

An Analysis of the Role of Women in the Cassava Value Chain in Nigeria

A Project Paper

Presented to the Faculty of the Graduate School

of Cornell University

in Partial Fulfilment of the Requirements for the Degree of  
Master of Professional Studies in Agriculture and Life Sciences  
Field of International Agriculture and Rural Development

by

Gabriella Otunba-Payne

August 2020

© 2020 Gabriella Otunba-Payne

## ABSTRACT

Nigeria is the largest producer of cassava in the world. As a result, cassava production is one of the critical agricultural enterprises providing household income and acting as a potential catalyst for poverty alleviation in Nigeria (Ijigbade, Fatuase, & Omisope, 2014). In Nigeria, the majority of labor associated with cassava production and processing is carried out by women (Forsythe, Posthumus, & Martin, 2016). This paper will examine women's participation at every level of the cassava value chain in Nigeria, the dominant activities of the women in the production and processing of cassava, their access to land, ownership of the means of production, household dynamics and the policies instituted by the state government and local authorities to support their activities. This analysis will provide insight into the factors affecting Nigerian women in the cassava value chain, the challenges they face, and the existing practices and technologies that can be implemented to foster the integration of gender-responsive strategies and recommendations for local government authorities.

Keywords: cassava value chain; factors; analysis; gender; women entrepreneurship; Nigeria.

## BIOGRAPHICAL SKETCH

Gabriella Otunba-Payne graduated with a degree in Politics and Sociology from the University of Kent, Canterbury England, in 2013. She then moved to Lagos, Nigeria, and started her career working for the Lagos State Government in the department of Central Business District as a Special Assistant to the Minister. After leaving the department of Central Business District, Gabriella went on to work for the All Progressive Congress as a Project Manager in 2014 on the successful 2015 Nigerian Presidential Campaign. She then joined the private sector working as a Senior Associate at Grace-Lake Partners, an Investment Firm based in Lagos, where she led projects in outdoor advertising, healthcare, and mining. Before joining Cornell, Gabriella's last position was as the Head of Operations for one of the leading shea butter agribusinesses in Nigeria, Shea Origin Limited, a company involved in the production of raw shea butter. There she played a pivotal role in improving the shea value chain, significantly ramping up processing capacity through technical training of the local women, providing the necessary tools and machinery, and developing new export markets.

Gabriella is pursuing a Professional Master's degree in Global Development with a focus on International Agriculture and Rural Development. Her areas of interest are gender-responsive strategies for promoting female entrepreneurship in agriculture and strengthening agricultural value chains, particularly for women at the production level in Sub-Saharan Africa. Gabriella was also a recipient of the P.E.O International Peace Scholarship in 2019 and chosen to serve as a 2020 Degree Marshal representing Master's degree graduates in the Graduate School, at the 152nd Cornell University Commencement.

*To my mother, Mobola,  
Thank you for always believing in me and being my greatest cheerleader.  
Mo niṣẹ rẹ diẹ sii ju ohunkohun lọ*

## ACKNOWLEDGMENTS

I would like to express my sincere thanks to Professor Terry Tucker, without whom many of my accomplishments at Cornell would not have been possible. Professor Tucker, in his capacity as my advisor, not only helped shape my research in such a productive and meaningful way, offering his help in every aspect of this project, but he also helped me in terms of figuring out my career trajectory and giving me the confidence to believe in my ideas. Professor Tucker contributed enormously to my development and experience at Cornell University, and I am immensely grateful for his support.

I would also like to extend my thanks to Professor Lori Leonard, whose encouragement and constant support was invaluable.

I would also like to express my gratitude to Denise Percey for being consistently helpful and always there to help get you where you need to go.

Finally, I would like to thank my cohort, the Global Development class of 2020, who made my time at Cornell so enjoyable and were a source of motivation and comradery.

## TABLE OF CONTENTS

Biographical Sketch	iii
Dedication	iv
Acknowledgements	v
Introduction	1
Cassava Production in Nigeria	5
Cassava Value Chain	14
Women and Cassava	19
Agricultural Finance and Inclusion	25
Value Chain Actors Interview Analysis	32
Recommendations	37
Conclusion	43
Appendix	44
References	47

## LIST OF FIGURES

Figure 1: Nigerian Crop Production Volumes

Figure 2: Growth in World Production of Major Crops, 1980-2011

Figure 3: Cassava production in Nigeria over time

Figure 4: Summary of potential demand for cassava-based products

Figure 5: Cassava food products & starch import trend Nigeria 2000-2013

Figure 6: Cassava intercrop combinations

Figure 7: The Nigerian Cassava Value Chain

Figure 8: Proportion of labor in all agricultural activities that is supplied by women

Figure 9: Loan characteristics of cassava value chain actors

Figure 10: Average values of loan variables by enterprise and financial institution characteristics  
women

Figure 11: Trend in Financial Inclusion Gender Gap (FIGG) in Nigeria

Figure 12: The three-phase structure of the PMCA methodology

Figure 13: Market chain collaboration: overcoming the “competitiveness trap” that affects rural  
areas



## LIST OF ABBREVIATIONS

ACGSF: Agricultural Credit Guarantee Scheme Fund

ACSS: Agricultural Credit Support Scheme

CACS: Commercial Agricultural Credit Scheme

FAO: Food and Agriculture Organization

FIGG: Financial Inclusion Gender Gap

FMA: Federal Ministry of Agriculture

HQCF: High-quality cassava flour

IFAD: International Fund for Agricultural Development

LUAN: Land Use Act of Nigeria

NBS: National Bureau of Statistics

NGO: Non-governmental Organizations

NIRSAL: Nigeria Incentive-Based Risk Sharing System for Agricultural Lending

NCPMA: National Cassava Processors and Marketers Association

MPC: Micro-Processing Centers

SBA: Starch-based paperboard adhesives

UN: United Nations

## CHAPTER 1

### INTRODUCTION

The economy of Nigeria relies heavily on oil exports, making the country's GDP heavily dependent on the volatile global oil market. Despite the country's dependence on the petroleum industry, Nigeria, like many developing countries, is mostly agrarian, with two-thirds of Nigeria's working population are engaged in the agricultural sector, making the agricultural industry critical to the nation's growth. Nigeria is the most populous country in Africa and has the 11<sup>th</sup> largest labor force in the world and the largest in Africa (FAO, 2020). Agriculture contributed 26.09% to the GDP in 2019, with crop production being the primary driver of the sector's growth compared with the 8.78 % contribution to GDP from the sale of petroleum products (National Bureau of Statistics, 2019). Over 80% of farmers in the country can be identified as smallholder or subsistence farmers, and excluding wheat, they produce 98% of the food consumed in the country (Janelid, 1975).

Nigerian smallholder farmers play an essential role in food security. They own, on average, 0.5 hectares of land used mostly running mixed crop-livestock systems (FAO, 2016). The agricultural sector remains mostly underdeveloped with less than 1% of farmland having irrigation creating an excessive reliance on rainfed agriculture. Additionally, only 16% of all smallholder farms have the use of mechanized equipment, and barely 6% of smallholder households have access to agricultural extension services. Seventy-two percent of smallholder farmers in Nigeria live in extreme poverty, living on less than \$1.90 a day (FAO, 2016).

