Constraints to financing cassava value chain actors in Enugu State, Nigeria

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Abstract

Purpose: The research study examined the analysis of value chain financing in cassava farming in Enugu State, Nigeria.

Design/Methodology/Approach: Information was collected from sixty cassava farmers, twenty processors and forty marketers to describe the socio-economic characteristics of Enugu cassava value chain actors, examine the strength of the cassava value chain actors, examine the costs and returns across the cassava value chain segments, examine financing needs and types along the cassava value chain and identify constraints in financing different cassava value chain segment the study area. Multi-stage random sampling was used to select the local government, communities and value chain actors. The primary data collected were analyzed using descriptive and inferential statistics like mean, frequency, percentage and gross margin.

Findings: The study also revealed that the value chain actors (producers, processors and marketers) need above 400,000 annually for the business to function effectively. The major constraints identified by the actors were inadequate capital and high interest rates for loans as hindrances to the expansion of their cassava enterprise and cassava value financing respectively.

Originality/Value: The study recommended subsidization of inputs and machineries to make them affordable to the rural actors and scale up access to credit and insurance to help smallholder farmers manage risk and foster the growth in farm productivity.

Keywords: Marketers and processors, producers, root crops,

Nijerya'nın Enugu Eyaletinde manyok değer zinciri aktörlerinin finansmanına yönelik kısıtlamalar

Özet

Amaç: Araştırma çalışmasında, Nijerya'nın Enugu Eyaletinde manyok tarımında değer zinciri finansmanının analizini incelemiştir.

Tasarım/Metodoloji/Yaklaşım: Enugu manyok değer zinciri aktörlerinin sosyo-ekonomik özelliklerini tanımlamak, manyok değer zinciri aktörlerinin gücünü incelemek, manyok değer zinciri segmentlerindeki maliyet ve getirileri incelemek, manyok değer zinciri boyunca finansman ihtiyaçlarını ve türlerini incelemek ve çalışma alanındaki farklı manyok değer zinciri segmentlerinin finansmanındaki kısıtlamaları belirlemek için altmış manyok çiftçisi, yirmi işleyici ve kırk pazarlamacıdan bilgi toplanmıştır. Yerel yönetim, topluluklar ve değer zinciri aktörlerini seçmek için çok aşamalı rastgele örnekleme kullanılmıştır. Toplanan birincil veriler ortalama, frekans, yüzde ve brüt marj gibi tanımlayıcı ve çıkarımsal istatistikler kullanılarak analiz edilmiştir.

Bulgular: Çalışma ayrıca değer zinciri aktörlerinin (üreticiler, işleyiciler ve pazarlamacılar) işlerinin etkin bir şekilde işleyebilmesi için yıllık 400.000'in üzerinde bir gelire ihtiyaç duyduklarını ortaya koymuştur. Aktörler tarafından tespit edilen başlıca kısıtlar sırasıyla yetersiz sermaye ve yüksek kredi faiz oranları olup, bunlar manyok işletmelerinin genişlemesinin ve manyok değerinin finansmanının önündeki engellerdir.

Özgünlük/Değer: Çalışma, girdilerin ve makinelerin kırsal aktörler için uygun fiyatlı hale getirilmesi için sübvanse edilmesini ve küçük çiftçilerin riski yönetmelerine yardımcı olmak ve çiftlik verimliliğindeki artışı teşvik etmek için kredi ve sigortaya erişimin artırılmasını önermektedir.

Anahtar kelimeler: Pazarlamacılar ve işleyiciler, üreticiler, kök bitkileri

INTRODUCTION

Cassava, (Manihot esculentum crantz), a starchy root crop that grows underground, is a primary food security crop in Africa due to its drought and disease resistance, flexibility in planting dates and tolerance for poor soil quality. Cassava is an important source of food and income because it provides essential nutrients such as carbohydrate and supports millions of farmers, processors, and marketers (Waigumba, et al, 2016). Cassava has surpassed yam and cocoyam as the most widely consumed carbohydrate, supplying up to 40% of all calories consumed in Africa (Udoh, Ndon, Asuquo and Ndaeyo, 2005). Nigeria is the world's leading producer of cassava, harvesting 3.81 million ha and producing 45.72 million tons in 2006, an increase of 18% over 2004 (Sanni, Onadipe, Ilona, Mussagy, Abas and Dixon, 2009). Cassava production has increased (Food and Agriculture Organization, 2018), and Nigeria has produced about 60 million tonnes (FOASTAT, 2019), indicating that there is a growing demand for cassava products, necessitating increased productivity. It has evolved into a major economic sustenance crop, and it now ranks as the world's largest producer, with a total production of 34 million tons (Adeniji, Ega, Akoroda, Adeniji, Ugwu and Balogun, 2005).

Some of the products from processed cassava tubers are garri, fufu, tapioca, cassava chips, cassava flour, lafun, starch, etc which can be consumed locally or for industrial uses. Processed Nigerian cassava products have also gained an improved patronage in the international market. Cassava is an important industrial raw material for the production of alcohol pharmaceuticals, gum, and confectionaries, in addition to its use as food (Okonkwo, 2002). Cassava value chain, according to the International Development Research Centre (IDRC), describes the full range of activities required to bring cassava produce from conception (stem), through various stages of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use. Converting fresh roots into High Quality Cassava Flour (HQCF), starch, sweeteners, dried chips, high quality meal (garri and fufu), and ethanol, among other products, is part of the cassava value chain, which helps farmers increase their income and get the most out of their crop production (Onya, Oriala, Ejaba and Okoronkwo, 2016). Production, processing, marketing, and distribution are all part of the cassava value chain. In agriculture, a value chain is a series of interconnected operations that begins with the delivery of seeds and fertilizers and ends with the mouths of consumers (IFAD, 2012). It is critical that activities aimed at improving access to financing are well-coordinated with policies aimed at improving value chains. Improving the competitiveness and underlying profitability of agricultural value chain participants is, at the end of the day, a critical component (Coates et al., 2011).

