



(REVIEW ARTICLE)



Cassava value chain and food security issues in Nigeria: A Case Study of IFAD-VCDP Intervention in Taraba State

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GSC Advanced Research and Reviews, 2021, 06(03), 019–028

Publication history: Received on 26 January 2021; revised on 28 February 2021; accepted on 02 March 2021

Article DOI: <https://doi.org/10.30574/gscarr.2021.6.3.0029>

Abstract

Nigeria is the largest cassava producing country in the world. Taraba state is one of the top 5 leading producers of cassava in Nigeria. Despite its large scale production of the crop, most existing literatures covers cassava production in the southern forest belt of the country, with little or not much on cassava production in Taraba State. It is against this background that the study examines cassava value chain and food security issues in Nigeria using the case of International Fund for Agricultural Development (IFAD) value chain development programme (VCDP) intervention in Taraba State Nigeria. Cassava is generally produced as food crop and industrial raw material for starch, high quality cassava floor, ethanol, cassava chips and pellets. A number of constraints in the cassava value chain emerged which were not initially foreseen. An innovation fund was approved in 2012 to allow the programme to respond to these challenges. Value addition to local cassava is essential, to reduce the bulkiness of fresh tuber, minimize post-harvest loses, increase shelf life, stabilize product prices and facilitate easy transportation from farm to local or urban markets. The data for this study were generated through secondary (desk) research and archival materials. The findings of the study reveals that IFAD-VCDP intervention only covers 5 LGAs in Taraba State (Takum, Gassol, Wukari, Ardo-kola and Karim-Lamido LGAs). Towards the end of the year 2020, 3 additional LGAs were added which include Bali, Jalingo and Donga LGA. The programme was able to carry out sensitization of stakeholders and training of about 30 leaders of farmer organizations (FOs) in each of the selected LGAs. The programme trained farmers on how to develop appropriate and usable business plan, financial management and record keeping systems. About 25 participating farmer groups were able to access credit from financial institutions, 24 groups received inputs in cassava production. Some of the challenges include inadequate funding, lack of adequate support to the marketing component, inadequate clean water and lack of improved mechanized cassava processing equipment. Based on the findings, the study recommended increase support for cassava marketers, financial linkages and establishment of more cassava processing centres.

Keywords: Cassava; Food security; IFAD; Taraba State and Value chain

1. Introduction

Cassava is grown for use as food in many African countries including Nigeria. It is a high yielding and drought resistant crop and with improved pest management practices, its high yielding capacity could be sustained (Cock, 1985 in Oyegbami et al, 2010). In Nigeria, cassava plays a very important role in the food economy (Agwu et al, 2007). Consequently, Nigeria is the largest cassava producing country in the world with an annual estimate of 39 million tones (Central Bank of Nigeria, 2003). Nigeria's production accounts for 19% of the world output and 34% of Africa's output (Okoro et al, 2005). According to Nweke et al (2002) eighty percent of Nigerians in the rural areas eat cassava meal at least once a week and majority eats cassava at least once a day; hence it plays a major role in the country's food security. As a crop whose by-products have a wide range of uses, cassava is the most important food crop for Nigeria by production quantity next to yam, which is the most important food crop by value (FAOSTAT, 2012). Nigeria is the

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world's largest producer of cassava with other top producers being Indonesia, Thailand, the Democratic Republic of Congo and Angola. It has been estimated that in 2010 Nigeria's production of cassava reached 37.5 million tonnes, FAOSTAT (2012). In Nigeria, there are two main group of cassava varieties produced; *Manihot palmata* and *Manihot aipi*, or bitter and sweet cassava respectively (Nwabueze, 2011). Cassava production in 2010 has reached about 37.5 million tonnes while yield and area values reached 12 tonnes per hectare and 3.13 million hectares respectively (FAOSTAT, 2012).

Global demand for Cassava products (flour, starch, ethanol, chips & pellets) runs into several billions of dollars in transaction value with China leading the demand pack at 60% of total imports (Business a.m., 2019). Other cassava import destinations could be found in North America, Europe and so on. The local demand value for cassava is projected to hit over \$8 billion in 2022 while global value for exports was put at \$51 billion as at 2013 (Business a.m., 2019).

Cassava industry is still very attractive, both locally and globally. Cassava has both traditional and industrial application. Traditionally, it is consumed as food in form of fufu or further processed into garri for consumption. The industrial application for cassava includes production of starch, high quality cassava flour (HQCF), ethanol, cassava chips and dried pellets. Cassava leaves are nutritious vegetables and can be used as animal feed. The stem can be sold as planting materials. In order to grow a healthy cassava, improved package of practices relating to plant production and protection are required. These include site selection, soil improvement, variety and planting materials selection, planting and post planting measures against weeds, pests and diseases.

