

Social, Economic and Ecological Factors Influencing *Cassava* Farming in Nigerian Rural Context

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ABSTRACT

This study examined socio-economic and ecological factors influencing *cassava* farming, various products and benefits of *cassava* farming, challenges facing *cassava* farming, and governmental interventions geared toward promoting *cassava* farming in Nigerian rural context. Descriptive explanatory research design was adopted to collect primary data from *cassava* farmers in Kuje Area Council, Abuja. Purposive sampling technique was employed to select study sample, using semi-structured questionnaire and in-depth interview guide as research instruments. Quantitative data were analyzed using descriptive statistics, and qualitative data were analyzed using content analysis. The results demonstrated that various socio-economic and ecological factors influenced *cassava* farming in the study location. Also, findings showed that there were several final products and bi-products of *cassava* that served various socio-economic benefits. Lastly, the findings revealed that majority of the *cassava* farmers had not received any government intervention. Among the minority who had received government interventions, it was gathered that financial support, amenities and equipment, as well as seeds and new species were the major assistance rendered by the government. The study concluded that there were various socio-economic factors influencing *cassava* farming in the study location and recommended that soft loans, access to land, basic amenities and farm implements, small scale investment in *cassava* farming and favourable policies should be considered for *cassava* farmers especially in Nigerian rural areas.

HIGHLIGHTS

- ① *Cassava* serves various socio-economic benefits.
- ② There are social, economic and ecological factors influencing *cassava* farming in rural areas.
- ③ Rural *cassava* farmers experience various challenges.
- ④ Financial support, amenities and equipment, seeds and new *cassava* species were the main assistance rendered by the government to few rural *cassava* farmers.

Keywords: Development studies, *Cassava* farming, Governmental interventions, Reduced inequalities, Nigerian rural context, rural sociology

Cassava, also known as *Manihot Esculenta*, is a tuber crop that is being used as one of the basic and mainly consumed food in different countries. While it originated from Latin America, it was discovered by

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indigenous Indians about 4000 years ago (Ferguson *et al.* 2019; Otekunrin and Sawicka, 2019). Initially, it was discovered by European traders when they were in Central America. This crop was then taken to Asia and Africa (especially during the slave trade era). The origin of *cassava* could be traced to Transatlantic Slave Trade that took place among Africans, South Americans and Europeans and was diffused to other parts of the world especially Africa through globalization processes (Inegbedion *et al.* 2020; Oyekola, 2018; Eke-Okoro and Njoku, 2012). Specifically, *cassava* products were brought from South America to the Southern part of Nigeria by colonizers and explorers (especially the British and Portuguese) around the 16th century. By the turn of 19th century when industrialization was taken hold of human society including agriculture through the introduction of advanced processing techniques, the usage and importance of *cassava* increased drastically. Today, *cassava* crop is grown in virtually all areas of the world especially the tropic regions because of its nature, although not without the influences of some socio-economic and ecological factors.

The importation of *cassava* was majorly to serve as food security, aside other many benefits of *cassava* produce (Inegbedion *et al.* 2020; Otekunrin and Sawicka, 2019; Simonyan, 2014; Akinpelu *et al.* 2011). Also, some food items that are usually consumed such as tapioca flakes or garri, fufu, starch (*cassava*), *cassava* flour (for biscuit, bread, chips, etc.) are all end products of the *cassava* crop. Hence, being one of the products that has served as a major source of profit for farmers, unlike other tuber crop, *cassava* is a major cash crop for Nigerian rural farmers and a very pertinent aspect of agro-economic. Latest report as at 2017 shows that Nigeria is the largest producer of *cassava* in the world with 59 million tons of tuberous root production, representing about 20 per cent of global production (International Institute of Tropical Agriculture (IITA), 2021). *Cassava* is one agricultural produce that can generate foreign exchange for Nigeria, considering her place in production and exportation of *cassava* products across the globe. However, *cassava* farming in Nigeria, and especially in rural Nigeria, is facing various challenges and that have affected Nigeria's foreign exchange (Inegbedion

et al. 2020). Importantly, while *cassava* farming has been playing vitally important role in the survival of rural dwellers, there are challenges facing *cassava* farming in rural areas where substantial quantity of *cassava* is being produced (Shackleton, 2020; Food and Agriculture Organization, 2018), and if these challenges are not addressed, it can cause serious setback to social and economic development.