In an agricultural value chain, each of the activities is anchored by an actor who is an input supplier, producer (farmer), processor, marketer, wholesaler, retailer or more than one of the listed. These series of activities within a chain have different financial demands. Who needs finance in the agriculture sector includes the farmers and small agricultural entrepreneurs: finance for inputs (such as seeds and fertilizers), for production (such as machinery and equipment) and for marketing (such as processing, packaging and transportation) (FAO and World Bank, 2013).

Consequently, cassava production has recently been constrained by post-harvest systems such as processing, packaging, marketing, storage, distribution, and transportation (RUSEP, 2002; FMARD 2004). One of the challenges faced by the actors in the cassava value chain, according to Abode and Adeola (2009), is ineffective linkages between producers, processors, and marketers. Lack of funding, poor road networks, poor power supply, and lack of or delayed technical support in the form of information on improved practices due to insufficient access to extension services (Okocha, Okafor andAnyaegbuna, 2010) are among the others.

Musuva (2015) relates the impact of business risk management on the effectiveness of value chain financing to financial and policy conditions. One of the constraints to value chain financing, according to Kariuki (2016), is that most financiers lack products that are tailored to specific segments of the value chain. According to Ifejirika, Arene, and Mkpado (2013), the inability of financial institutions to provide loans to traders is a serious problem that prevents traders from expanding. Marketers face two major constraints, according to Ilu (2015): limited access to credit and high marketing costs in addition to the financial constraints that come with it.

Despite increased awareness of the cassava value chain over time, producing cassava to meet near-real-time demand is more difficult than it appears. As a result, the Nigerian cassava value chain, despite its enormous potential, has yet to be transformed from a small-scale industry capable of providing sufficient job opportunities and products for domestic consumption and export. On the ground, there are instances of glut, poor quality products, low producer prices, and low productivity, all of which have become permanent features. The cassava industry's persistent underperformance, despite its potential and efforts by both the government and the private sector, highlights an

intriguing gap. Despite the fact that there have been a few studies on cassava value chain financing, there has been little or no research on cassava value chain financing in Enugu State, Nigeria.

Though cassava is an important source of food and income to most families, its production still inhibited some biotic and abiotic factors. Some of biotic factors include pests and diseases, lack of access to planting materials, damage done by animals in transhumance and abiotic factors are infertile soils, high cost of inputs, poor agronomic practices, poor post-harvest handling and processing activities, poor market structures, climate variability (Kombate, et al, 2017, Adebayo, et al, 2013 and Bull, et al, 2010). It was also identified by Yakasi, 2010 that transportation problem, land scarcity, lack of capital and high cost of labour also challenged cassava negatively, land scarcity mostly affects women and non-indigenes of the community and high cost of labour in mostly because of rural-urban migration.

According to Ogunyinka and Oguntuase (2020) who worked on analysis of cassava production and processing by various groups in support of cassava value chain in the south west of Nigeria and found out that there is a significant relationship between the cassava varieties grown and the processed products while Naziri, Quaye, Siwoku, Wanlapatit, Viet Phu, and Bennett (2014) worked on diversity of postharvest losses in cassava value chains in selected developing countries and found out that majority of the losses occur at different stages of the value chain. Similarily, a greater proportion of producers preferred working capital as their financing type, while 15.7% opted for deposit accounts, and a smaller proportion (3.5%) chose transfers as reported by Okpukpara, Onwuemelie, Ude, and Okpukpara, (2021). Understanding the concept of value chain financing will improve the overall effectiveness of the providers and takers of agricultural finance. It also improves the quality and efficiency of financing agricultural chains by identifying financing needs for strengthening the chain, tailoring financial products to fit the needs of the participants in the chain, reducing financial transaction costs through direct discount repayments and delivery of financial services and using value chain linkages and knowledge of the chain to mitigate risks of the chain and its partners (Ijioma and Osondu, 2015). Despite the handful of studies already done on value chain financing, little or none was on constraints encountered by the actors in financing of their respective cassava value chain segment in Enugu State, Nigeria. The study therefore analyzed the constraints faced by producers, processors and marketers in financing their enterprises.

The objectives covered by the work were: examine the costs and returns across value chain segment; examine financing needs and types along the cassava value chain and identify constraints in financing different cassava value chain segment.

CONCEPTUAL FRAMEWORK

Value chains are organized links between groups of producers, traders, processors, and repair providers, who collaborate to improve productivity and thus the value added from their activities (Soosay, Fearne, and Dent (2012). Value chain incorporate companies (or individuals) that engage to deliver goods and services are variously called efficient chains, value chains, advertising and marketing chains, supply chains, or distribution chains (Eboh, 2012).Value chain describes the total variety of value-including activities required to deliver a services or products via the exclusive stages of manufacturing, together with procurement of unprocessed substances and different inputs, assembly, bodily transformation, acquisition of required services along with shipping or cooling, and in the end reaction to consumer demand (Kaplinsky and Morris, 2002). According to UNIDO, (2009) value chain describes the complete variety of activities undertaken to deliver a product from the preliminary enter-deliver stage, via diverse stages of processing, to its very last marketplace destination, and it consists of its disposal after use. To them, value chains comprises of activities that take place on the farm or rural level, together with input delivery, and maintenance via handling, processing, storage, packaging, and distribution. According to Miller and Silva (2007) value chain is the set of actors (private, public, and together with service providers) and the collection of value-adding activities in bringing a product from manufacturing to the very last purchaser. In agriculture, they may be concept known of as a 'farm to fork' set of techniques and flows. The value chain is an idea which may be clearly defined as the complete range of activities required to deliver a product from the initial input-deliver stage, via diverse stages of manufacturing, to its very last marketplace destination. Value is any activity that increases the market form or function of the product or service; and in today's business climate, there is a need to maximize the value of every process in a business (Jacoby, 2005). According to Hill and Jones (2001) the term "value chain" refers to the concept that a company's chain of activities for transforming inputs into outputs with purpose to deliver value to the customers. A value chain refers to the full life cycle of a product or process, including material sourcing, production, consumption and disposal/recycling processes. Value chains are all about human interactions. They are about linkages between people and businesses who transfer or exchange products, money, knowledge and information. Value-chain promotion is an appropriate way of