There is also large importation of processed starch which are sold by various supermarkets, as well as ethanol and other cassava derivatives into Nigeria. These are opportunities for local investments. Agricultural production, marketing and trade serve as major sources of employment, income and foreign earnings before Nigeria became independent. The agricultural sector provided the basis for the agro-industrial development and contributed significantly to the commercialization, monetization and integration of rural sector.

Consequently, value addition to local cassava is essential, to reduce the bulkiness of fresh tuber, minimize post-harvest loses, increase shelf life, stabilize product prices and facilitate easy transportation from farm to local or urban markets. The limitation in value addition in smallholder agriculture in Nigeria is a factor that has continually reduced the potential of the agricultural system to be a major player in the global cassava bioeconomy. The limitation is a result of many interwoven and sequential variables. Perhaps the main challenge is lack of access to market by smallholder farmers in general and cassava farmers in particular (Rubin, Manfre & Barret, 2009). This has also been attributed to a lack of standardization of products and, hence, low competitiveness within the commodity market, which is also linked to inadequate infrastructure and technology. This has resulted in the continued classification of smallholder as subsistence with low production capacity and income. Hence, a cassava smallholder is mainly interested in selling his roots as fast as possible, while processing just enough for the subsistence of the farm family.

In November 2009, the Ministry of Foreign Affairs awarded a grant of 6 million Euro's for implementation of a public private partnership (PPP) program 'Helping Farmers Produce Cassava for Profit' (Cassava+). IFDC assists farmers to gain access to improved cassava varieties, fertilizer, appropriate crop protection products, and train farmers, agro-input dealers and other farm service providers in better farming practices to increase production levels such that more income is generated through cassava production systems. A number of constraints in the cassava value chain emerged which were not initially foreseen. An innovation fund was approved in 2012 to allow the programme to respond to these challenges.

Most of the cassava produced are processed at the village-level into a wide array of products using simple tools and techniques. In general, there are three main avenues by which cassava and its by-products reach the end markets: small-scale production for traditional food; medium scale production for more processed food products; and large-scale production for industrial products (Asante-Pok, 2013). Constraints in cassava production include a wide range of technical, institutional and socioeconomic factors. These include pests and diseases, agronomic problems, land degradation, shortage of planting materials, access to markets, limited processing options and inefficient/ ineffective extension delivery systems.

Cassava is one of the most common food crops grown and consume in many parts of Taraba State. The crop grows well in various soil types and ecological zones. It can be planted alone or in association with many other crops like maize, groundnut, and vegetables. Growing cassava is not very labour intensive. The roots can be harvested between 9 to 18 months after planting. Under traditional farming practice, one can expect between 8 and 15 tonnes of storage roots per hectare of land planted, but with improved technology one can expect between 20 to 45 tonnes of roots per hectare of land planted only with cassava. Even under harsh environmental conditions, cassava can provide some amount of food

when other crops fail. Taraba state is one of the top 5 leading producer of cassava in Nigeria. Others are Benue state which accounts for 11.08% of Nigeria's production of cassava and Kogi, Imo, and Cross River states. Despite its large scale production of the crop, most existing literatures covers cassava production in the southern forest belt of the country, with little or not much on cassava production in Taraba State. It is against this background that the study examines cassava value chain and food security issues in Nigeria using the case of International Food and Agricultural Development (IFAD) value chain development programme (VCDP) intervention in Taraba State Nigeria.

2. Conceptual Clarifications

2.1. Value chain

A value chain is the set of activities that a firm performs in order to deliver a valuable product or service for the market (De Marchi et al, 2018). Along the chain, value is added which give such product a competitive advantage in terms of quality and attracting a higher price at the market (Gereffi, 2018). In other words, a value chain is a series of activities or processes that aims at creating and adding value to an article (product) within it, analyzing the opportunity cost of the new sequence along the product worth (Lee et al, 2018). Thus, making the concept of value chains as decision support tools and competitive strategies paradigm. The study deduced that value chain analysis (VCA) can instill competitive advantage because the essence of adding value along the chain is to gain a competitive control. Using cassava as a case, the study explored the competitiveness of VCA which can be a useful approach in developing strategy for pro-poor and gender perspectives.