Existing studies have examined various challenges facing *cassava* transformation (Ekeleme *et al.* 2016). Some other studies have focused on technology adoption process in subsistence farming (Wossen *et al.*, 2019). Some more other studies have paid attention to the introduction and spread of *cassava* products in Western Nigeria (Inegbedion *et al.* 2020; Eke-Okoro and Njoku, 2012). In addition, while some extant studies have examined *cassava* utilization, storage and processing (Otekunrin and Sawicka, 2019); others have investigated the environmental factors influencing *cassava* production (Nwaobiala and Nottidge, 2013). Studies that examine social, economic and ecological factors influencing *cassava* farming in Nigerian rural context in a single study are emerging. Importantly, Kuje Area Council is noted to be a highly prominent *cassava* farming site for rural dwellers in Abuja. However, studies on the socio-economic and ecological factors influencing *cassava* farming are scanty in the area. Hence, this study aims at investigating social, economic and ecological factors influencing *cassava* farming and production in a Nigerian rural context: Kuje Area Council, Abuja. Specifically, various socio-economic uses of *cassava*, socio-ecological challenges of *cassava* farming and the roles of government and non-governmental actors in promoting *cassava* farming in Kuje Area Council, Abuja are examined.

Research Methods and Analyses

The study was carried out in Kuje area council, Abuja because it was an area that was dominated by agricultural activities especially *cassava* farming, and large range of farm land was accessible and available for farmers in the region (Yakasai, 2010). In addition, Kuje area council was with an estimated population of 97,367 in the year 2006 (Nigeria Data Porta, 2021), and

the indigenes of the area comprised Gbagy tribe, Gude people, Bassa, Hausa and Fulani all practicing *cassava* farming as dominant agricultural occupation, aside fishing, animal husbandry, palm tree plantation, rice and yam farming, among others. Descriptive explanatory research design was adopted to collect primary data on the social, economic and ecological factors influencing *cassava* farming as well as social-economic uses of *cassava* farming in the study area. The study population comprised *cassava* farmers in Kuje area council, Abuja because they are considered to possess requisite knowledge, skills and experience in *cassava* farming. A sample size of 121 respondents and 5 interviewees was selected using purposive sampling technique based on their vast experience in *cassava* farming. Gate-keeper who was residing in the community and was acquainted with the study location was instrumental in locating study sample. The research methods adopted were semi-structured questionnaire and in-depth interviews, and pre-tested questionnaire and in-depth interview guide were used as research instruments respectively. Quantitative data were analysed using descriptive statistics such as frequencies and percentages, and qualitative data were analysed using content analysis to decrypt underlying thought patterns and processes (Oyekola and Olajire, 2021). Study participants were duly informed about the purpose of the study and the confidentiality of their responses was ascertained.

Findings

Description of study Sample

The mean and median ages of the respondents were approximately 29 years and 23 years respectively. Also, the standard deviation of respondents' age was 10.9. Specifically, majority (56.2 per cent) of the respondents were between the ages of 16 and 25 years and a quarter (25.0 per cent) of them were between the ages of 26 and 35 years. In addition, 11.6 per cent represented the proportion of respondents who were between 36 and 45 years of age as well as between 46 and 55 years of age. Findings further showed that approximately half (50.4 per cent) of the respondents were males. In term of highest level of education attained, findings showed that majority (39.7 per cent) of the respondents had

Higher National Diploma (HND) or first degree such as Bachelor of Science (B.Sc.). Also, while almost one-third (32.2 per cent) of the respondents had Senior School Certificate (SSCE), 14.9 per cent of them had higher degree such as Post Graduate Diploma (PGD) and Masters of Science (M.Sc.). Furthermore, while 5.8 per cent of the respondents had either National Certificate Examination (NCE) or Ordinary National Diploma (OND), 7.4 per cent of the respondents had no formal education. Further investigation on the duration of their involvement in *cassava* farming showed that the involvement of the majority (85.1 per cent) of the respondents in *cassava* farming had been less than 11 years. Furthermore, while 9.1 per cent of the respondents had been involved in *cassava* farming practice between 11 and 20 years, 5.8 per cent of them had been practicing *cassava* farming for 21 years and above. More details of the study sample are presented in Table 1.

