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Research Article

Commercialization of Bambara Nut Production in Nigeria

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Abstract: The global population increases daily, which requires a considerable increase in food production. Bambara nut is an important staple food crop capable of supplying essential nutrients to the body and providing the farmers with income, yet it is underutilized. This study, therefore, assessed the commercialization of Bambara nut production in Nigeria to enhance food availability. Primary data were gathered from 240 respondents and analysed using descriptive statistics, household commercialization index (HCI), and the Tobit model. The results revealed that the mean HCI was 56%, indicating that there exists a gap of 44% for Bambara nut farmers to reach full commercialization. Access to credit, household size, age, farming experience, the quantity of fertilizer, farm output, and distance to the market were significant factors influencing the degree of Bambara nut commercialization. Inadequate access to credit/loan facilities, long-distance to market, high cost of inputs, poor road network to transport produce, and incidence of pests and diseases were the militating constraints to commercialization of Bambara nut production. This study advocates for the provision of credit and inputs, by government and financial institutions, to the farmers to improve their production and commercialization endeavours.

1. Introduction

Owing to the ever-increasing population in Nigeria and the world in general, it becomes pertinent that food production and security should also increase progressively to meet up with the food and nutrition demands of the citizenry and as well curb the menace of malnutrition, hunger and starvation. To this end, it has become necessarily important that government, researchers and other relevant authorities seek to diversify and broaden the sources of foodstuff available to the ever-increasing population. From all indications, man is yet to exploit the full potential of nature regarding the food we eat. Food and Agriculture Organisation (2013) estimates that the major sources of human food are from less than 20 crop species. Three crops, produced at a large scale, accounted for over half of the food consumed globally (Tanzi et al., 2019). Thus, the general world food supply is very much limited to a few sources as opposed to the numerous species which are available at our disposal but yet to be recognized. With about sixty percent of the food supply coming from majorly rice, wheat, and

maize (Adzawla et al., 2016), massive underutilization exists among so many other crop species, subsequently reducing these crops to a mere subsistence level of production. A level at which production cannot cater to the needs of the teeming population and boost the nation's economy as well through production returns.

Agricultural commercialization is thus needed to boost food availability. This is achievable when all or part of the output produced by farmers is oriented toward the market, and all or part of the inputs utilized in the course of production is purchased from the agricultural markets (Agbonkpolor, 2012; Osmani and Hossain, 2015). Agricultural commercialization consequently comprises two basic sides viz output and input commercialization (Kabiti et al., 2016). It, therefore, involves a meticulous action by the farmers to make use or adopt factors of production in such a way that a larger part of the output is for sale or exchange and to also make substantial purchases from input markets to aid production (Abdullah et al., 2019; Falola et al., 2017).

Most of the foodstuffs consumed in Nigeria are limited to majorly cereals, roots, tuber crops, and a few legumes, which have, over the years, been appreciated at a price per unit of any of the food commodities. Nonetheless, there are other sources of foodstuffs that can supply nearly equal to or even more than the quality of nutrients available in the current diet, but for some reason, the potentials of some of these species are yet to be harnessed. One among such crops which have been greatly side-lined and underutilized is the Bambara nut (*Vigna subterranea*). It is a legume grain crop capable of supplying necessary and important nutrients to the population. Increasing leguminous crop production would increase protein availability which will, in turn, improve peoples' nutrition (de Jager et al., 2017). Bambara nut can be consumed by both humans and animals without any harm as long as it is well processed (DAFF, 2016). Furthermore, the Bambara nut is a complete food source due to its substantial carbohydrate (65%) and protein (about 18%) content.