The objective of this paper is to conduct a gender-focused cassava value chain analysis through literature reviews and key informant interviews to provide a detailed evaluation of the cassava sector in the South-West of Nigeria and its impact on female smallholder farmers. Cassava has changed over the years from a low yield famine reserve crop to a high yielding cash crop and is now the most extensively cultivated crop in Nigeria (Apata, 2019). Cassava in Nigeria is primarily produced and grown by smallholder farmers, who account for 95% of total cassava production (Otekunrin and Sawicka, 2019). According to the United Nations Food and Agriculture Organisation, the average Nigerian gets roughly 95% of his or her minimum energy needs primarily from cereals, roots, and tubers (FAO 2005). Cassava and yams are over 50% of agricultural production in Nigeria (see Figure. 1), and around half of the food consumption (Deloitte- Africa Analysis, 2017). Cassava is a crucial staple crop in Nigeria, and in some regions, its average consumption surpasses 300 kg per person annually (Omotayo et al., 2016). Cassava is a perennial, versatile crop that adapts easily to different climates and soil conditions and can be cultivated all year round. It is a dietary carbohydrate staple for most Nigerians, cutting across cultural and social divides (Mufutau, 2018). In Nigeria, 80% of the cassava cultivated is for consumption, primarily as garri (ground cassava roots), but it can also be used to make fufu, tapioca, chips, and cassava flour. Non-edible derivatives of cassava include starch, ethanol, and pellets, and the waste produced from cassava processing can be reprocessed into animal feed, glue, and pharmaceutical materials (Mufutau, 2018). Cassava is also considered the most promising crop with the potential for biofuel production in Nigeria (Abila, 2012). In Nigeria, the majority of labor associated with cassava production and processing is carried out by women. As a result, cassava is viewed in some sense as a ‘women’s crop’ (Ijigbade et al., 2014). Cassava plays a vital role in household food security, which is often the burden of women. Cassava is also a low-risk and low-

input crop, which is particularly essential for women who experience more severe restraints in gaining access to agricultural inputs in contrast to men (Kiriti and Tisdell, 2003). When it comes to decision making, men make more decisions about farming and control productive resources. The imbalance in decision-making power and one-sided access to agricultural inputs and technologies affect women's capability or willingness to adopt innovations, thereby suppressing yield potential (Olaosebikan et al., 2019).

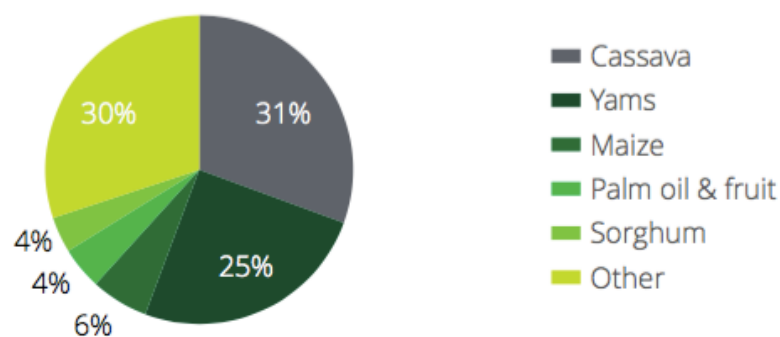


Figure 1: Nigerian Crop Production Volumes (Deloitte- Africa Analysis 2017)

According to the Federal Ministry of Agriculture (FMA) in Nigeria, women make up 75% of the farming population and the agricultural sector employs 74.8% of women in the country (Country Workforce Profile: Nigeria-Sloan Center on Aging and Work at Boston College, n.d.). Women in Nigeria, like most places in the world, are restricted and disadvantaged by traditional and cultural norms and do not have the same access as men or enjoy the same rewards for labor. According to the World Bank, male plot managers earn, on average, over five times their female counterparts. The United Nations Food and Agriculture Organisation estimates that if women had the same access to productive resources as men, they could increase yields on their farms by 20-30%, which could, in turn, reduce world hunger by 12–17%, reducing the number of undernourished globally

by 100-150 million people (FAO 2011). Women are employed in the agriculture sector predominantly as self-employed farmers, as unpaid labor on family farms and as paid or unpaid workers on farms owned by other and agricultural businesses (FAO 2011). Women are 43% of the global agricultural workers and are primarily responsible for crop and livestock farming at both subsistence and commercial stages. Women also produce food and cash crops and administer varied agricultural processes comprising of crops, livestock, and fish farming (FAO 2011).

This study will explore the constraints faced by women in the cassava value chain and the barriers that are inhibiting them from formal market participation. The study will include gender-sensitive market analyses and value chain analyses of cassava and its potential to support rural women's entrepreneurship and income diversification. It will also explore the ability of cassava production to close the gender gap in rural areas to strengthen the livelihoods of rural populations, reduce poverty, and facilitate sustainable rural development.

## CHAPTER 2

### **CASSAVA PRODUCTION IN NIGERIA**

Cassava production has grown dramatically in the last few decades. Between 1980 and 2011, the global harvested area of cassava grew by 44%, (from 13.6 million to 19.6 million ha), the most substantial percentage growth amongst the five major food crops globally (Howeler et al., 2013). Cassava is among the least exploited crops in commercial farming in Nigeria, and despite the high national demand, the value chain remains underdeveloped. However, the continued surge in interest and demand for cassava is driving local interest towards the improvement of agronomic cassava techniques (Deloitte- Africa Analysis 2017). In 2013, the global average cassava yield was 12.8 tonnes/ha. However, research shows maximum yields could climb as high as 80 tonnes/ha, and with both global and local demand rising (see Figure. 2), cassava has become an emerging cash crop for Nigeria (Deloitte- Africa Analysis 2017).

In the South-West of Nigeria, cassava is an essential staple food of both rural and urban households (see Figure. 3). Among the reasons for this is that cassava is a perennial crop that is drought-tolerant, requires minimum input, and has an extended harvesting period. Cassava also contains a high starch content and is a cheap and rich source of dietary energy, with an energy yield per hectare estimated to be considerably higher than that of cereals (Howeler et al., 2013). Cassava is slowly shedding its image as the ‘food of the poor’ and slowly developing into a multipurpose cash crop that has important food security and poverty alleviation implications.

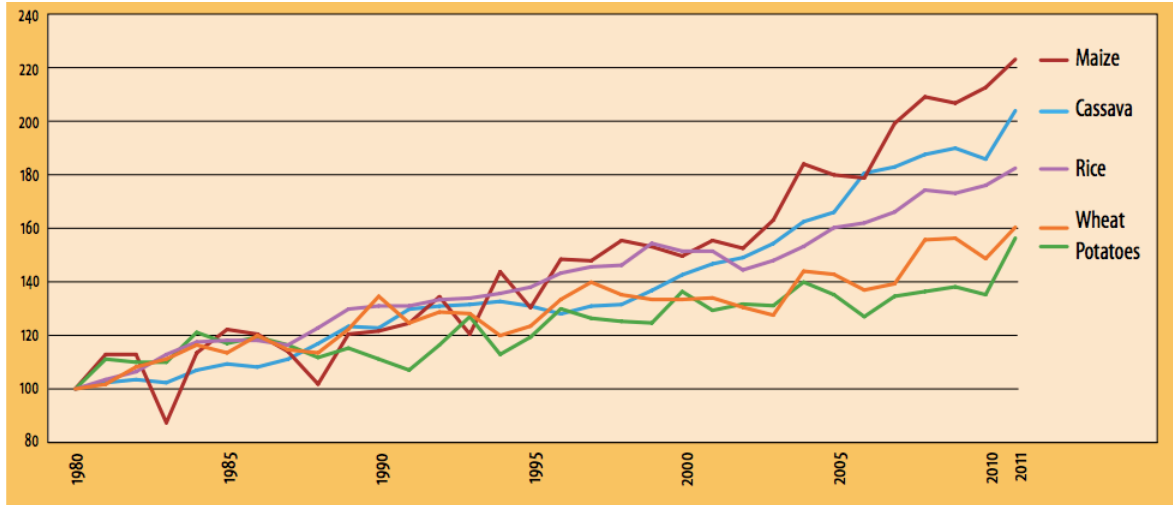


Figure 2: Growth in World Production of Major Crops, 1980-2011 (FAOSTAT, 2013 statistical database-<http://faostat.fao.org/>).