Table 1: Descriptive statistics of study sample

Independent variables	N	%
Age group		
16-25 years	68	56.2
26-35 years	25	20.6
36-45 years	14	11.6
46-55 years	14	11.6
Sex		
Male	61	50.4
Female	60	49.6
Highest educational qualification		
SSCE	39	32.2
NCE/OND	7	5.8
HND/B.Sc.	48	39.7
Higher degree	18	14.9
No formal education	9	7.4
Duration of involvement in <i>cassava</i> farming		
Less than 11 years	103	85.1
11-20 years	11	9.1
21 years and above	7	5.8
Total	121	100.0

Final and bi-products of cassava with various socio-economic benefits

Investigation was carried out on the final-products

and bi-products of *cassava* with their various socio-economic benefits and the results are presented in Table 2. Specifically, more than half (52.9 per cent) of the respondents claimed that *gari* or *cassava* flakes was one of the final farm products of *cassava*, and this final product could be used as food or sold in exchange for money. In addition, close to one-fifth (19.0 per cent) of the respondents affirmed that Tapioca (such as starch, *cassava* bread, chips, *et cetera*) was one of the final products of *cassava*, and it served various socio-economic benefits such as washing of clothes and social/economic exchange. In addition, while approximately one-tenth (9.9 per cent) of the respondents stated that 'fufu' (which was usually consumed as food) was one of the final farm products of *cassava*, 9.1 per cent of the respondents averred that African salad, which was also consumed as food, was one of the final farm products of *cassava*. Findings further showed other final farm products of *cassava* such as animal feeds, chemical catalyst/wall paper and paints, Aribo, and ethanol and sorbitol as these were supported by 4.1 per cent, 2.5 per cent, 1.7 per cent and 0.8 per cent of the respondents respectively. These final products of *cassava* served various social and economic benefits to the respondents. In addition, investigation was carried out on the farm bi-products of *cassava* and the results, as presented in Table 2, showed that tapioca (such as starch, *cassava* bread, flour, *et cetera*) was considered one of the bi-products of *cassava* as affirmed by 28.9 per cent of the respondents. Also, while 18.2 per cent of the respondents considered 'fufu' as one of the bi-products of *cassava*, 17.4 per cent of the respondents considered *gari* as one of the bi-products of *cassava* farming. Furthermore, manure, animal feeds and *cassava* stick and peels as well as eating of raw *cassava* were considered another bi-products of *cassava* farming, and each was affirmed by 13.2 per cent of the respondents. Lastly, while 5.0 per cent of the respondents considered glue as one of the bi-products of *cassava*, 4.1 per cent of the respondents considered Abacha as one of the bi-products of *cassava*. These bi-products continued to serve various social and economic benefits among the respondents, thereby ensuring the continuity of *cassava* farming in the study location.

Table 2: Final-products and bi-products of *cassava* with various socio-economic benefits

Final-products and bi-products of <i>cassava</i> with various socio-economic benefits	n	%
Final farm products of <i>cassava</i>		
<i>Gari/Cassava</i> flakes	64	52.9
<i>Fufu</i>	12	9.9
Animal feeds	5	4.1
African salad	11	9.1
Tapioca (Starch, <i>cassava</i> bread, chips, etc)	23	19.0
Ethanol and sorbitol	1	.8
Chemical catalyst/wall paper and paints)	3	2.5
Aribo	2	1.7
Farm bi-products of <i>cassava</i>		
Tapioca (starch, <i>cassava</i> bread, flour, etc.)	35	28.9
<i>Fufu</i>	22	18.2
<i>Gari</i>	21	17.4
Manure, animal feeds and <i>cassava</i> stick and peels	16	13.2
Abacha	5	4.1
Glue	6	5.0
Raw <i>cassava</i>	16	13.2
Total	121	100