Bambara nut is categorized as a crop specie whose potentials are yet to be fully exploited in terms of commercialization and utilization. The potential of this crop is still very much yet to be maximized as production at the subsistence level alone will not suffice to raise the status of the Bambara nut from underutilized to a commercially utilized specie. Commercialization of Bambara nuts on the sides of the farmers will help to improve their livelihood and welfare status as there would be significant returns through the sales of their produce. It will also bring about an improvement in food security, enhance income, and lower the rate of unemployment by creating an opportunity for massive production of the crop in contrast to the subsistence form of production that is being practiced currently.

It is the negligence and underutilization of Bambara nut, its inadequate level of commercialization, and recognition of its potential to enhance food security in Nigeria and other parts of the world that necessitated this work. Also, the available studies on the Bambara nut did not focus on its commercialisation (Adzawla et al., 2015; Ibrahim et al., 2018; Mayes et al., 2019; Oyeyinka et al., 2017). This study, therefore, aims at investigating the commercialization of the Bambara nut with the view of increasing its production. This study further examines the factors influencing Bambara nut commercialization and identifies constraints to its production. Understanding these would serve as a reference point for the policymakers to intervene in commercialising neglected and underutilised crops.

2. Material and Methods

2.1. Study area

This study was carried out in Kogi State, Nigeria. Kogi state has 21 local government areas (LGAs) and consists of three Senatorial Districts comprising of the Igala people, Okun (Yoruba), and Egbira. Other minority tribes include the Bassa-Nge, Bassa-Komo, and Idoma as well. Kogi State lies between latitude $7^0 75^' N$ and $6^0 75^' E$ of the equator with a total land size of 29,833km. Bambara nut is consumed majorly by the Igala people of the state; hence, cultivation is most prominent in the 9 LGAs occupied by these set of people. These are Olamaboro, Ankpa, Idah, Dekina, Ofu, Omala, Igalamela-Odolu, Ibaji, and Okehi local governments, respectively.

2.2. Sample and sampling techniques

The study population was rural Bambara nut farming households. A three-stage sampling technique was used to carry out this study. In the first stage, Ankpa, Omala, Idah, and Olamaboro LGAs

of Kogi State respectively were purposively selected. The reason is that the production of Bambara nut is highly concentrated in this region of the State. The second stage constituted a random selection of five farm villages from each of the LGAs. This was followed by the last stage using snowballing sampling technique to select Bambara nut farming households from each of the villages using the probability proportional to size technique. A total of 240 respondents were, therefore, sampled for this research.

Table 1. Sampling design

Local Governments	Villages	No of the households selected	Percentage
Ankpa	Ogodo	12	5.0
	Ikanekpo	10	4.2
	Enjema	10	4.2
	Acharane	10	4.2
	Ochi-Ofago	12	5.0
Idah	Obajadaka	10	4.2
	Idoma	10	4.2
	Etoba	12	5.0
	Okweje	10	4.2
	Alade	12	5.0
Omala	Bukami	10	4.2
	Bagana	12	5.0
	Akpacha	12	5.0
	Ajibu	20	8.3
	Ogodu	12	5.0
Olamaboro	Ofante	20	8.3
	Okpoga	12	5.0
	Emenenga	12	5.0
	Amaka	10	4.2
	Okpo	12	5.0
Total	20	240	100.0

2.3. Methods of data collection and analysis

Data were obtained from Bambara nut farmers using a structured questionnaire. The questionnaires were distributed, by the researchers and research assistants, to the selected sample of the population and supplemented with an oral interview where necessary. The data were collected between September and November 2021.

Descriptive statistics, household commercialization index (HCI), and the Tobit model were means of analysing the data. The description of the socio-economic features of the Bambara nut farmers was achieved using descriptive statistics. It was also used to examine the constraints to market-oriented Bambara nut production. The HCI was used to investigate the level of household commercialization of Bambara nut production, while the Tobit regression model was used to identify the determinants of the commercialization of Bambara nut production.