integrating smallholder producers and other rural target groups of development cooperation into value chains. The whole range of activities and services required to carry a product or service from conception to sale in its end market, whether local, national, international, or global, is referred to as a value chain. Producers, input suppliers, operations, processors, merchants, and customers are all part of the value chain. In agriculture, a value chain is a series of interconnected operations that begins with the delivery of seeds and fertilizers and ends with the mouths of consumers (IFAD, 2012). Activities aimed at improving access to financing must be well-coordinated with policies aimed at improving value chains. Improving the competitiveness and underlying profitability of agricultural value chain participants is, at the end of the day, a critical component (Coates et al., 2011). In an agricultural value chain, each of the activities is anchored by an actor who is an input supplier, producer (farmer), processor, marketer, wholesaler, retailer or more than one of the listed. These series of activities within a chain have different financial demands. Who needs finance in the agriculture sector includes the farmers and small agricultural entrepreneurs: finance for inputs (such as seeds and fertilizers), for production (such as machinery and equipment) and for marketing (such as processing, packaging and transportation) (FAO and World Bank, 2013).

Fresh cassava tubers are sold to rural households primarily through local markets, trading centers, and roadside markets. Cassava tubers are sold by producers to retailers, who then sell them to consumers. Retailers in this channel are frequently found in rural areas, and they travel from one market to the next on bicycles or motorbikes. Cassava products were sold in urban markets by some retailers. Producers sell to wholesalers, who then sell to retailers, who then sell to consumers through the third channel. Cassava was sold in all three forms in this country: fresh tubers, chips, and flour. Cassava millers were also service processors on this channel. Wholesalers were traders with sufficient financial resources to purchase fresh cassava tubers in bulk from producers and transport them to urban markets.

Cassava growers could be found all over the state. They intercropped cassava with maize, yam, and even vegetables on plots ranging from 0.2 hectare to 2 hectares (mostly in scattered plots). These farmers sold their fresh tubers to other rural and urban retailers, as well as wholesalers, either raw or after processing them into cassava chips, flour, or gari. Other farmers worked as retailers, selling fresh tubers, chips, and flour to individuals and small businesses, primarily households and local restaurants.

Fresh tubers were sorted according to size, consumer preferences, and packaging by the retailers, while tubers were processed into cassava chips and flour by others. Retailers, who had a larger capital base than producers, went to the top cassava producers to collect fresh tubers and cassava products. After purchasing fresh tubers at a price range from producers and/or wholesalers, retailers sold them in heaps (about 2 kg) in the urban or peri-urban markets, at a price increase of 50% over the farm gate price. Along major highways, a section of retailers set up temporary shelters and storefronts where they displayed cassava products ready for sale to passersby and nearby residents. In addition to transporting cassava products from rural areas to urban areas, retailers also processed cassava into chips and flour.

Cassava products were sourced directly from producers by wholesalers. The majority of the wholesalers dealt in fresh tubers. Other wholesalers purchased unharvested cassava in the fields and hired village labor to harvest, package, and load the cassava into hired vehicles for delivery to open markets and other nearby urban markets. There were also wholesalers who hired both producers and distributors. Producers for both fresh tubers and cassava chips were also contracted by wholesalers.

Processors primarily served as service millers for producers, retailers, and wholesalers. Processors did not own the cassava products they processed; rather, they provided a service that the business owners paid for. As a result, most of the processors milled a variety of products in addition to cassava, including maize, millet, and sorghum.

The product flows involve chain actors. Product flows from the input supplier to the farmer or producer, through the processor to the exporters or wholesalers. For the financial flows, finances or credit flow through banks, non-bank institutions, public investors and microfinance institutions alongside the augmenting supporting services.

Finance in agriculture is becoming more important in many regions of the world since it is now considered as a tool for agricultural development and efficiency (Omonona, Lawaland and Oyinlana, 2010). Capital has been one of the most frequently raised issues in relation to the stagnation of agriculture in general, and small-scale farming in particular (Atkilt and Isaac, 2010), and Alegieuno (2010) claims that increasing capital in the agricultural sector would increase labor productivity by improving division of labor and, as a result, create more jobs. Farmers' own savings and cooperative farm finance are the most common sources of capital for agricultural investment. Agriculture requires a variety of inputs in order to be productive, one of which is credit (Alkilt and Isaac, 2010). Due to the subsistence agriculture practiced by Nigerian farmers (in which saving is difficult), they must rely heavily on credit in order to

extend the scale of their operation, the expected low return from small loans; the inability of small enterprises to provide basic information on themselves and their inability to raise acceptable collateral for loans. According to Olagunju and Ajiboye (2010), agricultural finance can be a powerful economic force for development if it is used to inject appropriate capital for the purchase of agricultural inputs that farmers would not otherwise be able to obtain through their own financial, physical, and labor resources; however, if it is insufficient, it impedes the transfer of technology and investment into agriculture. According to Ololade and Olagunju (2013), simply recognizing credit as a condition for agricultural growth is not enough to ensure increased agricultural productivity and farm income, and that unless production credit is made available on reasonable terms, the majority of small-scale farmers will be severely hampered in adopting profitable technology. A well-motivated farmer without credit cannot buy improved seeds, fertilizer, and chemicals (Ammani, 2012, Ololade and Olagunju, 2013), and credit availability to a small-scale farmer is critical to increasing the efficiency required by small-scale farmers and to advantageously use inputs and factors of production, credit serves as a catalyst driving the machinery of production to optimum performance as cited by Nwaru and Onuoha (2010)