Challenges facing *cassava* farming and production

This section explains the challenges facing *cassava* farmers during *cassava* farming and production. The findings, as presented in Table 3, showed that more than one-fifth (26.5 per cent) of the respondents considered lack of loans as the major challenge facing *cassava* production. Also, while 13.2 per cent of the respondents affirmed that inadequate farmland was one of the challenges facing *cassava* production, 12.4 per cent of the respondents posited that pest and disease ravaging farmland was another challenge facing *cassava* farm production. Inadequate transportation of farm-produce to areas where they would be needed as well as inadequate labour supply were considered another challenges facing *cassava* production as each of these was supported by 10.7 per cent of the respondents. Socio problem and climatic change were other challenges facing *cassava* production and these were affirmed by 5.8 per cent of the respondents and 3.3 per cent of the respondents respectively. Other challenges such as man and animal invasion, inconsistency in government

policies, and lack of access to competitive market were identified in the study as facing *cassava* production. A 32-year old female interviewee that has practiced *cassava* farming for 4 years said:

After farming, we need to transport our cassava to urban areas and settings. However, bad roads and fuel hike/ scarcity were major challenges. So the government should provide good roads for ease of transportation and provision of large expanse of land for commercial farmers. Also, inadequate farmlands, was a challenge especially to we women.

A 29-year-old male *cassava* farmer with 3 years of experience considered soil fertility to be another challenge facing *cassava* farmers in the study location. He said, *cassava* farmers need to ‘consider the land that will make the *cassava* grow well’ to know whether ‘the land is fertile enough or would be able the grow the *cassava* well’.

Table 3: Challenges facing *cassava* production

Challenges facing <i>cassava</i> production	n	%
Lack of loans	32	26.5
Inadequate farmlands	16	13.2
Inadequacy in transportation	13	10.7
Inadequate labour supply	13	10.7
Climatic change	4	3.3
Soil problem	7	5.8
Pest and diseases	15	12.4
Others such as man and animal invasion, inconsistency in government policies, and lack of access to competitive market	21	17.4
Total	121	100

Solutions to challenges militating against cassava production

This section explains suggestive solutions to challenges militating against *cassava* production and the results are presented in Table 4. Findings showed that 77.7 per cent of the respondents had no solution to proffer to the challenges militating against *cassava* production. However, 22.3 per cent of the respondents provided solutions to the challenges militating against *cassava* production. Among those who provided solutions to

the challenges militating against *cassava* production, 29.6 per cent of them claimed that provision of amenities and infrastructural facilities as well as provision of loans were two of the solutions to the challenges militating against *cassava* production. Moreover, 14.9 per cent of the respondents stated that increased awareness on *cassava* farming would help to address the challenges militating against *cassava* production. In addition, use of chemicals, and provision of and access to farmland were considered two of the solutions to the challenges militating against *cassava* production and these were affirmed by 11.1 per cent each of the respondents who provided solutions to the challenges militating against *cassava* production. Lastly, 3.7 per cent of the respondents posited that formulation of favourable farm policies was another solution to the challenges militating against *cassava* production.

Table 4: Solutions to challenges militating against *cassava* production

Any solutions to challenges militating against <i>cassava</i> production	n	%
Yes	27	22.3
No	94	77.7
Total	121	100
Solutions to challenges militating against <i>cassava</i> production		
Provision of amenities and infrastructural facilities	8	29.6
Use of chemicals	3	11.1
Provision and access to farmland	3	11.1
Provision of loans	8	29.6
Increased awareness	4	14.9
Formulation of favourable farm policies	1	3.7
Total	27	100

Governmental interventions towards cassava farming

Respondents were asked whether they have enjoyed any government assistance regarding their *cassava* farming and the results of this investigation are presented in Table 5. The results in the table show that majority (87.6 per cent) of the respondents had not received any government intervention towards *cassava* farming. However, 12.4 per cent of the respondents stated that they had received governmental intervention towards

cassava farming. Various governmental assistance was further investigated and the findings showed that financial support was one of the governmental interventions enjoyed by *cassava* farmers as this was affirmed by three-fifth (60.0 per cent) of the respondents who claimed they had received government assistance towards *cassava* farming. Also, two-fifth (40.0 per cent) of the respondents stated that provision of amenities and equipment was another governmental intervention enjoyed by *cassava* farmers. From the findings, it could be deduced that government intervention towards *cassava* farming had no significant impact on *cassava* farmers since majority of them did not receive such assistant. Additionally, a 25-year-old female *cassava* farmer said:

Government gives seeds, new species, and new product. ...sometimes they [governments] give supplies and ask for the bi-product like garri, then buy it from the farmers. They [governments] don't give land, but money and fertilizer. Although the money they give is very small, the thing government can do is to increase what is being given.