2.3.1. Household commercialization index

To assess the HCI (market sales) of Bambara nut by the farming households, the crop output market participation share (COMPS) indicator was used. It is estimated as the share of the value of crop (Bambara nut) sold and the value of total Bambara nut produced.

$$COMPSi = \frac{\sum_{k=1}^{k} \overline{P}_k \, s_{ik}}{\sum_{k=1}^{k} \overline{P}_k \, Q_{ik}} \qquad (1)$$

Where S_{ik} is the amount of Bambara nut, *k*, sold by farming household *i* at the market at a mean community-level price P_k. The amount of Bambara nut sold will be equal to or less than the total amount produced. Therefore, when a farming household *i* sells all Bambara nuts produced at the market, S_{ik} = Q_{ik} and $COMPS_i$ = 1. If a farming household sells none of its Bambara nut produced at the market, S_{ik} = 0 and $COMPS_i$ = 0. A value of 0 further implies a total subsistence-oriented household, while an index of 1 signifies full commercialization, and the value of the index closer to 1 means a higher degree of commercialization.

2.3.2. Tobit regression analysis

Factors influencing the level of Bambara nut household commercialization were ascertained with Tobit regression. The Tobit model is a censored model with a lower limit (0) and upper limit (1). It can perfectly predict a non-negative outcome (dependent variable) using sets of explanatory or independent variables. The model was used because the dependent variable is an index with values ranging from 0 to 1.

The model is explicitly expressed as:

$$Y = \beta_0 + \beta_1 E + \beta_2 HS + \beta_3 A + \beta_4 FE + \beta_5 FS + \beta_6 CM + \beta_7 AC + \beta_8 F + \beta_9 FO + \beta_{10} DM + \epsilon \qquad (2)$$

Thus, the variables that were used in the regression analysis are measured as;
Y = Household commercialization index (0 to 1)
E = Educational level (years)
HS = Household size (Number of persons in a household)
A = Age of farmer (Years)
FE = Farming experience (years)
FS = Farm size (hectares)
CM = Cooperative membership (Yes=1 or No=0)
AC = Access to credit (₦)
F = Quantity of fertilizer (kg)
FO = Farm output (kg)
DM = Distance to market (Km)
β_0 = constant
β = estimable parameter
ϵ = Error term

2.3.3. Likert type rating scale

Likert type scale was put forward by Rensis Likert in 1932 as a technique for the measurement of attitudes (Joshi et al., 2015). A four-point Likert type scale was utilized to identify the challenges faced in Bambara nut production. The Bambara nut farmers were asked to rate their challenge on a four-point numerical rating scale. A benchmark mean of 2.50 was adopted as the decision to consider a statement as being severe or not in Bambara nut production. Any statement with a mean greater than the benchmark mean was considered a severe challenge, while those with a mean less than the decision mean were not severe, according to this study.

3. Results and Discussion

3.1. Socioeconomic and demographic profile of the farmers

Table 2 presents the socioeconomic distributions of the Bambara nut farmers. The majority (70%) of the Bambara nut farmers were males, while females also formed a reasonable proportion of the respondents. This indicated that the farming occupation was chiefly a male occupation among the respondents in the study area. Furthermore, only a few of the respondents (9.2%) were youths under 30 years of age based on the stipulation by the national youth development. The majority of the respondents (84.1%) were not older than 60 years, while only a few respondents (6.7%) were older than 60 years. Furthermore, their average age was 43 years. This indicated that Bambara nut farmers were still in their

productive and active years and therefore possessed enough physical strength to practice their farming operations. Also, the majority of the Bambara nut farmers (83.3%) were married, 12.5% of the respondents were widowed, while a few (4.2%) were single. The average household size was 11 persons. This is not far-fetched as most rural areas are extended families and employ the use of family labour to carry out farm operations; thus, they care to have many people in their household (Falola et al., 2022; Mukaila et al., 2020).