Finance is the breaker of the poverty trap, allowing the active poor to access more funds than their existing salaries allow. Lack of access to financial services, on the other hand, is one of the most significant impediments to the growth of small and medium businesses. A survey of credit market literature suggests that small businesses have fewer financing options than major corporations. Small farmers' lack of access to credit is primarily due to banks' reluctance to lend to them, based on the assumption that lending to small businesses is risky; the presence of asymmetric information, resulting in adverse selection and moral hazards; and the presence of asymmetric information, resulting in adverse selection and moral hazards (Soludo, 2008). In agreement with Soludo (2008) and Anyanwu (2004) stated that removal of small-scale farmers from credits by the formal banking institutions. The primary purpose of credit facilities is to improve the active poor's level of living by increasing access to small-scale financial services. Microfinance mobilizes savings and meets other financial service needs of the active poor, integrates the poor's informal activities into the financial system, encourages entrepreneurship, boosts job creation, and accelerates economic growth and development (Adebusuyi et al 2008). As a result, value chain financing plays an important role in satisfying the increased need for agricultural finance and investment as consumers seek more processed or value-added products.

MATERIALS AND METHODS

The study was carried out in Enugu State, Nigeria. The study employed purposive sampling technique based on local government and communities with a high prevalence of cassava based enterprise from various agricultural zones. 2 LGA (Udenu and Isiuzor) were purposively selected, 3 communities each were also selected from the LGA and 10 small scale farmers (that is famers with less than five hectares) each were randomly selected from each of the communities giving a total of 60 small scale farmers, 40 marketers who deal only on cassava roots or cassava products consisting of 2 wholesalers and 3 retailers were randomly selected from 8 markets (4 markets from each LGA) giving a total of 16 wholesalers and 24 retailers while snowball technique was used to select 20 processors of cassava products because of their limited number in the sampled area. The respondents were divided into three groups: sixty farmers/producers, twenty processors, and forty marketers, for a total of one hundred and twenty- one people. The selection was done using a random selection technique. The data were collected by the researcher using a structured questionnaires and interview schedule. Data for the study were analyzed using descriptive statistics and gross margin.

The costs and returns of producers along the cassava value chain were calculated using the gross margin analysis. This was stated as follows:

Gross Margin (naira/ha) = Gross Value of Output (GVO) – Total Variable Cost (TVC) (1)

where; Gross value of cassava = quantity of cassava tuber in Kg (Q) price (P) (2)

Total variable cost = cost incurred for labour and purchased inputs for the production season.

Cassava producers' gross margins were calculated per hectare. Cassava processors' and marketers' gross and net marketing margins, as well as marketing efficiency, were calculated. This was given as: Gross marketing margin (in naira) = Selling price – Producers price – TVC (3)

Net Marketing Margin (in naira) = Gross marketing margin – Total fixed costs (TFC) (4)

Marketing efficiency (%) = x 100 ……………………….. (5)

Where; TVC = Total variable costs and Total marketing cost = TVC + TFC

5-point Likert type scale is expressed as follows: Strongly Agree (SD) = 5 points, Agree (A) = 4 points, Neutral (N) = 3 points, Disagree (D) = 2 points, Strongly Disagree (SD) = 1 point

Decision rule: if the mean score is > 3.0, then the constraint severely affects cassava value chain.

In the study area, there was only forward connectivity in the cassava value chain, with the main nodes being production, processing, marketing, and consumption. The researcher also observed that cassava products were sourced directly from producers by marketers (wholesalers and retailers). The marketers dealt in fresh tubers. Others purchased unharvested cassava in the fields and hired village labor to harvest, package, and load the cassava into hired vehicles for delivery to open markets and other nearby urban markets. There were also marketers who hired both producers and distributors.

Processors primarily served as service millers for producers and marketers. Sometimes, processors did not own the cassava products they processed; rather, they provided a service that the business owners paid for.
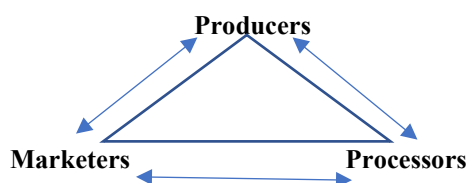

Figure 1. Diagrammatic representation of value chain interactions between the actors.

RESEARCH FINDINGS AND DISCUSSIONS

Gross margin analysis for cassava production

The gross margin analysis for the cassava producer shows that the farmer stands to make a profit of ₦ 241,444.43 per hectare of land used for cassava production per year. It's important to note that labor costs accounted for nearly half (49%) of the total cost of cassava production. Pesticide cost accounted for just 13 percent, transportation cost accounted for 20 percent while the remaining cost was incurred from the purchase of planting materials. On the average, 60bundles were planted per hectare. Average quantity of tubers harvested per hectare was 15.05 tons with a mean selling price of ₦22,956/ton. This is because payment made to labour is on the high side and the producers use manual labour instead of machines due to paucity of funds.