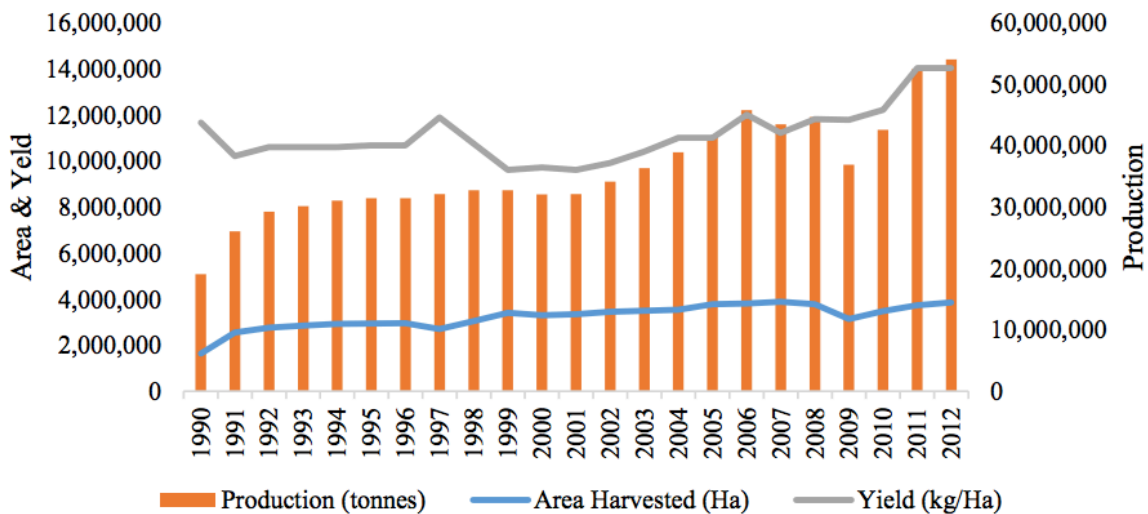


Figure 3: Cassava production in Nigeria over time (Coulibaly et al., 2014)

In Nigeria, an estimated 90% of cassava produced is processed into food. Seventy percent of the cassava processed into food is turned into garri, a product achieved when cassava is fermented, dried, and ground. The remaining cassava processed into food takes the form of elubo or lafun, fufu, or abacha. There is high industrial demand for cassava, mainly as a local and cheaper replacement for imported raw materials and semi-finished products. Locally there is a particular demand for high-quality cassava flour (HQCF). It currently accounts for 10% of Nigeria's

industrial market and is used as a replacement in bread flour, biscuits, and confectioneries, adhesives, seasonings, and hydrolysates for pharmaceutical products. Another industrial use is in the production of native and modified starches (Otekunrin & Sawicka, 2019).

The growth potential of the cassava industry is also driven by government support., Due to the slump in oil prices in recent years, the Nigerian government has prioritized the development of the agricultural sector. As the largest producer of cassava, the Nigerian government has taken a keen interest in the cassava sub-sector. As a result, this cash crop has taken center stage in their plans for the agricultural sector and has led to what can be termed as a “cassava revolution.” The introduction of the Agricultural Transformation Agenda of the Federal Government of Nigeria in 2013 has created a new movement of integrating rural development on a relatively long-term basis into government policy. An offshoot of this plan is the 15% levy increase on wheat grain imports and the cassava flour inclusion policy, which mandates that flour mills and bakeries must include 40% locally produced HQCF in bread. These policies were aimed at growing HQCF production and further diversifying cassava production from garri and creating more value within the market chain.

#### *Market Opportunities for Cassava in Nigeria*

In Nigeria, the market for cassava products, both domestically and internationally, is growing, and the cassava industry serves as one of the promising sub-sectors for future investments and growth (see Figures. 4 and 5). Four major products have been identified by the government and highlighted as potential areas of market growth and expansion in the sub-sector:

1. High Quality Cassava Flour - HQCF derived from peeled and grated cassava contains greater than 90% starch and a great source of energy and a direct substitute for starch, specifically in starch-based paperboard adhesives (SBA). HQCF is considerably cheaper



(\$530 per ton to \$933 per ton) than maize starch, which is the prevalent starch in the market and is mostly imported. The largest market for HQCF is as a partial replacement for wheat flour in baked goods and bolstered by the government policies regarding wheat flour and HQCF; the market has the opportunity to expand rapidly (Naziri et al., 2012).

2. Fufu - Fufu is a wet fermented cassava dough. The monthly fufu market sees about 0.5 – 29 tons sold throughout the country. Fufu traditionally has a strong odor that many find off-putting. In recent years an instant odorless version of the product has been developed, and there has been a growing market for odorless fufu. According to the National Cassava Processors and Marketers Association (NCPMA), 470 tons of instant fufu were sold in 2011/2012, with the advent of this odorless version of Fufu consumption estimated to increase (Naziri et al., 2012).
3. Garri - The average consumption of garri in Nigeria ranges from 6-7 million tons annually, with demand being close to double the consumption average. The garri market is a continually growing market as every stratum of society eats it. The current market is dominated by smallholder farmers and producers and done with manual labor and crude tools that limit production capacity (Naziri et al., 2012).
4. Starch – In Nigeria, between 80-90% of starch is used in food production and is primarily imported maize starch. The estimated market is around 60,000 tons/annum. However, there are very few operational starch production centers in Nigeria. To take advantage of the market, additional investment in local production is needed (Naziri et al., 2012).

Sub-sector	Competing ingredient	Current / potential annual demand for cassava-based products			Medium-term potential in FCR* equivalents t/yr	Potential for smallholder involvement	Comments
		Current market tons	Theoretical demand	Achievable demand			
HQCF in bread	Hard-Wheat Flour	2,500	400,000	40,000	160,000	~13,300	Depends on solving root supply, processing & bakery inclusion issues
HQCF in biscuits	Soft-Wheat Flour	0	80,000	16,500	66,000	~5,500	
HQCF in snacks	Hard-Wheat Flour	12,500	18,500	12,500	50,000	~4,200	
HQCF in paperboard	Maize Starch	0	6,000	6,000	24,000	~2,000	Depends on buy-in from paperboard factories
Instant Fufu	Wet Fufu	500	Niche market, follow-up in Feb 2013 to assess potential for market development by HQCF SME's				
Packaged garri	Traditional Garri	50-100	100 t	100 t	430	V. small	Niche market no potential
Cassava Starch	Maize Starch	4,000 – 10,000	60,000 t	10,000 t	50,000 t	~4,200	Little potential for expansion
Sugar Syrups	Maize-based syrups	0	200,000 t	0	0	0	Investment is unlikely in the medium-term
Chips for export to China	Cassava Chips from Thailand & Vietnam	0	2.2 million t	0	0	0	Nigeria is unable to compete, exports are not economic
Chips for animal feed	Maize-based feed	0	450,000 t	Follow-up in Feb 2013	1,215,000t	~100,000	Depends on cost of maize, cassava & protein ingredients & access to pelletisation
Ethanol industrial	Imported Ethanol	0	60 million litres	Follow-up in Feb 2013 to confirm economics of cassava-based ethanol.	360,000 t	~30,000	The economics of cassava-based ethanol do not look favourable, the potential for E10 & cooking fuel remains unclear, smallholders will only be involved if dry chips are used, major sourcing probably from commercial farms.
Ethanol in petrol (E10)	Ordinary petrol without ethanol	0	700 million litres		4.2 million t	~350,000	
Ethanol for cooking	Kerosene & firewood	0	1 billion litres		6 million t	~500,000	
Cassava-based beer	Barley-based beer	0	30,800t <sup>a</sup>	Follow-up Feb 2013	123,200t	~11,000	Dependant on commitment from breweries & tax incentives
<b>Total</b>					<b>~12.5 million t</b>	<b>~1 million</b>	

\* = Tons of fresh cassava roots (FCR) a = Cassava grits adjusted to 14% moisture or equivalent in wet-cake (~40% moisture)

Figure 4: Summary of potential demand for cassava-based products (Naziri et al., 2012)