Education is an important factor in agricultural production and farmers income (Mohammed et al., 2020). About 22% of Bambara nut farmers did not have formal education, 45% had only primary education, with just a few of them (2.5%) possessing tertiary education. This shows the high level of formal illiteracy among rural farmers, which could influence their decision-making process, negatively (Mukaila et al., 2021b). Their average farming experience was 19 years suggesting a high level of knowledge and experience among them due to many years spent in farming. A few of the Bambara nut farmers were part of associations, including cooperative societies, while a majority did not participate in any form of association. There was low access to credit among the Bambara nut farmers. This implies a very low level of support rural farmers got in the areas of credit facilities. Furthermore, only a few of the respondents had contact with extension agents ranging from 2 to 3 times. The majority of the Bambara nut farmers had to travel about 8km to the market to sell their products.

Table 2. Distribution of the respondents by socioeconomic characteristics

Variables	Category	Frequency	Percentage	Mean
Gender	Male	168	70	
	Female	72	30	
Age	≤ 30	22	9.2	43
	31 – 40	80	33.3	
	41 – 50	96	40.0	
	51 – 60	26	10.8	
	> 60	16	6.7	
Marital status	Single	10	4.2	
	Married	200	83.3	
	Widowed	30	12.5	
Household size	≤ 5	48	20.0	11
	6 – 10	102	42.5	
	11 – 15	52	21.7	
	>15	38	15.8	
Education level	No formal education	52	21.7	
	Primary education	108	45.0	
	Secondary education	74	30.8	
	Tertiary education	6	2.5	
Farming experience (Years)	5 – 9	24	10.0	19
	10 – 14	50	20.8	
	15 – 19	76	31.7	
	20 – 24	18	7.5	
	≥25	72	30.0	
Membership of Association	Yes	62	25.8	
	No	178	74.2	
Access to credit facilities	Yes	16	6.7	
	No	224	93.3	
Extension contacts	Yes	76	31.7	
	No	164	68.3	
Number of contacts	≤2	70	29.2	
	>3	6	2.5	
Distance to market (km)	≤3	20	8.3	8
	4 – 8	132	55.0	
	9 – 13	66	27.5	
	>14	22	9.2	

Table 3 presents the distribution of Bambara nut farmers by their farming activities. The majority of the Bambara nut farmers (95%) acquired their land by inheritance, while a few of the respondents (5%) purchased their farmlands. The average farm size was discovered to be 2.76 hectares, with most of the farmers devoting less than or equal to one hectare to Bambara nut cultivation. This shows that Bambara nut production is on a small-scale level. Furthermore, the majority of the farmers (97.5%) still used crude implements like hoe and cutlass for farming, with just a few of the farmers (2.5%) employing the use of mechanized implements like a tractor to carry out cultivation activities. The majority of the respondents used personal funds for farming purposes. This is partly the reason for the low and subsistence level of production among the Bambara nut farmers. The commonest form of labour use among the respondents was the use of family labour. This was followed by a combination of both families and hired labour. Using motorcycles majorly as the predominant means of transportation. Transportation is; therefore, a critical issue to be considered as it affects the commercialization process of agriculture.

Table 3. Distribution of the respondents by farming activities

Variables	Category	Frequency	Percentage
Source of farmland	Inheritance	228	95.0
	Purchase	12	5.0
Size of farmland (Ha)	≤ 5.00	218	90.8
	5.01 – 10.00	20	8.3
Mean = 2.76	> 10.00	2	0.8
Means of land cultivation	Hoe and cutlass	234	97.5
	Tractor	6	2.5
Source of capital for farming	Owned funds	224	93.3
	Friends/relatives	14	5.8
	Thrift/Cooperative societies	2	0.8
Major labour use	Family	212	88.3
	Hired	6	2.5
	Family and hired	22	9.2
Means of transport to market	Motorcycle	190	79.2
	Trucks	50	20.8

3.2. Level of commercialization of Bambara nut production

Table 4 presents the summary of the Bambara nut produced, sold, or consumed by the farming households. The average quantity of Bambara nut produced by the farmers was 318.48kg, out of which 139.43kg was consumed, and 179.05kg was sold. A 100kg bag of Bambara nut which was the standard unit of measurement, was sold for ₦30 000. Thus, the values of Bambara nut produced, sold, and consumed by the households were ₦95 544, ₦53 715, and ₦41 829, respectively. About 44% of the total Bambara nut production was consumed by the farmers, and about 56% was sold in the market for public consumption.