Table 1 Cassava Value Chain Segment

SN	Stages	Activities
1	Inputs: this stage is concern with sourcing of raw materials required for cassava production	Seedling Supply Fertilizer Herbicides/Pesticides Farm Hardware Advisory Service Financing Crop Protection Insurance
2	Production and Logistics: This covers primary production of raw commodity, storage and sale	Cultivation Collection and Aggregation Storage Retailers Financing
3	Processing and Packaging: This stage involves the transformation of cassava raw materials into one or more finished internationally traded goods	Financing Equipment Manufacturing Freight and Logistics Safety Services
4	Sales and Distribution: This stage is concerned with the delivery of traded commodities to their final destination	Freight and Logistics Marketing

Value chain enterprise and development procedure has been adduced to be a pro-poor economic development and well matched to tackling gendered market. There are two concerns to this approach (Tell et al, 2016). Firstly, it has economic feasibility and sustainability at its central and aspires for win-win results for all contributors. Secondly, it is a robust

qualitative analytical instrument that is efficient, if used skillfully, recognizing critical issues and creating robust operational policies (Linda et al, 2019). In addition, the study conceptualized that inculcating the benefit of a solid cassava product value chains enterprise can help rural populations to transit out of subsistence to commercial farming. The significance of small farm development in cassava production and value chain enterprise in cassava products is a very important potential source of pro-poor growth (Breisinger and Diao, 2008; Wu et al, 2014).

2.2. Cassava Value Chain in Taraba State

Cassava value chain entails the entire range of goods and services required for a cassava product to move from the producer or farm to the final consumer. It links the steps a product takes from the farmer to the consumer. It includes research and development, input, production, processing, marketing and finance (Table 1). The nature of agricultural development and the way food is produced, processed and sold is changing rapidly. Consumers increasingly want safe, higher value and varied agricultural products. This is creating opportunities for players along cassava value chains to transform commodities into higher value products, a process that can play an important role in eradicating poverty.

2.3. Production and Profitability of Cassava among Smallholders

Since profit is a major driving force in any investment; it is an indicator that will encourage or discourage participation. Profitability is the key to sustainability of agricultural innovations. Olomola (2007), in analyzing the value chain of cassava, cotton, maize, rice, soyabeans and sugarcane industries, placed cassava as third after rice and maize based on operating profit. In terms of yield, cassava is by far ahead of other crops. It is observed that cassava is a competitive commercial agricultural crop with attendant benefits to its farmers, processors, marketers and consumers (Ani, Ojila and Abu, 2019).

The net profits derived from processing cassava into garri, chips and fufu/akpu vary significantly. Moreover, the result of Ani, Ojila and Abu (2019) finding shows that garri's profit is significantly higher than both chips and fufu/akpu. However, between chips and fufu/akpu, fufu/akpu's profit is higher than that of chips although the difference is not significant. In other words, among the three cassava products they investigated, garri had the highest profit while chips had the least profit.

The business of cassava production was found to be profitable with total revenue of N174,231.81, average profit of N54,069.57 and gross margin of N62,449.11 per hectare. The study findings by Ani et al (2019) revealed that net return of the farmers is affected positively by the use of fertilizer, price per cassava truck and the total revenue. On the other hand, cost of ridge making, cost of land clearing, cost of weeding, type of labor used, cost of feeding, cost of cassava stem cutting, and cost of transportation to point of sale were negative and significant to the net return (Ogunleye, Adeyemo, Bamire and Kehinde, 2017).

There are different cassava varieties cultivated across Taraba State. However, IFAD-VCDP only promotes TME 419 cassava variety because of its high economic benefits such as high resistance to pest, high yielding capacity and ability to adapt to unfavorable environmental conditions. The cassava production in the selected LGAs are given as follows;

Table 2 Cassava production in the study area.

S/N	LGA	Cassava prodn (in metric tons per hectare)
1	Karim Lamido	25
2	Jalingo	4
3	Ardo Kola	Farmland destroyed by grazing animals
4	Bali	No record
5	Wukari	33

Source: EVL (2020)

2.4. Stages of Processing Cassava into Garri

Raw cassava is transformed into garri through peeling, liquid extraction, drying, frying etc (Table 3). It is often in response to the consumer or market requirement.

Table 3 Cassava Processing.