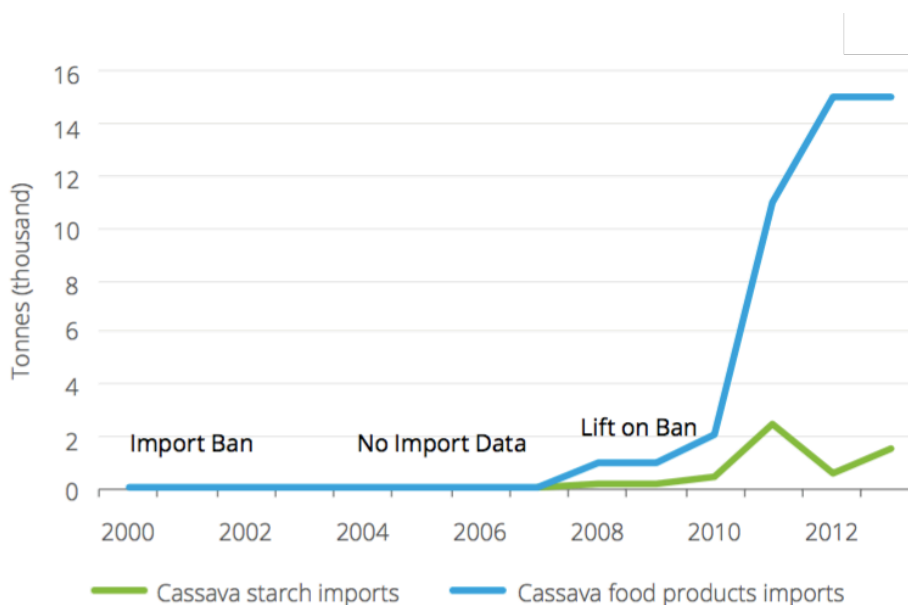


Figure 5: Cassava food products & starch import trend Nigeria 2000-2013 (Deloitte-Africa Analysis 2017)

Smallholder cassava producers typically cultivate between 0.2 and 1 hectare on dispersed plots, planting cassava primarily for personal consumption and often selling whatever excess they have (Coulibaly et al., 2014). Smallholder cassava production remains highly labor-intensive, with most farmers using traditional manual implements such as hoes and cutlasses, and most of the labor used for production activities supplied by family members (Abila, 2012). Subsistence farmers rarely utilize fertilizer, pesticides, improved seed or machinery, and are often reliant on older varieties of cassava and traditional technologies. This makes it challenging to achieve the yield potential of cassava in ways similar to other cassava producing countries like Thailand and India that are experiencing increased yield through the use of improved practices and new technologies (Deloitte- Africa Analysis 2017).

Cassava production includes five main activities:

1. land preparation (clearing, packing)
2. planting (laying-out, tilling, planting)
3. weeding/farm maintenance
4. harvesting/ transportation for off-farm events (market days, selling to middlemen, etc.)
5. Processing/value addition

Cassava farming activities are typically performed manually and mainly conducted by hired day laborers, often not from the community, working with machetes and hoes (Coulibaly et al., 2014). Cassava is traditionally farmed either as a sole crop or mixed with other crops like yam or maize (see Figure. 6). Around 65% of farmers in Nigeria utilize a mixed cropping system. In the case of combined cassava-maize plots, the maize is typically the first crop planted. Once it has reached

maturity, cassava cuttings are planted in the same place as the maize and grow alongside the maize until the maize is harvested, leaving the cassava alone to fully mature. (Coulibaly et al., 2014)

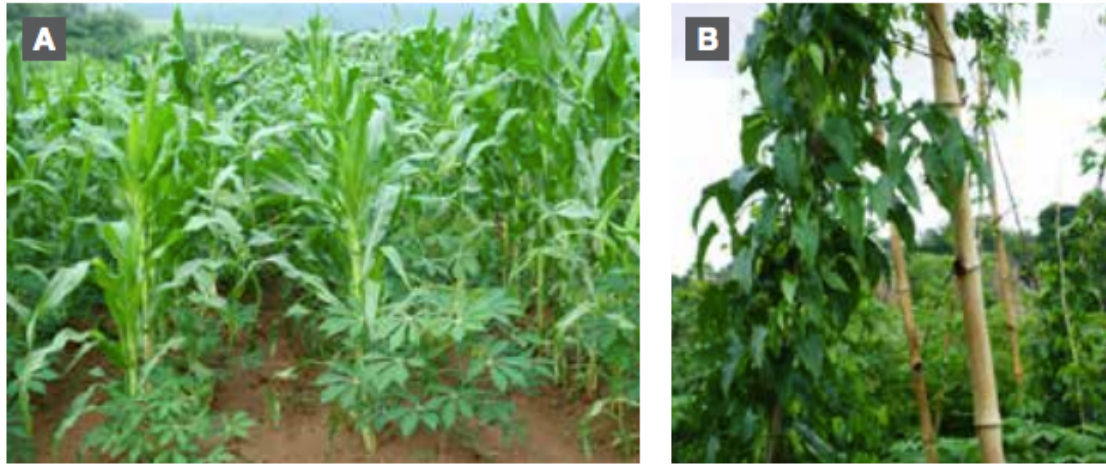


Figure 6: Cassava intercrop combinations (A) Maize and Cassava (B) Yam and Cassava (Hauser et al., 2014)

Among the constraints to more efficient cassava production in Nigeria is the current land tenure system. Small, fragmented land parcels limit mechanized cultivation. With the exception of a small number of hired tractors, cassava farming remains un-mechanized. The lack of adequate transportation infrastructure throughout Nigeria, most notably in the more rural areas, limits trade, and commercial-scale value addition. It remains challenging to aggregate and move raw cassava from farms to processing plants (Coulibaly et al., 2014). There are several factors within production and market information systems in Nigeria that currently need rethinking to capture market potentials fully;

1. cassava farmers are still at the mercy of middlemen when it comes to pricing, which in turn creates uneven profit margins and value-added distribution.
2. Nigeria is lagging behind the rest of the world in the development of improved cassava varieties, which would enable increased productivity. By adopting new varieties, the

annual production of cassava in Nigeria could increase substantially and generate more income for the smallholder farmer. (Coulibaly et al., 2014)

### *Cassava and Food Security*

The United Nations Food and Agriculture Organisation estimates the average Nigerian gets roughly 95% of his or her minimum energy needs primarily from cereals, roots, and tubers (FAO 2005). Cassava and yams are over 50% of agricultural production in Nigeria and around half of the food consumption (Deloitte- Africa Analysis 2017). Cassava is a crucial staple crop in Nigeria, and in some regions, its average consumption surpasses 300 kg per person annually (Omotayo et al., 2016). The level of food insecurity in Nigeria has been rising as a result of the limited economic access to food both directly and indirectly. A study undertaken in 2013 on Nigerian farm households found that up to 60% of them were food insecure and employed tactics like applying for loans, reducing the number of daily meals in their household, and changing their diets to address this (Coulibaly et al., 2014). Cassava production and consumption offers a viable option in helping to improve food security, known as the ‘crop of last resort,’ as it can be cultivated on less fertile and poor soils. Cassava can act as a source of ready revenue for farmers as there is a high local demand for cassava products like the popular staple food, garri, and input costs are low. Additionally, cassava is a cheap source of carbohydrates, providing the highest yield of food energy per cultivated area per day of any crop in the country, except for sugarcane. To adequately address the shortfalls in food production that contribute to an increase in food security, there needs to be a marked increase in labor productivity and yield, particularly in the cassava sub-sector. By increasing labor production and yield, we can work towards increasing household food security and, as a result, have a positive effect on the socio-economic welfare of smallholder farmers.

Understanding the connection between cassava production, farm income, and food security is essential for governments and non-governmental organizations (NGO's) who aim to create intervention strategies and pathways to food security and financial stability for smallholder farmers.

## CHAPTER 3

### CASSAVA VALUE CHAIN

Successful and efficient value chains have a critical role in poverty reduction in Africa. The bedrock of the cassava value chain in Nigeria is the female small-scale farmer. Though men are traditionally more involved in cash-crop activities, which gives them the advantage of higher income (Sell & Minot, 2018), the cassava value chain in Nigeria is primarily built upon the labor of women for both farm-level production and value addition. However, these women are often excluded from the majority of the financial benefits, receiving fewer profits than other male actors in the cassava chain (Apata, 2019). Women are limited by a variety of social and cultural norms at the household, community, and larger societal scale, as well as discriminatory government policies.

