the loan. Agricultural mechanization play a major role in improving the work efficiency of farmers, reduce time wastage, reduce farm drudgery and utterly improve farm production efficiency. Lack of mechanized farming also lead to low productivity as cocoyam farmers still make use of crude implements like hoe and cutlass. Poor access to fertilizer has also hindered cocoyam production. Research has linked low fertilizer usage to the high cost of input leading to increased production cost amid the risks or uncertainties of production (delayed rains, poor weather, crop failure etc.) which will impact farm profitability (Boakye-Achampong., 2016). Climate as well has also put threat to cocoyam production as it has led to the vagaries of weather leading to flooding and incidence of pest and diseases which also resulted to low yield and which could lead to extinction of cocoyam. This agrees with Ukonze (2012) who identified reduction in nutritional value, taste and quality to low yield as the major effect of climate change on cocoyam production. Onyeka (2014) also attributed low production of cocoyam across West Africa to declining soil fertility as well as land degradation that cause reducing forest frontiers which are most suitable for cocoyam production. Also, very little research attention has been given to it occasioning knowledge gap for policies and programmes. According to Boaky, Wireko.Manu, Oduro, Ellis and Gudjonsdottir (2018) the lack of policy and research interventions for the promotion and growth of cocoyam has relegated its production to the background compared with other root and tuber crops.

Table 8. Constraints to cocoyam production

Constraints	Mean	Standard Deviation
Poor access to land	*2.46	1.8277
Incidence of pests and diseases	*3.68	0.7920
Weed problem	*2.44	1.5082
Lack of extension contact	*2.98	0.9933
Lack of improved cultivars of cocoyam	*3.50	0.9808
Lack of government support	*3.90	0.4088
High cost of labour	*3.52	0.8565
High cost of farm inputs	*3.85	0.5975
Non-existence of cooperative societies in my area	*3.01	0.8493
Poor access to information	*2.83	1.1449
Low demand for cocoyam	.223	0.6556
Old age affecting my cocoyam farming activity	.938	1.4613
Poor state of feeder roads	*2.29	1.4600
Low price of cocoyam in the market	.263	0.7753
Shortage of planting materials	*3.75	0.8494
Lack of access to credit facilities	*3.50	0.9678
Lack of mechanized farming	*3.56	0.8979
Lack of sufficient farming experience to tackle climate exigencies	*3.46	0.9671
Poor recognition of cocoyam as food	.113	0.3556
Lack of collateral to secure available credit facilities	*2.91	1.0087
Poor access to fertilizers	*3.80	0.5603
Negative impact of climate change	*3.64	0.6607

Cut-off mean=2 and above

Source: Field survey, 2021

Table 9. Strategies for improving cocoyam production

Strategies to improve cocoyam production	Mean	SD
Use of disease resistant varieties	*2.95	.2193
Planting cocoyam early with the first rainfall	*2.24	0.8604
Provision of adequate credit facilities	*2.21	0.8815
Formation of farmers` cooperative societies	*2.44	0.5476
Availability and regular visit by extension agent	*2.63	0.4872
Encouraging farmers programmes in agriculture	*2.54	0.5017
Subsidizing agricultural inputs	*2.91	0.3258
Provision of farm machineries	*2.79	0.5441
Regular weeding of farm	*2.85	0.4528
Use of recommended spacing	1.99	0.7712
Availability of improved varieties	*2.80	0.4328
Availability of market	*2.59	0.5203
Early harvesting	*2.29	0.8143
Use of improved storage facilities	*2.64	0.6005
Use of available credit facilities	*2.19	0.8728
Increased use of fertilizer to improve soil fertility	*2.20	0.7008
Increased use of organic manure to improve soil fertility	*2.83	0.4141
Change of planting and harvesting of cocoyam date	*2.30	0.5603
Implementing government policy and research intervention for promotion and growth of cocoyam	*2.38	0.5819