Table 1. Gross margin analysis for cassava production

Variables	Values (₦)
Average quantity of cassava produced (A) 15.05 tons	345,488.85
Cost of labour	51,464
Cost of pesticides/fertilizers	14,215.48
Cost of planting material	17,015.42
Cost of transportation of inputs and harvested produce	21,350
Total variable cost (B)	104,044.42
Gross margin (C) = (A) - (B)	241,444.43
Operating ratio = B/A	0.3012

Source: Field Survey, 2020.

Gross margin analysis for cassava processing

The result for gross margin analysis for the cassava processors indicates that cassava processing per annum the processor stands to make a margin of ₦ 262,863.11. It is worth noting that labour costs accounted for roughly 13 percent of the total cost of cassava processing. Cost of processing materials accounted for just 12 percent, transportation cost accounted for 16 percent while the remaining cost was incurred from cassava tubers purchased from producers.

Table 2. Gross margin analysis for cassava processing

Variables	Values (₦)
Average Quantity processed per season (A) = 1,426kg	356,354.81
Cost of cassava from the producers	55,437.70
Cost of labour	12,021.14
Cost of processing materials	11,149.48
Cost of transportation	15,028.57
TVC (B)	93,636.89
Gross margin (C) = A – B	262,863.11

Source: Field Survey, 2020.

Gross margin analysis for cassava marketing

The result for gross margin analysis for the cassava marketers indicates that the marketers stand to make a margin of ₦ 134,678.47 per annum. It is should be noted that labour cost of loading and offloading accounted for about 1.7% of the total cost incurred in cassava marketing. Cost of storage, rent and taxes accounted for just 9.8 percent, transportation cost accounted for 2.8 percent while the remaining cost was incurred from purchasing processed products. This finding is in agreement with Ikwuakam, et al, (2015) who found out that majority of the marketers had between 5 to 25 years of experience in the business earning between ₦ 200,000 to ₦ 300,000 in a year, this depicts that they are mostly low income earners.

Table 3. Gross margin analysis for cassava marketing

Variables	Values (₦)
Average quantity marketed per annum(A) = 1,248.5kg	499,400
Cost of processed products	312,125
Cost of loading and offloading	6,355
Cost of transportation	10,241.53
Cost of storage, rent and taxes	36,000
Total Cost (B)	364,721.53
Gross marketing margin (C) = A – B	134,678.47

Source: Field Survey, 2020.

The gross margin analysis for cassava production, processing, and marketing provides insights into the profitability and cost distribution across the value chain. Comparing these three activities reveals notable differences in cost structures, efficiency, and financial returns, shaping the overall economic viability of cassava enterprises.

Across the value chain, cassava production records the lowest total revenue (₦345,488.85) compared to processing (₦356,354.81) and marketing (₦499,400.00). However, despite generating lower revenue, production maintains a high gross margin (₦241,444.43), as its total variable costs (₦104,044.42) are relatively higher than those in processing (₦93,636.89) and marketing (₦364,721.53). This suggests that while production is fundamental to the value chain, its profitability depends on efficient cost management. The operating ratio of production (0.3012) indicates that only 30.12% of revenue is spent on variable costs, reinforcing its cost-effectiveness compared to other segments.

In contrast, cassava processing adds value to raw cassava, leading to increased revenue (₦356,354.81) and a higher gross margin (₦262,717.92) than production. However, its key cost driver is the procurement of cassava from producers (₦55,437.70), alongside costs of labour (₦12,021.14) and processing materials (₦11,149.48). Notably, processing maintains a stronger profit position than marketing despite a lower total revenue. This indicates that the ability to transform raw cassava into higher-value products enhances financial returns while controlling costs.

Cassava marketing generates the highest revenue (₦499,400.00), but it also incurs the highest cost burden (₦364,721.53). The primary expense is the cost of acquiring processed products (₦312,125.00), which significantly reduces profitability. Other costs, including loading and offloading (₦6,355.00), transportation (₦10,241.53), and storage, rent, and taxes (₦36,000.00), further contribute to its total cost. Consequently, the gross marketing margin (₦134,678.47) is lower than both production and processing, illustrating that while marketing generates higher revenue, its high operational expenses limit profitability.

When analyzed together, the value chain demonstrates that while each stage contributes to overall cassava enterprise success, their cost and revenue dynamics differ. Production is the most cost-efficient, with the lowest operating ratio, allowing a higher proportion of revenue to contribute to profits. Processing maximizes profitability through value addition, though it remains dependent on stable raw cassava supply. Marketing, despite commanding the highest revenue, faces significant cost challenges, particularly in procuring processed cassava products. To

optimize the cassava value chain, strategies should focus on reducing marketing costs, improving efficiency in product acquisition, and expanding processing capacity to enhance profitability across all segments.

Financing needs and types along the cassava value chain

The results from table 4 shows that greater proportion (49.2%) of the producers needed above ₦500,000 for efficient management of their cassava production enterprise while 14.8%, 13.1%, 9.8%, 8.2% and 4.9% require ₦400,001-₦500,000, ₦100,001-₦200,000, ₦300,001-₦400,000, ₦200,001-₦300,000 and less than ₦100,000 respectively with mean of ₦413,935 to ensure that their business is going smoothly. Similarly, greater proportion (75%) of the processors needed above ₦500,000 for efficient management of their cassava processing enterprise while 15%, 5% and 5% require ₦400,001-₦500,000, ₦300,001-₦400,000 and ₦200,001-₦300,000 respectively with mean of ₦510,001 to ensure that their business is going smoothly. Table 4 further revealed that greater proportion (30%) of the marketers needed above ₦500,000 for efficient management of their cassava marketing enterprise while 25%, 25%, 17.5% and 2.5% require ₦400,001-₦500,000, ₦300,001-₦400,000, ₦300,001-₦400,000, ₦200,001-₦300,000 and ₦100,001-₦200,000 respectively with mean of ₦412,501 to ensure that their business is going smoothly.