SN	Process	Description
1	Peeling	Removal of the outer thin papery layer and the leathery tough inner layer. Peeling can be carried out mechanically or manually
2	Washing	To remove sand and other particles from the peeled roots. Washing in most processing facility is done before and after peeling
3	Grating	The washed tubers are taken to the Hammer Mill where they are grated
4	Fermentation	This is the heart of garri processing because it is where the acid (HCN) is detoxified and removed to make the garri edible
5	Dewatering or Pressing	Fermented mash in bags are stacked in the hydraulic jack press and pressed mechanically to squeeze out the remaining fermented liquor
6	Disintegration or Sieving	This is breaking up the dewatered mash into small lumps
7	Roasting	Dry-frying the particle to make granules (garri)
8	Cooling	Cooling of fried granules to cool
9	Sieving or Grading	Garri is further sieved to obtain uniform particle sizes
10	Packaging	Garri is put in packages for the consumers

2.5. Technical Efficiency and Value Addition among Smallholders

Ater and Umeh (2003), Ewaonicha (2005) and Amao et al (2011), reported that small-holder cassava farmers with many years of experience are in better position to be more technically efficient than their counterparts with few years of experience or none. This is because farmers with more years of experience have better knowledge in allocating resources and are expected to run a more profitable enterprise.

It has been observed that cassava production in Nigeria has been characterized by burst-boom cycle due to unstable price and low productivity (FMARD, 2011; Oludiran, 2012). Moreover, access of processors to fresh tubers is hindered by poor road and transportation infrastructure.

Contrary to a priori expectation, access to credit tends to reduce efficiency of processors significantly; which may be an indication of discouragement or disenfranchisement on the part of the processors due to policy inconsistencies such as failure of government to enforce the policy of 10% inclusion of HQCF in bread flour which has left several small processors with unsold inventories and farmers with nowhere to sell their cassava harvest (FMARD, 2011; Oluwemimo, 2006).

Dzever, Ayoola, Alakali, Ater, Sanni, Ngadi and Kok (2016) reported that raw cassava tubers and capital inputs positively and significantly affect HQCF output, while diesel was significantly negative. Similarly, gender and processing experience were factors that significantly promote technical efficiency of cassava processors, while access to credit increases their technical inefficiency.

3. Material and methods

The data for this study were generated through secondary (desk) research, to identify existing literature on cassava production potentials of Taraba state and past production in the area. This include information from archival records of government agencies and IFAD-VCDP State Programme Management Unit Jalingo, Taraba State. Field observation and interview of key informant was used to obtain additional information. Content analysis method was used to analyze the data generated.

4. Result of the Findings

4.1. IFAD-VCDP intervention in cassava production in the study area

At the commencement of IFAD-VCDP activities in the state in 2015, the programme embarked on sensitizing and profiling stakeholders and various farmers group for involvement in its activities. At the commencement of the programme, 5 LGAs were selected from each participating State in Nigeria. In Taraba state, the selected 5 LGAs were Takum, Gassol, Wukari, Ardo-kola and Karim-Lamido LGAs. Towards the end of the year 2020, 3 additional LGAs were added which include Bali, Jalingo and Donga LGA (IFAD-VCDP, 2020).

The LGAs were selected based on the comparative advantage they have in cassava production. The selection of farmers was based on cooperative societies with membership of minimum 10 and maximum 25, engaged in cassava farming (between 1 to 5 hectares), processing or marketing (IFAD, 2015).

The IFAD-VCDP intervention was aimed at providing capacity building to benefiting farmers' groups in order to establish a strong exit and sustainability strategy. In pursuit of this goal, the program adopted several approaches. This include sensitization of stakeholders. The programme had 14.4% and 36.3%, respectively of women and youth participation. This was followed by training workshops which focused on two thematic areas (i) group dynamics, good governance and development and (ii) record keeping, business management, management of common resources, linkage and advocacy, respectively were organized for the groups. The programme was able to train about 30 leaders of farmer organizations (FOs) in each of the LGAs.

The programme trained farmers on how to develop appropriate and usable business plan, financial management and record keeping systems. The participants were assisted on how to draft group vision, mission, activities, roles etc. The participating farmers were also assisted with respect to access to credit (25 groups have so far accessed credit from financial institutions), inputs (24 groups received inputs in cassava), about 225 farmers got inputs from about 100 groups) and markets amongst others.

The training and guidance on savings mobilization has led to significant improvement of savings of the groups to N173.381,000 (one hundred and seventy-three million, three hundred and eighty-one thousand naira) against the record of about N76.6m (seventy-six million, six hundred thousand naira) as at June, 2018. Similarly, some of the groups that were operating without individual or group bank accounts have been linked to banks and 68.88% of FO members now have individual bank accounts with Biometric Verification Numbers (BVNs). The IFAD-VCDP programme engaged the service of a private extension service provider, Egalf Ventures Limited (EVL) to strengthen farmer organizations and provide extension service support to the farmers in Taraba and Benue States.