Among all the cash crops in Nigeria, cassava production plays a significant role in securing the livelihood of the rural poor and providing a sustainable avenue for value chain actors to create positional advantage (Ho et al., 2019). Ho et al. describes the positional advantage as an *“advantage gained by exploiting resources and capabilities to create superior performance. Positional advantage mediates the affiliation between competitive advantage and venture performance; and between market orientation and new product performance”*. One could argue that the cassava value chain actors are in a position to leverage the demand, market and government will to propel the sub-sector forward while also improving the lives and livelihoods of the women who are the main actors within the value chain. The current cassava value chain can be broken down into the following activities:

### *Cassava Producers*

In Nigeria, cassava is primarily produced by four types of groups; small-scale subsistence farmers, small-scale commercial farmers, medium-scale commercial and large-scale farmers (see Figure.7), and they each face different challenges and have diverse operational models (Daniels et al., 2011).

1. **Subsistence Farmers-** subsistence farmers, make up the majority of cassava producers in Nigeria and produce the bulk of cassava products eaten in Nigeria today. Subsistence farmers usually farm on scattered plots between 0.2 ha to less than 1 hectare in size, and produce cassava primarily for household food consumption and selling any excess for income. These producers have little to no access to machinery and use traditional manual tools for farming. Their farming activities are often labor-intensive and are carried out by family members.
2. **Small Commercial Farmers-** these farms are usually up to 5ha in size, and typically employ hired labor. The main objective of their production is commercial rather than household consumption. Small commercial farmers are more likely to use improved varieties of cassava. Neither type of farmer is likely to use fertilizer, herbicides, and pesticides. Similar to subsistence farmers, small commercial farmers rarely use machinery, and their work is very labor-intensive.
3. **Medium Farms-** medium farms are typically between 6ha and 10ha and utilize improved variety stems, fertilizer, herbicides, and pesticides. These farms use machinery and hired labor.
4. **Large Farm-** Bigger industrial companies often own large farms, typically larger than 10ha, and process cassava for commercial activities both domestically and internationally. These



farms also use hired labor but also work with modern inputs and technologies and generally have higher yields.

#### Productivity Differences Across Producer Categories

1. Subsistence Farms- subsistence farms are the most susceptible to harmful external factors like disease and climate change. They have the lowest yields among cassava farmers in Nigeria, achieving around 8-10 mt/hectare. Subsistence farmers, unlike the larger farmers, cannot afford yield-enhancing inputs, improved varieties, or mechanization.
2. Small Farms- typically small farms achieve yields of 11-15 tonnes/ha, far below their estimated potential of 25 tonnes/ha. This can be attributed to the inadequate use of agrochemicals and poor farming techniques. Higher yields are attainable by small commercial farmers in Nigeria, especially in regions that have received support with training and inputs. Such farmers have obtained yields of 25-30 tonnes/ha. Small commercial farms predominantly produce cassava for medium-quality traditional food products.
3. Medium Farms- medium farms produce 27-30 tonnes/ha. Medium-scale farms mainly supply a range of industrial processors. One of the critical outputs of these industrial processors is high-quality cassava flour (HQCF).
4. Large Farms- these operations are not as prevalent in Nigeria due to the cost of operations, and the lack of infrastructure in the country. The larger commercial farms produce around 27-35 tonnes/ha. These farms are mostly owned by large-scale industrial processors like Nigerian starch mills and almost solely provide cassava for industrial processing of starch, glucose, dextrose, animal feed, and other non-food products.

### *Traders and Transportation*

There are three types of traders:

1. Collectors are the most common traders in Nigeria and account for 20% of cassava root sales in Nigeria. They hire transport and travel to cassava farming regions and often purchase on-farm directly from cassava producers. Collectors employ local labor to harvest and load the cassava they are buying and then transport it to cottages or mills. The process is expensive, as the rapid perishability of the crop means that large amounts must be harvested and transported in a short period. Despite this, collectors make on average 15% profit on the sale of the cassava.
2. Cooperatives though vital to rural society, play a much smaller role in the cassava market compared to collectors. Cooperatives account for 2-8% of cassava (raw roots or value-added products) sold in Nigeria. These cooperatives sell their member farmers' cassava to larger processing companies. They also sell processed cassava products to retailers. Like collectors, cooperatives must also hire transport, a very high cost in the value chain.
3. Retailers sell processed cassava products such as garri and fufu and cassava food products. They distribute these foods in rural and urban markets, as well as on the roadside. Around 5-7% of farmers are also retailers selling their cassava products.

### *Processing*

Processing of cassava occurs at cottages, micro-processing centers (MPC), small to medium-scale processors, and large-scale processors:

1. Cottages account for the majority of processing and is carried out by women and children at the household level, where cassava is refined manually into artisanal cassava products. Cottage processor produce on average 30kg of cassava daily.

2. MPCs usually consist of a shed, a grater, a press, and a modern roaster. Cottages and MPCs produce traditional food products such as garri and fufu.
3. Small-medium processors produce HQCF, starch, and high-grade fufu for export. They usually utilize mechanical driers and employ up to 10 people.
4. The large processors process up to 100 tonnes of dry cassava per day. These plants focus on producing cassava starch and other products for industrial use. The limitation of large processing plants is the need for large amounts of raw cassava to keep production profitable as currently there are few sustainable supply lines of cassava to these processing plants. As a result, many of these large processors own their cassava fields to ensure enough cassava is available to make processing profitable. In addition to this, a new type of mobile processing plant has emerged, able to move between farms and process raw cassava into a wet cake at a rate of 5 tonnes/hour. These machines are expensive but are an effective way of overcoming the complication of cassava spoiling two days after harvest.

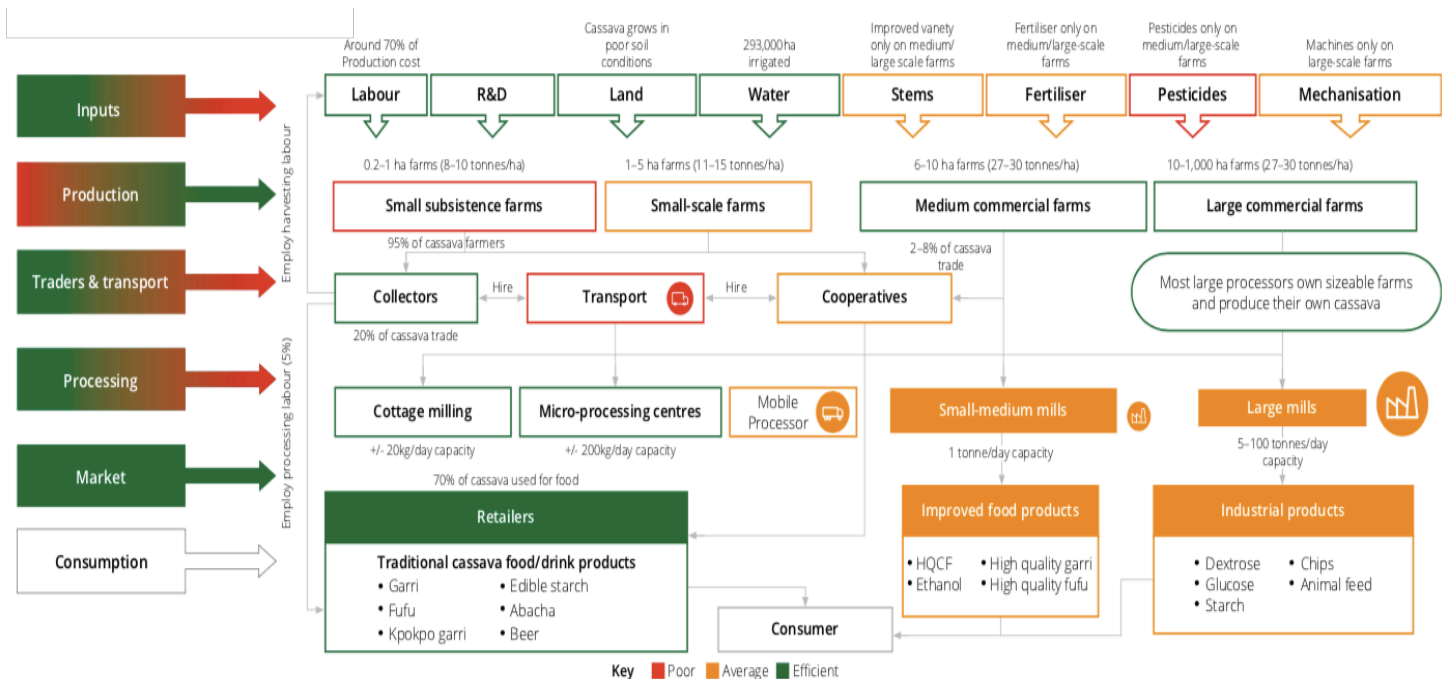


Figure 7: The Nigerian Cassava Value Chain (Deloitte- Africa Analysis 2017)