The results from table 4 revealed that greater proportion (70.5%) of the producers did not have access to credit while only 29.5% of the producers did. Greater proportion (70.0%) of the processors had access to credit while 30.0% did not and greater proportion (80.0%) of the marketers had no access to credit while 20.0% of the marketers had.

The results from Table 4 further revealed that greater proportion (67.2%) of the producers said that the credit is always available while 32.8% claim that the credit is not always available, 65.0% of the processors claim that credit is not available while 35.0% affirmed that credit is always available and greater proportion (55.0%) of the marketers affirmed that credit is always available while 45.0% claimed that credit is not available. The result also shows that greater proportion (65.6%) of the producers mostly request for short term loan while 16.4%, 14.8% and 3.3% request none, medium and long term loan respectively. Similarly, greater proportion (75.0%) of the processors mostly request for short term loan while 15.0%%, and 10.0% request none and medium term loan respectively greater proportion (62.5%) of the marketers mostly request for short term loan while 32.5% and 5.0% request none and medium term loan respectively.

The results from table 4 shows that greater proportion (54.1%) of the producers mostly request for loan that expires within 1 year while 18.0% do not request for loan at all. Also 14.8%, 8.2%, 1.6%, 1.6% and 1.6% request for loan that expires within 2, 3, 4, 5 and 6 years respectively. The result also shows that greater proportion (70.0%) of the processors mostly request for loan that expires within 1 year while 15.0% do not request for loan at all. Also 5.0%, 5.0% and 5.0% request for loan that expires within 2, 3, and 5 years respectively and greater proportion (65.0%) of the marketers mostly request for loan that expires within 1 year while 30.0% do not request for loan at all and 5.0% request for loans that expires within 3 years. Majority (59.0%) of the producers mostly request for loan yearly while 19.7% have not requested for loan at all. Also 11.5%, 6.6% and 3.3% request for loans every 2, 3 and 4years respectively, 30.0% of the processors mostly request for loan yearly while 20.0% have requested for loan once every four years. Also 15.0% have not requested for loan at all while 15.0%, 10.0%, 5.0% and 5.0% request for loans once every 3, 2, 5 and 10 years respectively and 50.0% of the marketers mostly request for loan yearly while 30.0% have not requested for loan at all. Also 12.5%, 2.5%, 2.5% and 2.5% request for loans once every 2, 3, 4 and 5 years respectively.

Majority (44.3%) of the producers mostly source for loan from microfinance banks while 32.8%, 6.6% and 1.6% source loans from informal institutions, commercial and state banks respectively and 14.8% have not borrowed loan at all. The results also showed that greater proportion (55.0%) of the processors mostly source for loan from informal institutions while 30.0% source loans from microfinance banks and 15.0% have not borrowed loan at all. Table 4 shows that greater proportion (52.5%) of the marketers mostly source for loan from informal institutions while 30.0% have not borrowed loan at all and10.0% and 7.5% source loans from commercial and microfinance banks respectively.

The results showed that efficient cassava production, processing, and marketing demand significant financial investment and producers face more difficulty in accessing loans which may affect agricultural productivity negatively. Many of the actors prefer informal credit which incurs higher interest rates and financial insecurity.

Table 4. Financing needs, types and access to finance along the cassava value chain

Variables	Category	Producers		Processors		Marketers	
		Freq	%	Freq	%	Freq	%
Amount Required (₦)	≤ 100,000	3	4.9	0	0.0	0	0.0
	100,001-200,000	8	13.1	0	0.0	1	2.5
	200,001-300,000	5	8.2	1	5.0	7	17.5
	300,001-400,000	6	9.8	1	5.0	10	25.0
	400,001-500,000	9	14.8	3	15.0	10	25.0
	Above 500,000	30	49.2	15	75.0	12	30.0
Mean			413,935		510,001		412,501
Credit accessibility	Inaccessible	43	70.5	6	30.0	32	80.0
	Accessible	18	29.5	14	70.0	8	20.0
Nature of credit	Unavailable	20	32.8	13	65.0	18	45.0
	Available	41	67.2	7	35.0	22	55.0
Type of Loan request	None	10	16.4	3	15.0	13	32.5
	Short	40	65.6	15	75.0	25	62.5
	Medium	9	14.8	2	10.0	2	5.0
	Long	2	3.3	-	-	-	-
Duration of Loan(Yrs)	0	11	18.0	3	15.0	12	30.0
	1	33	54.1	14	70.0	26	65.0
	2	9	14.8	1	5.0	1	2.5
	3	5	8.2	1	5.0	-	-
	4	1	1.6	-	-	-	-
	5	1	1.6	1	5.0	1	5.0
	6	1	1.6	-	-	-	-
How often do you demand loan (Yrs)	None	12	19.7	3	15.0	12	30.0
	1	36	59.0	6	30.0	20	50.0
	2	7	11.5	2	10.0	5	12.5
	3	4	6.6	3	15.0	1	2.5
	4	2	3.3	4	20.0	1	2.5
	5	-	-	1	5.0	1	2.5
	10	-	-	1	5.0	-	-
Credit Institution	None	9	14.8	3	15.0	12	30.0
	Informal	20	32.8	11	55.0	21	52.5
	Microfinance	27	44.3	6	30.0	3	7.5
	Commercial	4	6.6	-	-	4	10.0
	State	1	1.6	-	-	-	-

Source: Field Survey, 2020.