Table 4. Breakdown of Bambara nut produced, sold, and consumed by the farmers

Variable	Mean quantity (kg)	Value (₦)
Quantity produced	318.48	95 544
Quantity consumed (as food, gifts, or stored)	139.43	41 829
Quantity sold	179.05	53 715

3.3. Distribution of the Farmers by Household Commercialization Indices

Table 5 presents the distribution of the Bambara nut farmers according to their Household commercialization indices. The household commercialization indices that range from 0 to 1 were converted to a percentage for easy understanding and interpretation. The maximum commercialization index achievable is 1 (100%) in a situation where the farmers did not consume or give Bambara nut as a gift. The household commercialization indices of the Bambara nut farmers ranged from 0 – 90.0%. The farming households whose household commercialization indices were 0 accounted for 2.5% of the

population. This implies that they grow Bambara nut mainly for household consumption (food, storage or gifts). The modal group had between 50.1 and 60% household commercialization indices. The farmers had an average household commercialization index of 56 percent. It was further revealed that 54.3 percent of the farmers had less than the average HCI, while 45.7 percent had more than or equal to the average HCI. The average HCI of 56% implies that the Bambara nut farmers still have a wide gap of 44% (100 – 56%) to attain full commercialization in the production of Bambara nut. This result implies that a little less than half (44%) of the Bambara nut produced by the farming households is consumed by the households, while the remainder (56%) is oriented towards the market for the general public through market forces.

Table 5. Distribution of the Farmers by Household Commercialization Indices

HCI	Frequency	Percentage	Minimum	Maximum
≤ 30.0	6	5.0	0	26.7
30.1 – 40.0	17	14.2	31.1	40.0
40.1 – 50.0	23	19.2	45.0	50.0
50.1 – 60.0	28	23.3	51.7	58.3
60.1 – 70.0	16	13.3	62.5	68.9
70.1 – 80.0	23	19.2	72.2	80.0
> 80	7	5.8	80.9	90.0
Sample Total:	240	100	0	90.0

3.4. Determinants of commercialization of Bambara nut production

The result of the Tobit model, determinants of commercialisation of Bambara nut production, is presented in Table 6. The model was significant at 1%, indicating its fitness. The result revealed that age, household size, access to credit, farming experience, the quantity of fertilizer used, and total farm output are significant factors that influenced the commercialization of Bambara nut production among the respondents.

The age of the Bambara nut farmers influenced the commercialisation of Bambara nut production negatively (P<0.01). This implies that aged farmers will have less Bambara nut output for public consumption. Thus, young, energetic, and economically active Bambara nut farmers would have more output for Bambara nut commercialization. This is because an increase in farmers' age reduces their strength and productivity (Mukaila et al., 2022).

Household size positively influenced household commercialisation of Bambara nut production (P<0.01). This implies that an increase in household size will result in a probability increase in output which will, in turn, lead to more Bambara nuts being sold in the market. This conforms with prior expectations. Most farming households employ the use of family labour; hence, an increase in the family size will provide manual and cheap labour to be utilized in their farming activities. This is logical as farming activities in developing countries, Nigeria inclusive, depend chiefly on physical strength (Mukaila et al. 2021a).

Farming experience also had a positive influence on household commercialization of Bambara nut production (P<0.01). This suggests that an increase in the number of years spent in the farming business increases the output and decision to commercialize. The experience acquired through time gives the farmers abundant knowledge on the most efficient practices that will yield the best output and as well inform their choice to become more market-oriented. Thus, well experienced Bambara nut farmers produced towards market orientation.