## CHAPTER 4

### WOMEN AND CASSAVA

In Sub-Saharan Africa (SSA), female labor-force participation percentages are comparatively high when compared to the rest of the world, and the average agricultural labor-force participation rate in SSA is the highest globally (see Figure.8). The SSA rate of participation in agriculture can be somewhat credited to societal and cultural norms, which traditionally promote the economic self-reliance of women and give women substantial control of agricultural production (FAO 2011). However, this does not equate to equality between men and women in terms of decision making in the household or access to land and resources.

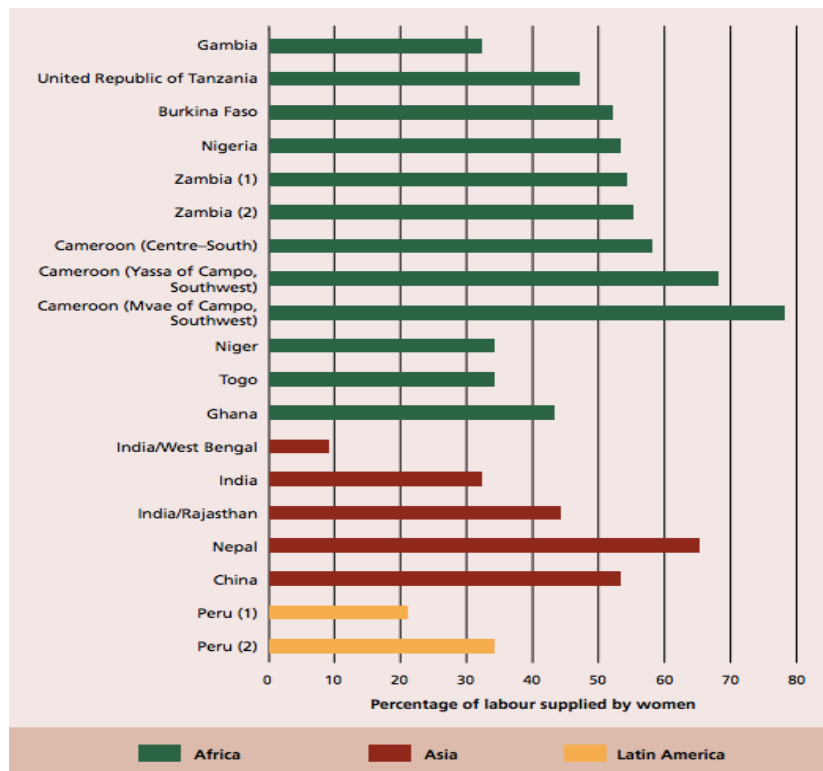


Figure 8: Proportion of labor in all agricultural activities that is supplied by women (FAO 2011)

Agriculture is underperforming in Nigeria for several reasons. One of the leading causes for this is the fact that women are often cut off both socially and legally from resources, the means of production, and opportunities that are typically afforded to men. However, women in Nigeria still provide a large amount of agricultural labor, women participate in agricultural activity as self-employed farmers, as unpaid workers on family farms and as paid or unpaid laborers on other farms and agrarian organizations (FAO, 2011). Nigerian women work in various sectors of agriculture and are essential to the selection, breeding, cultivation, preparation, and harvest of food grains and cash crops. In recent years, their participation in cash crop production has significantly increased, with 22% of female-led households and 25% of the male-led household involved in cash crop production (Oseni et al., 2013a).

Despite this, women are still falsely pigeonholed as “economically inactive” in statistical surveys of agriculture (Janelid, 1975). In the South of Nigeria, the number of women engaged in agriculture as a percentage of the economically active population is roughly equal to that of men, with women constituting 51% of the agricultural labor force (Palacios-Lopez et al., 2017). Nigerian women are traditionally in charge of most of the agricultural labor in the homestead and are responsible for household food security and augmenting family incomes. Women in Nigeria also experience reduced agricultural productivity due to gender-based inequalities in access to land and control of productive and financial resources, perpetuating food insecurity, malnutrition, and poverty. The notion that female farmers need to be overseen by men to be successful in farming has been proven wrong. Female plot managers in Nigeria undertake their farming tasks at similar rates as male managers. The percentage of female plot managers processing and selling their crops is 32%, and 36% is not far off from their male counterparts who are processing their crops at a rate of 34% and

selling their crop at 38%. Despite this, male plot managers can earn, on average more than five times their female plot managers (Oseni et al., 2013).

### *Women's Access to Services*

Women in Nigeria, like women globally, are underserved by agricultural services and extension. Agricultural extension programming in Nigeria fails to recognize the significant contributions of women in agricultural production and value addition. Policymakers and administrators continue to believe, despite evidence to the contrary, that farmers are men, and women only hold supportive positions in agriculture by virtue of being farmers' wives (Samanta, 1994). According to the United Nations Food and Agriculture Organisation, for a long time, the very definition of farmers discriminated against women. A Nigerian farmer was legally defined as being "an adult male... who has the right to the produce of a farm... women are not classified as farmers" (Swanson et al., 2005). Agricultural extension activities usually focus on promoting the farming and production of cash crops and do this through delivering training almost exclusively to men granting them a monopoly on access to inputs and services. This preferential treatment can be seen most clearly in farmer residential training centers, which are created to disseminate agricultural technologies and new practices to advance rural development and agriculture. However, many of these centers are not women inclusive and fail to provide essential facilities for women, such as separate washrooms, dormitories, and resources for childcare. The absence of these prevents many women from attending or taking part in the center activities. Another barrier to women's participation in agricultural service is their day-to-day household activities (Swanson et al., 2005). Women are usually the principal caregivers and in charge of maintaining the household, which may prohibit them from attending residential training. Even when women manage to bypass these barriers and

attend trainings, and the attendance of women is significant or high as a proportion of the total, they are mainly given training in home economics and craft subjects and excluded from more technical agricultural exercises (Swanson et al., 2005). This practice is common globally and is not exclusive to Nigeria. A study of the role of gender norms in access to agricultural training in Chikwawa and Phalombe, Malawi analyzing the work of the Irish Aid-funded *Rooting Out Hunger* program in Malawi with nutritious orange-fleshed sweet potato found that there are ‘prevailing perceptions,’ both socially and culturally, that may prevent men or women from accessing the information and training that the local communities require (Mudege et al., 2017). The study highlighted that men were frequently targeted with agronomic training, even though women also contribute to the production of crops, and women with nutritional training, excluding both genders from the other respective trainings. Men were perceived as the head of the house and consequently should attend production training on behalf of their households, taking the information they receive to train other household members (Mudege et al., 2017). Men were also characterized as ‘demonstrators,’ who disseminate what is classified as ‘important’ agronomic information. In contrast, women who were trained on subjects related to nutrition, food preparation, and processing are classed as ‘displayers’ (food display), which implies a more passive exercise (Mudege et al., 2017).

A common misconception that is prevalent in Nigeria and globally is the idea of passive females in agriculture, someone who is not actively engaged in farming and is reliant on their husbands to give them information regarding farming, which is an outdated and wrong perception. The importance of women in agricultural and global development cannot afford this continued thinking when it comes to extension and farming services.