Cut-off mean= 2 and above

Source: Field survey, 2021

### 3.10 Strategies for improving cocoyam production

Entries in Table 9 showed the mean distribution of strategies for improving cocoyam production. The following was the major strategies for improving cocoyam production: use of disease resistant varieties ( $\bar{x}$ =2.95), planting cocoyam early with the first rainfall ( $\bar{x}$ =2.24), provision of adequate credit facilities ( $\bar{x}$ =2.21), formation of farmers` cooperative societies ( $\bar{x}$ =2.44), Availability and regular visit by extension agent ( $\bar{x}$ =2.63), encouraging farmers programs in agriculture ( $\bar{x}$ =2.54), subsidizing agricultural inputs ( $\bar{x}$ =2.91), provision of farm machineries ( $\bar{x}$ =2.79), regular weeding of farm ( $\bar{x}$ =2.85), availability of improved varieties ( $\bar{x}$ =2.80), availability of market ( $\bar{x}$ =2.59), early harvesting ( $\bar{x}$ =2.29), use of improved storage facilities ( $\bar{x}$ =2.64), use of available credit facilities ( $\bar{x}$ =2.19), increased use of fertilizer to improve soil fertility ( $\bar{x}$ =2.20), increased use of organic manure to improve soil fertility ( $\bar{x}$ =2.83), change of planting and harvesting of cocoyam date ( $\bar{x}$ =2.30) and Implementing government policy and research intervention for the promotion and growth of cocoyam ( $\bar{x}$ =2.38). From the findings above, cocoyam farmers indicated that formation of farmer`s cooperative society is crucial to access to credits, and farm inputs like improved seeds, fertilizer, among others. This agree with Obi, Togun, Lambell and Arokogu (2017) who noted the it is imperative to educate farmers on the benefits and opportunities associated with membership of a cooperative s ociety to enable them to have access to agricultural inputs and farm credits which will strengthening their resilience to climate change. This will enable them mobilize the required financial resources for the acquisition of increased farm land for cocoyam production. Also availability and regular visit by extension agent will enable the farmer gain knowledge on improving production. Sarmapithaet al. (2016) noted that in order to improve farm productivity, the contacts between farmers and extension network is crucial. Encouraging farmers` programmes in agriculture will also enable farmers full participation in activities that will affect their social and economic life leading increase productivity and generation of higher income. Also, provision of adequate credit facilities such as soft loan to cocoyam farmers is important in improving cocoyam production. Subsidizing agricultural inputs such as fertilizer, improved seeds, farm implements in such a way that small scale farmer can afford it will as well boast cocoyam production. Provision of farm machineries like tractor will reduce the cost of labour and promote efficient and timely productivity in cocoyam production. Respondents indicated that availability and access to improved cocoyam variety will improve their overall farm yield. Boakye-Achampong et al. (2017) who noted that the use of improved planting materials such as high yielding and early maturing varieties are crucial towards increasing output and income from cocoyam. Therefore, aavailability of improved variety of cocoyam that will be disease resistance will also enhance cocoyam production by increasing output and income of farmer. Additionally, provision of modern storage facilities to cocoyam farmers

rather than storing cocoyam seed inside pit which encourages decay is important to cocoyam farmers. Modern storage facilities such as refrigerator help cocoyam farmers to increase the shelf life of their produce which will enable them to store and sell their produce at the price are favourable without fear of spoilage. Respondents indicated that regular weeding of cocoyam farm is necessary in improving cocoyam production as weeds compete with the main crop for nutrients. Weeds are unwanted plants on a farmland that compete with crops for sunlight and soil nutrient, and also harbour disease causing organism. Therefore, regular weeding discourages weed competition with the crop as well as reduces the outbreak of pest and disease of cocoyam thereby improving cocoyam production. Early harvesting according to the farmers reduces decaying of cocoyam and as well improves its life shell. Increase use of fertilizer to improve soil fertility is important due to leaching of soil nutrients as a result of effect of climate changes. Farmers should be provided with fertilizer as well as with the knowledge of its application in order to enhance sustainable cocoyam production.

#### 4. Conclusion and Recommendation

On the basis of the major findings of the work, the following conclusions were drawn: Cocoyam production in the area is predominantly small scale farmers who use crude implements for their cocoyam production, with no external innovation to boost production. The farmers equally use a hybrid of adaptation to climate as they engage in early planting due to climate change and use a combination of both organic and inorganic fertilizer. Cocoyam farmers rely on interpersonal channels such as friends, neighbour, co-farmer and intrapersonal channel such as personal experience as their major sources of information on cocoyam production. Findings showed that farmers need information in all aspect of cocoyam production. Incidence of pest and disease, lack of improved cultivar of cocoyam, lack of extension contact, lack of government support, and high cost of labour, among others were the major factors that constrained the cocoyam farmers' productivity. The major strategies suggested by farmers for improving cocoyam production were the use of disease resistant varieties, availability and regular visit by extension agent, subsidizing agricultural inputs, provision of farm machineries, regular weeding of farm, availability of improved varieties, use of improved storage facilities, among others.

The following recommendations were made based on the findings:

1. Development of weed, pest and disease resistant cocoyam varieties by research institutes will play a large role in enhancing cocoyam yield and production. This will help to increase the income of the farmers since their cost and loss of cocoyam will be reduced.
2. Subsidizing farm inputs such as cocoyam seed, fertilizer, farm implements among others by the government in such a way that every cocoyam producer will be able to afford them. This will also increase productivity.
3. In addition, there should be provision of extension services by the government to the farmers to create awareness about cocoyam activities and also enable farmer's participation in any agricultural programmes that affect them.
4. Farmers in the area should form farmers' cooperative in order to pull resources together for their cocoyam production and also to help them gain access to credit facilities.
5. International development agencies which have interest in agriculture should invest in the provision of enabling environment for cocoyam production in the area through the supply of modern cocoyam production, storage and processing facilities. This will boost the quality of the production resulting to overall marketing value.

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