Access to credit was positive and significant at 10% in relation to household commercialization of Bambara nut production. This implies that the more access farmers have to credit facilities, the higher their degree of commercialization. Financial access and information also enhance investment and participation in agriculture (Achoja et al., 2020; Falola et al., 2022). Thus, access to credit paves the way for farmers to improve their production and as well channel their output to the markets for public consumption (sales). This is in line with the findings of Falola et al. (2017), who agreed that capital in the form of credit and other sources are an important stimulus and a key asset to the commercialization process of agriculture.

Furthermore, the coefficient for the quantity of fertilizer utilized in the production process was positively significant in relation to household commercialization at 5%. This implies that an increase in the quantity of fertilizer used will result in a considerable increase in the commercialization of Bambara nut production. This also conforms to *a priori* expectation as fertilizer aids the fertility of the soil on which farmers carry out their production activities; hence, an increase in the quantity utilized per production would increase their output which directly impacts the quantity of the produce channelled to the market for sales.

The result further shows that farm output was significant and positively related to household commercialization at 5%. This implies that an increase in farm output resulted in an increase in farmers' commercialization indices. This shows that an increase in total output will increase the quantity that is oriented towards the market.

The coefficient of distance to market had a negative and significant influence in relation to the commercialization of Bambara nut production at 1%. This implies that the farther the distance of the farm to the market, the lesser the farmers cultivate Bambara nut at a market-oriented level. This could be a result of high transportation costs and spoilage (post-harvest) due to a poor road network. Thus, farmers who had their farms closer to the market produced at a market-oriented level and consequently had a high level of commercialization.

Table 6. Factors affecting the level of commercialization of Bambara nut production

Variables	Coeff.	Std. error	T-value	P>t
Age	-0.0041***	0.0011	-3.86	0.000
Household size	0.0201***	0.0051	3.97	0.002
Level of education	0.0013	0.0067	0.19	0.849
Farming experience	0.0165***	0.0030	5.47	0.000
Farm size	0.0019	0.0077	0.24	0.812
Membership of Association	0.0059	0.0433	0.14	0.211
Access to credit	0.0734*	0.0402	1.82	0.071
Quantity of fertilizer	0.0009**	0.0003	2.53	0.042
Farm output	$5.92e^-06$**	$7.12e^-07$	2.14	0.034
Distance to market	-0.0004	0.0001	-3.04	0.003
Constant	0.9655***	0.1696	5.69	0.000
Pseudo R^2 = 0.7808				
Log likelihood = 21.63437				
Prob>chi2 = 0.0000 (59.83)				

Note: *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

3.5. Constraints to commercialization of Bambara nut production

Table 7 shows the constraints to Bambara nut production as perceived by the respondents. The table shows that the respondents agreed that inadequate access to loan/credit facilities was a severe constraint they faced in their production endeavours towards commercialization. Falola et al. (2022) agreed with the importance of capital in farming when they reported that capital accumulation is an important stimulus and a key asset to investment and commercialization. Furthermore, long-distance to the market and poor road network to transport produce to the market were also severe barriers to the commercialization of Bambara nut production. Market access is crucial to the commercialization process; therefore, the long distances to the market and poor road conditions are considered external factors which impact the farmer's decision to commercialize, thereby reducing the level of production and overall market participation. Also, the high cost of inputs (labour, fertilizer, pesticides, and herbicides) was a severe constraint farmers faced in the process of commercialization of Bambara nut production. Key assets for rural households include access to physical inputs like pesticides, herbicides, and labour, amongst others. Therefore, the high prices accruing to these inputs, whereas capital used for the production process by farmers is quite meagre constitutes a great barrier to farmers' decision and ability to produce more and increase orientation towards the market. İncidence of pests and diseases was a severe constraint farmers face in the process of commercialization of Bambara nut production. This supports the reports of Ibrahim et al. (2018) that Bambara nut production was faced with the challenge of incidence of pests and disease. Mohammed (2016) reported a similar result that the severe constraints

faced in Bambara nut production were inadequate capital, high cost of input, and incidence of pests and diseases.