### *Women's Access to Land and the Means of Production*

The land is a critical resource for poverty reduction, food security, and rural development as it offers a route to earning a livelihood through the production and sale of crops and the opportunity of accessing credit (Meinzen-Dick, 2009). However, men and women do not always enjoy the same rights to land. In Nigeria, the gender gap in terms of land ownership is one of the worst in the world, less than 2% of women, compared to 17% of men, own land by themselves (Slavchevska et al., 2016). The patrilineal system of inheritance laws and customs in Nigeria discriminate against women as men are more likely to inherit land over women. Inheritance laws are governed by the 1978 Land Use Act of Nigeria (LUAN), which was established to give men and women equal opportunities to inherit ancestral or familial land but, in reality, falls extremely short in achieving this goal. The LUAN is only applicable to legally married women. Unmarried women are not eligible to inherit the land (Slavchevska et al., 2016). Secondly, transfer of land ownership is still largely governed by customary law or the primogeniture rule, which decrees that upon the death of the owner the land is transferred to the eldest male child or if none is present, the eldest male relative of the deceased, bypassing female children or wives (Onuoha, 2008). Nigerian women's land rights are through the conduit of their husband or their marriage, and they maintain this access to land, providing they remain in their husband's household (Charles, 2010).

Nigeria today is home to 12% of the world's poor, with close to 100 million people living below \$1.90 a day and over half of them being women (World Bank- Poverty, n.d.). In June 2018, Nigeria overtook India, with a population seven times that of Nigeria, as the world's poverty capital (World Poverty Clock, n.d.). As a consequence of land rights discrimination, women's lack of access to



physical assets, a lack of education, and biased cultural and social norms, women in Nigeria are particularly vulnerable to poverty and food insecurity. This has led to what some call the feminization of poverty in the country (Anyanwu, 2010). Nigerian women have higher instances of poor nutrition caught in a negative circle of poverty and undernutrition (Oniang' o and Mukudi, 2002) Food insecurity prevalence is higher in female-headed households at 49% than in male-headed households at 38%. (Omonona et al., 2007). This privation of resources from women has considerable implications on the future of the country and its overall development, as the contribution of women to the economy is both critical and vast, and the continued marginalization of women will lead to the continued increase of people falling below the poverty line.

## CHAPTER 5

### AGRICULTURE FINANCE AND INCLUSION

The World Bank estimates that the global demand for food will increase by 70% by 2050, putting a massive strain on the current agricultural sector. Moreover, meeting this demand will require an additional investment of \$80 billion annually. The countries that will bear the brunt of this demand will be developing countries like Nigeria, that currently lend a disproportionately lower portion of their loan portfolios to agriculture (World Bank, 2019). In Nigeria, only 23% of the adult population has access to formal financial institutions, with 24% having access to informal financial services, e.g., money lenders, cooperative lending, etc., leaving 53% of the population entirely financially excluded. Residents of rural areas are most vulnerable to financial exclusion (Badiru, 2010). Studies have shown a positive correlation between institutional credit access and increased productivity among subsistence farmers in Nigeria. Nevertheless, a majority of subsistence/smallholder farmers are unable to access credit and cannot adequately improve their production, income, and social welfare. Improved access to credit promotes the development of both farm and non-farm income and general household income (Linh et al., 2019).

Agricultural finance is “a process of obtaining control over the use of money, goods, and services (for agricultural purposes) in the present in exchange for a promise to repay an agreed amount at a future date” (Ejiogu, 2018). Agriculture financing is a necessary and critical part of agriculture and farming, and an essential step in deciding the quantity and quality of inputs, technology, materials, and labor utilized by the farmers (World Bank, 2019). Economically, farmers in Nigeria are among the weakest groups in the country and are often trapped in a poverty cycle. Their marginal propensity to consume and save is extremely low, and access to capital is vital for farmers

to escape this poverty cycle, increase farm operations, and improve livelihoods (Okeke and Okeke, 2009).

### *The sources of agricultural finance in Nigeria*

Nigerian agriculture finance markets are limited by several factors, including (World Bank, 2019):

- incompetent or ineffectual policies,
- high transaction costs to reach remote rural populations,
- covariance of production, market, and price risks,
- absence of adequate instruments to manage risks,
- low levels of demand due to fragmentation and embryonic development of value chains,
- lack of expertise of financial institutions in managing agricultural loan portfolios.

The two primary sources of agricultural finance for farmers in Nigeria are the non-institutional/informal financial sector and the institutional/formal financial sector.

1. The **non-institutional/informal financial sector** is categorized as funds obtained through cooperative societies, borrowings from family members, or money lenders. The primary source of lending in the non-institutional/informal financial market is through money lenders who often are exploitative and charge interest rates that further plunge farmers into financial jeopardy. Often these money lenders require collateral from the farmers; in most cases, their most valuable assets, including farm equipment. In the absence of such equipment, personal belongings are offered as collateral. The cooperative society form of non-institutional/informal finance is traditionally administered through formal cooperatives or contribution among groups of social networks. The money is distributed in one of two ways, either lent to the members of the society on a rotational basis, or the money is combined and is awarded to the member that has made the request at an agreed

interest rate. Despite the fact there is no collateral requirement, the repayment interest rates of cooperative societies can be high, and in some cases, between 10 to 15% per month (Fadeyi, 2018).

2. The **institutional/formal financial sector**, in terms of agriculture, can be further broken down into governmental funding and commercial funding, i.e., banks. The Nigerian government has several initiatives that were established to improve agricultural financing in the country. These initiatives include the Agricultural Credit Guarantee Scheme Fund (ACGSF), the Agricultural Credit Support Scheme (ACSS), the Commercial Agricultural Credit Scheme (CACCS) and the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL). These schemes typically have very favorable terms for farmers, providing credit to producers at a single-digit interest rate and supporting repayment with a 6.0% rebate on credit facility (Okoruwa et al., 2020). Despite the various initiatives available, the funding of the schemes by the government has been mostly inconsistent since the inception of the oldest initiative ACGSF in 1978. As a result, these schemes have been mostly ineffective in improving the financial access of smallholder farmers. Another reason for the ineffectiveness of government funding is that the number of loans issued is not commensurate with the needs of the smallholder farmers, making it difficult for farmers to gain access (Okoruwa et al., 2020). Commercial, agricultural, development, and microfinance banks are the principal entities rendering financial services to the agricultural sector in Nigeria. Credit provision from banks in Nigeria for small processing equipment is nearly non-existent, and banks rarely lend to small scale farmers directly without them going through one of the existing government schemes. Banks are more more likely to lend to large processors and that credit comes with better terms than

loans to smaller processors. Formal financing in Nigeria in its current form cannot meet the credit need of all value chain actors concurrently. (Okoruwa et al., 2020)

The cassava value chain in Nigeria has excellent economic positioning, and there is room for development both from supply and demand sides. However, this will require financial infusion into the value chain, more specifically, access to credit for farmers (see Figure. 9 and 10). As previously outlined, there is little or no formal financing from financial institutions, and existing micro-finance schemes are neither widely available nor address all sector requests (Okoruwa et al., 2020).