Table 5: Governmental interventions towards *cassava* farming

Any governmental interventions towards <i>cassava</i> farming	n	%
Yes	15	12.4
No	106	87.6
Total	121	100
Governmental interventions enjoyed		
Provision of amenities and equipment	6	40.0
Financial support	9	60.0
Total	15	100

Ways through which government agencies could assist *cassava* farming

Various ways through which government agencies could assist *cassava* farming were examined and the results are presented in Table 6. According to the results, provision of loan and capital was the major way through which government agencies could assist *cassava* farming as this was affirmed by majority (40.5 percent) of the respondents. Another way through which government agencies could assist *cassava* farming was through the provision of infrastructure, modernized machines and *cassava* farm inputs and this was supported by approximately

a quarter (25.6 per cent) of the respondents. Moreover, formulation of favourable agricultural policies was identified as another way through which government agencies could assist *cassava* farming and 8.3 per cent of the respondents affirmed this. Furthermore, 7.4 per cent of the respondents each claimed that increase in palliatives given to *cassava* farmers and creation of job opportunities through *cassava* farming were other ways through which government agencies could assist *cassava* farming. In addition, 6.6 per cent of the respondents stated that provision of subsidy on *cassava* farm inputs was another way through which government agencies could assist *cassava* farming. Lastly, 4.1 per cent of the respondents claimed that small scale investment on *cassava* farming was an important way through which government agencies could assist *cassava* farming.

Table 6: Various ways through which government agencies can assist *cassava* farming

Various ways through which government agencies can assist <i>cassava</i> farming	n	%
Provision of loan or capital	49	40.5
Provision of infrastructure, modernised machines and inputs	31	25.6
Provision of subsidy on farm inputs	8	6.6
Small scale investment on <i>cassava</i> farming	5	4.1
Increase in palliatives given to <i>cassava</i> farmers	9	7.4
Creation of job opportunities through <i>cassava</i> farming	9	7.4
Formulating favourable policies	10	8.3
Total	121	100

DISCUSSION

This study examined the socio, economic and ecological factors influencing *cassava* farming in *kuje* area council, Abuja with the aim of finding out the various socio-economic uses of *cassava*, examining various socio-economic and ecological challenges of *cassava* farming, as well as inquiring the roles of government in promoting *cassava* farming. As indicated by the age group, youths dominated *cassava* farming practice in the study location and they engaged in the practice in less than eleven years. This shows that youths are becoming

conversant of the need to engage in agriculture for economy diversification. Also, their involvement might have resulted from various socio-economic benefits of *cassava* farming. Based on the study carried out, there were several final products and bi-products of *cassava* that served various socio-economic benefits. According to the findings from the research, *cassava* could be used for gari, tapioca (starch, *cassava* bread, chips, among others), *fufu*, African salad, animal feeds, chemical catalyst/wall paper and paints, aribo (that can be used to make solid foods like semolina), as well as ethanol and sorbitol. These findings confirm the findings of existing studies on the uses of *cassava* which also affirm that *cassava* can be used for ethanol production, breads, cakes, fries, and noodles (Kennedy *et al.* 2019; Shigaki, 2016). In addition, it was found that tapioca, *fufu*, *gari*, manure, animal feeds and *cassava* stick and peels, eating of raw *cassava*, glue, and Abacha were bi-products of *cassava*, with various socio-economic benefits. These findings are in line with the findings of existing studies (Waisundara, 2018; Odoemenem and Otanwa, 2011; Yakasai, 2010). These final and bi-products of *cassava* served as income for farmers and seller, as well as for household uses and food, textile industries, and food companies. Aside the human uses, *cassava* is also important for animal as it is used for feeds in animal husbandry or domestic animals.