Constraints in cassava production

The high cost of fertilizers as well as the lack of access to machines occupied the first and second positions amongst the constraints with mean scores of 4.03 and 4.00 respectively and showed that they were very severe constraint amongst the farmers. Inadequate capital, pests and diseases and high labour cost ranked third, fourth and fifth with mean scores of 3.92, 3.77 and 3.74 and were considered to be severe constraints. Other limitations encountered were lack of storage facilities, insurance, risk in operations, scarcity of inputs, shortage of water, unavailability of improved cassava stem variety, conduct of middlemen, poor profit margin poor road access, flooding, poor produce prices, land unavailability and increase in production leading to glut, these were all considered to be serious constraints. It was also identified by Yakasi (2010) that transportation problem, land scarcity, insufficient capital and high cost of labour also challenged the production negatively, land scarcity mostly affects women and non-indigenes of the community and high cost of labour in mostly because of rural-urban migration. Some of biotic factors include pests and diseases, lack of access to planting materials, damage done by animals in transhumance and abiotic factors are infertile soils, high cost of inputs, poor agronomic practices, ineffective post-harvest handling and processing, poor market structures, climate variability (Kombate, et al, 2017, Adebayo, et al, 2013 and Bull, et al, 2010).

Table 5. Constraints in cassava production

Constraints	Mean	Std. Deviation	Decision	Rank
High cost of fertilizer	4.03	.983	Very severe	1st
Access to machines	4.00	1.252	Very severe	2nd
Inadequate Capital	3.92	1.069	Severe	3rd
pests and Diseases	3.77	1.270	Severe	4th
High cost of labour	3.74	1.079	Severe	5th
Lack of Storage	3.56	1.218	Severe	6th
Insurance	3.54	1.285	Severe	7th
Risk in operations	3.54	1.191	Severe	7th
Input Scarcity	3.54	1.233	Severe	7th
Water Shortage	3.46	1.119	Severe	10th
Improved variety unavailability	3.38	1.356	Severe	11th
Conduct of traders and middlemen	3.38	1.113	Severe	11th
Poor profit margin	3.38	1.254	Severe	11th
Poor road access	3.11	1.473	Severe	14th
Flooding	3.11	1.318	Severe	14th
Poor prices	3.08	1.370	Severe	16th
Unavailability of land and water	3.07	1.401	Severe	17th
Increase in production	3.05	1.217	Severe	18th
Low yielding varieties	2.92	1.229	Not severe	19th
Decrease in demand for tubers	2.18	1.258	Not severe	20th

Source: Field Survey, 2020.

Constraints in cassava processing

Lack of storage facilities, poor product prices, high cost of machines, inadequate capital and high cost of operations ranked first, second, third, fourth and fifth amongst the constraints with mean scores of 4.90, 4.85, 4.65, 4.65 and 4.55 respectively and showed that they were extremely severe constraint amongst the farmers. Access to machine spare parts, access to machines for processing, high cost of labour, conduct of traders and middlemen, glut, risk in operations, poor profit margin, insurance and poor road access were considered as very severe limitations while pest and diseases and high cost of processing equipments were considered severe constraints. There is always scarcity of labour especially during season as most operations are done manually. Another major constraint is poor equipment. This resulted to long queues which were regular at grating and jacking stages thereby causing delay in processing. This is caused by the few machines in the community. This is in line with Omolara et al. (2017) who found that 81.5% of women processors in Osun State were faced with equipment problem. Processors complained about inadequate capital. This problem was as a result of farmers limited access to loan from financial institutions. This is consistent with the result found by Omolara et al. (2017) and Ehinmowo et al. (2014).

Table 6. Constraints in cassava processing

Constraints	Mean	Std. Deviation	Decision	Rank
Lack of storage facilities	4.90	0.308	Extremely severe	1st
Inadequate Capital	4.85	0.366	Extremely severe	2nd
Poor product Prices	4.65	0.489	Extremely severe	3rd
High cost of machines	4.65	0.489	Extremely severe	3rd
High cost of operations	4.55	0.510	Extremely severe	5th
Access to machine spare parts	4.45	0.759	Very severe	6th
Access to machines for processing	4.40	0.754	Very severe	7th
High cost of labour	4.35	0.933	Very severe	8th
Conduct of traders and middlemen	4.30	0.470	Very severe	9th
Glut	4.20	0.410	Very severe	10th
Risk in operations	4.20	0.523	Very severe	10th
Poor profit margin	4.15	0.745	Very severe	12th
Insurance	4.15	0.875	Very severe	12th
Poor road access	4.00	0.858	Very severe	14th
Pests and Diseases	3.95	0.887	Severe	15th
High cost of Processing Equipment	3.85	1.309	Severe	16th
Decrease in demand	2.85	0.933	Not severe	17th

Source: Field Survey, 2020.

Constraints in cassava marketing

Lack of storage facilities and inadequate capital ranked first and second with mean scores of 4.20 and 4.10 and were considered severe limitations. Poor motorable road, high cost of labour, poor profit margin, insurance, high risk in operations and conduct of middle men were considered severe limitations while pest and diseases and high cost of processing equipments were considered severe constraints.