4.2. Cassava Products for Human and Industrial Uses

Cassava is use in making ethanol, starch, bread, ice cream, white Maggi, jams, sweets, gums, stamps, envelopes, animal feed etc. (plates 1 & 2)



Plate 1 Utem MPCs, a cassava processing group in Wukari LGA



Plate 2 TME 419 Cassava at VCDP Demonstration Plot in Gassol LGA

4.3. Challenges of IFAD-VCDP Interventions in the Study Area

- The first challenge of IFAD-VCDP intervention in the study area was the inability of the programme to meet its targeted population of women and youth participation. The low enrolment of women and youth into the programme was as a result of their inability to pay the matching grants expected of beneficiaries, access to land and labour.
- Low literacy levels of women in particular make them shy away from opportunities provided by the IFAD-VCDP intervention in the area. The study area has high rate of adult illiteracy rate especially among the women.
- Although the producers were the major beneficiaries of the programme, the marketing component suffered much neglect owing to little or lack of any noticeable support. Most cassava farmers experience lower product price for products. These lower prices can be attributable to the activities of middlemen exploitation, product value chain, poor market infrastructure as they are restricted to the on-farm sale of fresh roots (Olaosebikana et al, 2019).
- While only about 37.4% of the FOs were considered strong, 34.6 per cent of them fall within the moderate category and 28% are considered emerging. Generally, more time and guidance are required to get most of the groups (especially those in the emerging and moderate categories) to the level where they can take responsibility for their own development.
- Inadequate funding; the high interest rate demanded by most of the financial institutions made it difficult for the farmers to access credit facilities as the loans were unattractive. The major challenge was in the interest rates, rather than willingness to serve. Lack or poor access to credit has been cited in several studies (Doss, 2003; Acheampong, 2015) as a key constraint limiting new technologies/improved seeds for increased production.
- High cost of transporting fresh roots from farm to processing centers/home and then to the markets due to bad road network is affecting cassava production. This position was corroborated by the findings of Akinragbe (2010) and Olaosebikana et al (2019).
- Inadequate clean water supply: most times where there is access to clean portable water for processing activities such as washing and soaking of peeled tubers, it is usually distant which poses security risks for women (Olaosebikana et al, 2019). In communities that do not have access to borehole water, other sources like wells often do not provide enough water during the dry season and the water is difficult to fetch and bring up.
- Lack of improved mechanized cassava processing equipment. Large percentage of harvested cassava roots are processed into garri with simple implements especially in Takum, Gassol, Wukari and Ardo-kola LGAs.

5. Conclusion

The study has examined cassava value chain and food security issues in Nigeria using the case of IFAD-VCDP intervention in Taraba State. The development of sustainable value chain processes is expected to influence business opportunities and enhanced competitive advantage in cassava production. Value chain processes create shared value between business and society.

Policies that would create reliable demand and strengthen cassava value added chains may include: provision of incentives for users of cassava products, cash back incentives to exporters, and a levy on imports of competing products. The findings of the study reveals that IFAD-VCDP intervention only covers 8 LGAs in Taraba State. The programme was able to carry out sensitization of stakeholders and training of about 30 leaders of farmer organizations (FOs) in each of the selected LGAs. The programme trained farmers on how to develop appropriate and usable business plan, financial management and record keeping systems. About 25 participating farmer groups were able to access credit from financial institutions, 24 groups received inputs in cassava production. Some of the challenges include inadequate funding, lack of adequate support to the marketing component, inadequate clean water and lack of improved mechanized cassava processing equipment.

Recommendations

Based on the findings of the study, the following recommendations were suggested;

- Support for marketers more in terms of capacity building, market information and linkages to sources of finance for access to credit should be pursued with vigour.
- Financial linkages, there is need to source for friendlier financial institutions that can grant credit facilities at very low and favorable interest rate of 2%.
- More cassava processing centers should be established in the state.
- Cassava producers should be trained on cassava waste management.

Compliance with ethical standards

Acknowledgments

The authors wish to acknowledge with gratitude the authors whose works were extensively used in this study and duly acknowledge in the reference section. The authors express immense gratitude to the management and staff of Egalf Ventures Limited (EVL) and the IFAD-VCDP State Programme Management Unit Jalingo, Taraba State.

Disclosure of conflict of interest

The authors firmly attest to the fact that there is no any conflicting interest in this study.

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