Various socio-economic and ecological challenges of *cassava* farming were also examined and the results showed that man and animal invasion, inconsistency in government policies, lack of access to competitive market, lack of loans for *cassava* farmers, inadequate farmlands, inadequacy in transportation, inadequate labour supply, pests and diseases, soil problem, climatic change, communal conflict/land disputes as well as women dominance in *cassava* farming were identified in the study as challenges facing *cassava* farming and production. These findings support the findings of existing studies who found various social, economic and ecological factors influencing *cassava* farming such as farm size, *cassava* cuttings, literacy level, availability of fertilizer, climatic change, female dominance in agriculture, and land disputes (Olaosebikan *et al.* 2019; Itam *et al.* 2018; Nwaobiala and Nottidge, 2013; Yakasai,

2010; Nweke, 2004; Polson and Spencer, 1991). Women dominance in *cassava* farming was most likely because the *cassava* bi-products were usually processed by women, although large number of male labourers may be required when the work is intense. These findings confirm the findings from existing studies which stated that *Cassava* farming was dominated by females among the adopters and non-adopters of *cassava* farming (Olaosebikan *et al.* 2019; Itam *et al.* 2018; Yakasai, 2010). The involvements of majority female *cassava* farmers have created limitations of *cassava* farming in the study area, as most female farmers do not have access to land. In other words, land was owned majorly by men who participated less in *cassava* farming. *Cassava* farming was one of the occupational lifestyles of these females, but they lack the capital to invest in their farming practices for increased *cassava* production, thereby widening gender inequality gap and creating social inequality (Oyekola and Oyeyipo, 2020). Balancing the tedious farming practices with the role of being a woman in the society can be too stressful for the female farmers and it can create a slack in performance.

Furthermore, solutions to challenges militating against *cassava* production were provided. Some of these solutions included provision of amenities and infrastructural facilities to *cassava* farmers, provision of loans to support *cassava* farming, increased awareness on the importance of *cassava* farming, use of chemicals to kill and prevent pests and diseases, provision and access to farmland for *cassava* farming, as well as formulation of favourable farm policies towards enhancement of *cassava* farming. Existing studies have also suggested the need for redesigning effective implementation of already existing policies aimed at improving farmer's education and providing soft loan in order to increase their level of awareness and participation in *cassava* farming (Itam *et al.* 2018; Ekeleme *et al.* 2016; Odoemenem and Otanwa, 2011). Majority of the *cassava* farmers in the study location relied on crude farming implements which in turn reduced productivity; there is therefore urgent need for mechanization that will encourage large scale farming in the region as this will boost *cassava* productivity. Importantly, provision of agricultural amenities, infrastructural facilities, soft

loans and *cassava* farm chemicals among others are germane for enhanced *cassava* productivity.

In addition, the roles of government in promoting *cassava* farming cannot be over emphasised. It was evident that there were actually governmental interventions toward *cassava* farming in the study location, although not sufficient to promote *cassava* farming. Suggestions were therefore made on various ways through which government could intervene so as to promote *cassava* farming in Nigeria rural contexts. Importantly, it was found that provision of loan or capital for *cassava* farming, provision of infrastructure, modernised machines and *cassava* farming inputs, formulation of favourable policies towards effective and profitable *cassava* farming, increase in palliatives given to *cassava* farmers, creation of job opportunities through *cassava* farming, provision of subsidy on *cassava* farm inputs, as well as engaging in small scale investment on *cassava* farming were ways through which government could intervene to promote *cassava* farming. In the findings of Eke-Okoro and Njoku (2012), Odoemenem and Otanwa (2011) and Yakasai (2010), provision of start-up capital, provision of soft loans and accessible roads to ease transportation cost, among others, were considered very important ways through which government agencies could assist *cassava* farmers. Government therefore has a vitally important role to play in promoting *cassava* farming in rural areas as this will further boost foreign exchange and better the lives of rural *cassava* farmers.

CONCLUSION AND RECOMMENDATIONS

The study concluded that social, economic and ecological factors influenced *cassava* farming. Also, the socio-economic uses of *cassava* were vast. However, *cassava* farmers always experience various challenges ranging from social, economic and ecological challenges, although not without suggestive solutions, of which, governments have key roles to play. This study therefore recommends that proper measures should be put in place by *cassava* farmers in order to address any social, economic and ecological challenges that may surface. Also, women should be allowed to inherit and own lands so as to enhance their *cassava* farming processes. Lastly, it was recommended that *cassava* farmers should

be given soft loans with considerable interest, provided with basic amenities and sufficient palliatives in order to enhance *cassava* farming and production.

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