Table 7. Constraints in cassava marketing

Constraints	Mean	Std Deviation	Decision	Rank
Lack of storage facilities	4.20	1.203	Very severe	1st
Inadequate capital	4.10	1.105	Very severe	2nd
Poor road	3.78	1.230	Severe	3rd
High cost of labour	3.78	1.121	Severe	3rd
Small profit Margin	3.62	1.295	Severe	5th
Insurance	3.55	1.260	Severe	6th
High risk in operation	3.55	1.011	Severe	6th
Conduct of middlemen	3.35	0.864	Severe	8th
Poor product prices	2.95	1.239	Not severe	9th
Decrease in demand	2.83	1.375	Not severe	10th

Source: Field Survey, 2020.

CONSTRAINTS IN CASSAVA VALUE CHAIN FINANCING

Constraints in cassava production financing

Farm drudgery ranked first among the limitations with mean score of 5.00 and it is considered extremely severe. High interest rates, lack of collateral and high transaction cost were considered very severe limitations with mean scores of 4.30, 4.08 and 4.00. Small scale farms, low mobilization, lack of information, Bureaucratic process and high risk in default were considered severe limitations to cassava production financing. Kariuki (2016) recorded over 54% of farmers cited from a combination of high interest rates and a lack of collateral, lack of loan security and information about credit products as inhibiting credit conditions.

Table 8. Constraints in cassava production financing

Constraints	Mean	SD	Decision	Rank
Farm Drudgery	5.00	.000	Extremely severe	1st
High Interest Rate	4.30	1.054	Very severe	2nd
Lack of collateral	4.08	.971	Very severe	3rd
High transaction cost	4.00	.796	Very severe	4th
Small scale farm	3.87	1.040	Severe	5th
Low Mobilization	3.51	1.135	Severe	6th
Lack of Information	3.49	.994	Severe	7th
Bureaucratic process	3.44	.940	Severe	8th
High risk of default	3.31	1.205	Severe	9th
Decrease in buyers	2.95	1.296	Not severe	10th

Source: Field Survey, 2020.

Constraints in cassava processing financing

Small scale farm and high risk of default ranked first and second among the limitations with mean scores of 4.65 and 4.55 and it is considered extremely severe. Lacks of collateral and low mobilization were considered very severe limitations with mean scores of 4.30 and 4.20. High transaction cost, bureaucratic process, lack of information, high interest rate and decrease in buyers, and high risk in default were considered severe limitations to cassava processing financing.

Table 9. Constraints in cassava value chain financing (processing)

Constraints	Mean	Standard deviation	Decision	Rank
Small scale farm	4.65	0.489	Extremely severe	1st
High risk of default	4.55	0.510	Extremely severe	2nd
Lack of collateral	4.30	0.923	Very severe	3rd
Low Mobilization	4.20	0.616	Very severe	4th
High transaction cost	3.90	0.968	Severe	5th
Bureaucratic process	3.80	0.696	Severe	6th
Lack of Information	3.70	1.031	Severe	7th
High Interest Rate	3.50	1.395	Severe	8th
Decrease in buyers	3.45	0.826	Severe	9th

Source: Field Survey, 2020.

Constraints in cassava marketing financing

High interest rate and lack of information ranked first and second among the limitations with mean scores of 4.30 and 3.93 and it was considered very severe. Low mobilization, lack of collateral, high transaction cost, small scale farm, and high risk in default, were considered severe limitations to cassava marketing financing while bureaucratic process and decrease in buyers were considered not severe.

Table 10. Constraints in cassava marketing value chain financing

Constraints	Mean	SD	Decision	Rank
High Interest Rate	4.30	0.939	Very severe	1st
Lack of Information	3.93	0.888	Very severe	2nd
Low Mobilization	3.90	1.236	Severe	3rd
Lack of collateral	3.85	1.075	Severe	4th
High transaction cost	3.70	1.114	Severe	5th
Small scale farm	3.68	1.403	Severe	6th
High risk of default	3.30	1.091	Severe	7th
Bureaucratic process	2.88	1.223	Not Severe	8th
Decrease in buyers	2.63	1.480	Not Severe	9th

Source: Field Survey, 2020

CONCLUSION AND RECOMMENDATIONS

This study provided insights into the gross margins of cassava production, processing, and marketing, profitability and cost distribution and constraints across the value chain. State. The study established that even though the cassava production, processing and marketing were profitable yet it is still under-financed making it difficult for the actors to expand their enterprise and the actors also encountered a lot of challenges in access finance and to help cassava value chain actors overcome constraints in the financing of the value chain, the study recommends that government and appropriate agencies should invest in subsidization of inputs and machineries to make them affordable to rural cassava value chain actors. In addition, there should be provision of credit input materials to cassava value chain actors to help encourage undercapitalized farmers to adopt improved practices in cassava enterprise. There is also a need to expand access to insurance to help smallholder farmers manage risks and increase farm productivity. Despite the various operational risks that farmers face, tailored formal and informal insurance mechanisms are severely lacking. There is need to review and strengthen monitoring and control mechanisms based on an accurate and objective evaluation of the credit value of the clients towards reducing the level of non-performing loans. Financial institutions should be able to give, manage and service loans cost-efficiently in a bid to improve loan processing and monitoring and finally, the success of cassava value chain lies both in meeting up with the financial demands of chain actors as well as providing enabling environment for effective use of these finances to be able to impact growth in the sector in the study area.

The results showed that efficient cassava production, processing, and marketing demand significant financial investment and producers face more difficulty in accessing loans which may affect agricultural productivity negatively. Many of the actors prefer informal credit which incurs higher interest rates and financial insecurity.

Contribution Rate of Researchers Declaration Summary

The authors declare that they have contributed equally to the article and have not plagiarized.

Conflict of Interest Declaration

The authors of the article declare that there is no conflict of interest between them.

Ethical Statement

Authors declared that they would abide by ethical rules and have obtained consent from participants in the research questionnaire.

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