Table 7. Constraints to commercialization of Bambara nut production

Constraints	Very severe	Severe	Moderately severe	Not severe	Mean	Remark
Inadequate access to credit or loan facilities	64 (53.3)	56 (46.7)	0 (0)	0 (0)	3.53	Severe
Long distance to market	22 (18.3)	84 (70)	14 (11.7)	0 (0)	3.07	Severe
Inadequate access to timely market information	8 (6.7)	13 (10.8)	61 (50.8)	38(31.7)	1.93	Not severe
Poor road network to transport produce	41 (34.2)	54 (45)	24 (20)	1 (0.8)	3.13	Severe
Restriction on land usage by land tenure system	4 (3.3)	0 (0)	22 (18.3)	94 (78.3)	1.28	Not severe
High cost of inputs	44 (36.7)	74 (61.7)	2 (1.7)	0 (0)	3.35	Severe
Incidence of pest and diseases	39 (32.5)	74 (61.7)	7 (5.8)	0 (0)	3.27	Severe
On-farm or post-harvest loss	4 (3.3)	46 (38.3)	45 (37.5)	25 (20.8)	2.24	Not severe

*Figures in brackets are percentages.

Conclusion

The study concludes that the current level of Bambara nut commercialization is relatively low. About half of the Bambara nut produced by the farmers is consumed, thereby reducing the quantity that is available for sales in the market, leading to the underutilization of Bambara nut. The production of Bambara nut at a more or less subsistence level by the farmers has contributed greatly to the side-lining of the food crop and its high level of underutilization among the populace. Thus, the commercialization of Bambara nut would enhance food availability and, consequently food security as the populace would have access to cheap and nutritious food (Bambara nut). The study also showed that access to credit facilities, farming experience, household size, fertilizer usage, and farm output enhance the commercialisation of Bambara nut production, while age is an inhibiting factor to commercialisation of Bambara nut production. This study further revealed that the constraints to market-oriented Bambara nut production include inadequate access to credit facilities, long-distance to markets, high cost of inputs, poor road network, and incidence of pests and diseases.

This study advocates that the government, non-governmental organizations, and agricultural policymakers should support the farmers with inputs at a subsidized rate to curb the incidence of pests and diseases, increase their level of production, and increase and improve the use of technology. This will subsequently improve market orientation and participation. The poor state of rural roads impeded greatly the decision of farmers to become more market-oriented as this increases the time it would take to get to the market and also increases the cost of transportation. Measures that will improve infrastructure (rehabilitation and/or construction of rural roads) should, therefore, be put in place. Subsequent provision of means of efficient transportation of farm produce to both rural and urban markets is also needed. This will improve the farmer's decision to commercialize as there will be a price incentive.

There is a need for more education and enlightenment on the use of improved technology which is a major prerequisite for transiting from subsistence to a commercialized form of agriculture. It is, therefore, necessary to provide farmers with the required knowledge and technical training on mechanized and improved methods of farming. Thus, effort should be made by the government and other relevant agencies to provide extension services to the farmers to provide necessary and relevant information on new technology and its usage amongst farmers. This will greatly improve the farmer's knowledge of the need and importance of improved methods of farming and consequently commercializing their production. Inadequate access to credit was discovered to be a major constraint of Bambara nut production, while it was also discovered that credit available to the farmers would increase their production hence, the decision to commercialize. It becomes imperative that capital sources for farmers be increased to increase production. Therefore, financial institutions, as well as the

government, should provide farmers with credit facilities. This will enable the farmers to gain access to assets that will be further used to expand their production.

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