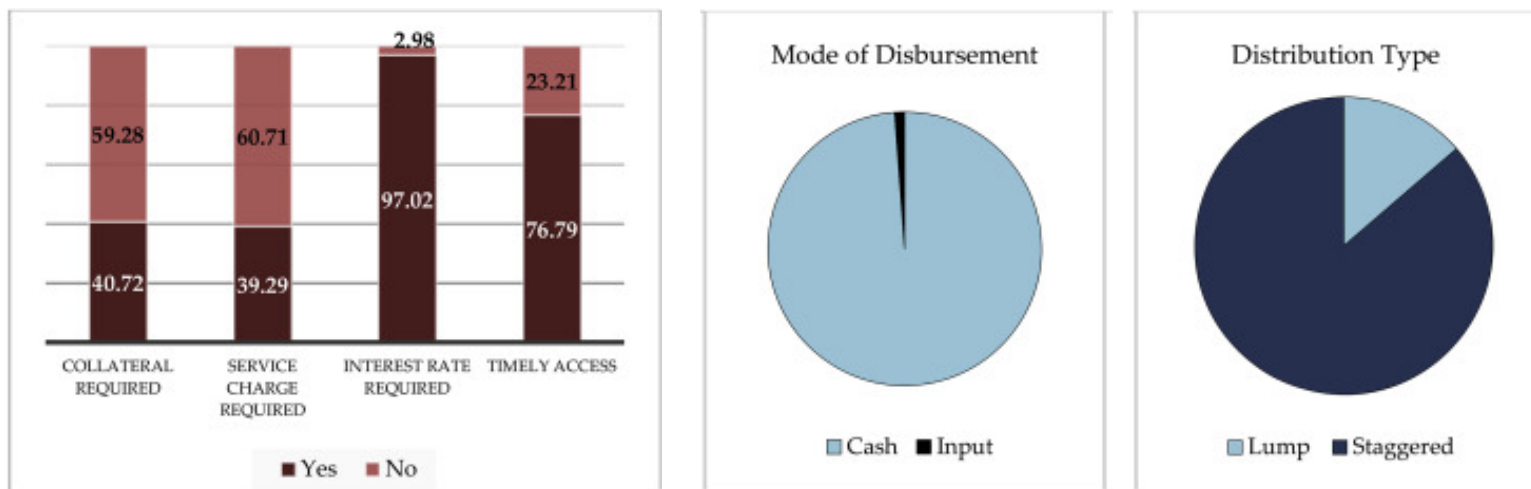


Figure 9: Loan characteristics of cassava value chain actors (Okoruwa et al., 2020)

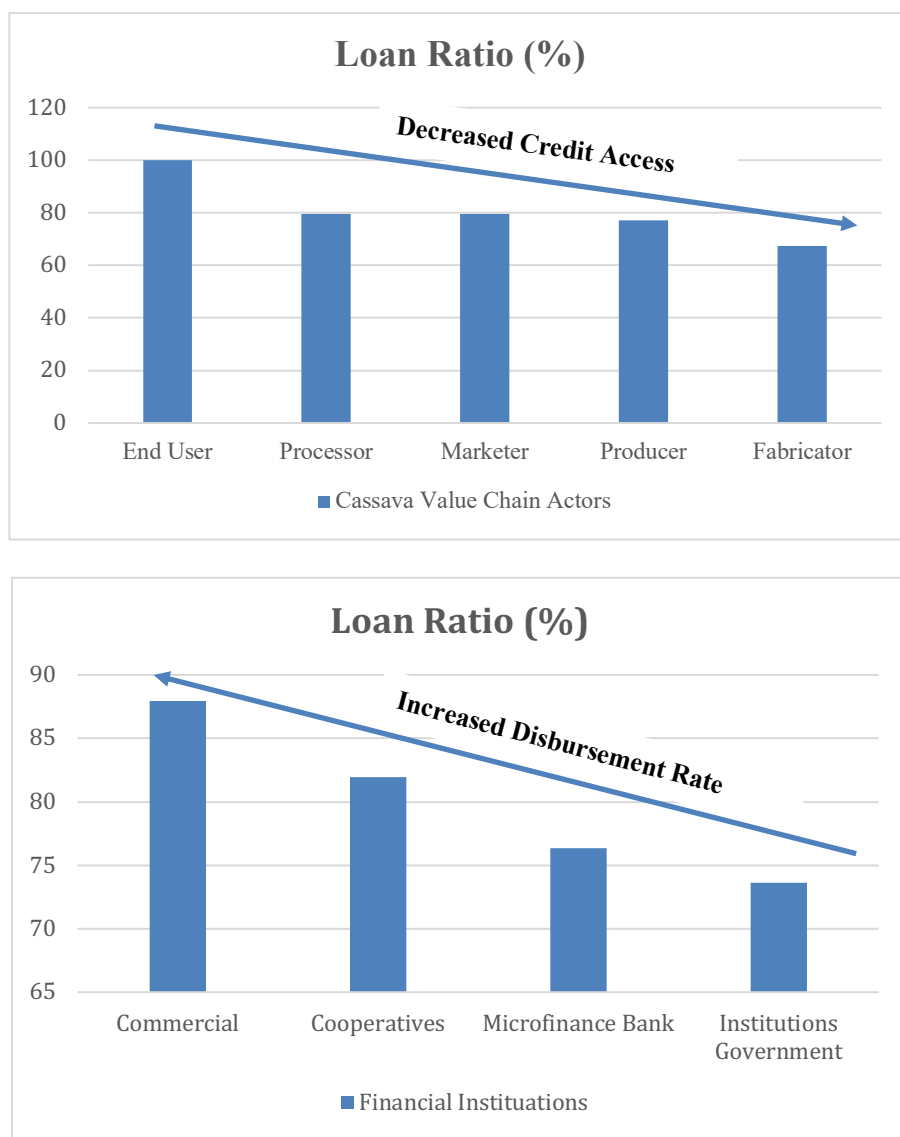


Figure 10: Average values of loan variables by enterprise and financial institution characteristics women (Okoruwa et al., 2020)

Women agricultural workers are often on even worse financial terms than the men who work in similar roles in agriculture. By virtue of their position in the home as caregivers, and despite their need to work to provide for their household, their working status in society is often not viewed as formal work or labor. This status affects not only how they see themselves but often also how they value their labor and is a significant factor in why women agricultural workers accept lower pay for the same role. Women often also have virtually no access to agricultural financial information,

services, or even to production assets, and have minimal power over their livelihoods or earnings. (Swamikannan, 2015). The financial inclusion gender gap is defined as “the percentage unequal access to and usage of broad range formal financial services (credit, savings, insurance, and remittances) between the males and females” (Adegbite and Machete, 2020). The financial inclusion gender gap (FIGG) (see Figure. 11); in Nigeria in smallholder agriculture has been increasing steadily in recent years, going from 7% in 2011 to 24% in 2017 and continues to climb (Adegbite and Machete, 2020). Women are more likely to be excluded from the formal financial sector and as a result, take advantage of the informal financial industry and as a result, generally have worse financial terms than men, which in turn can serve to keep them within the poverty cycle (Adegbite and Machete, 2020).

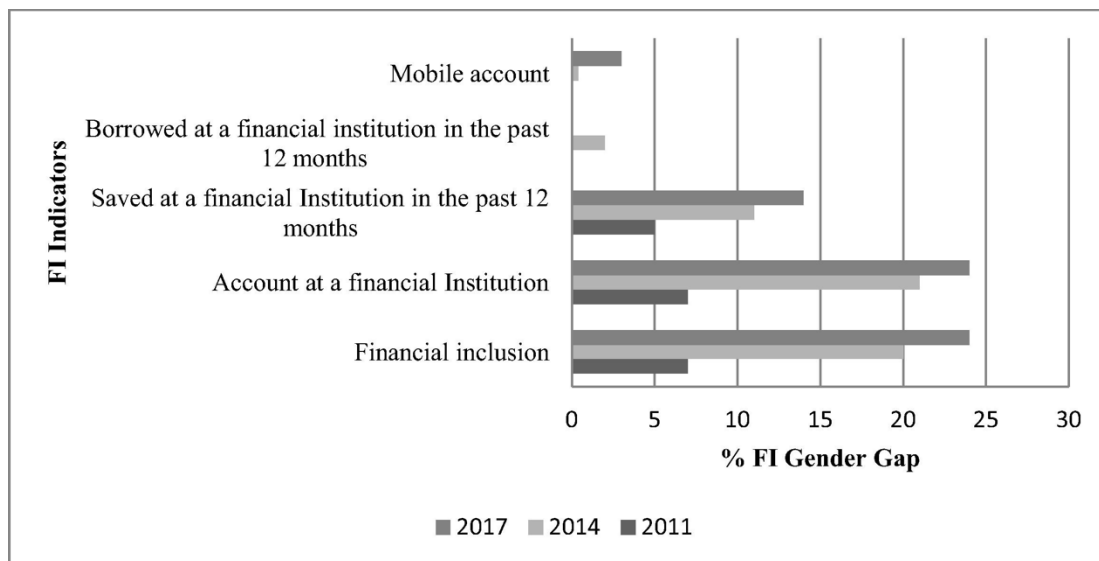


Figure 11: Trend in Financial Inclusion Gender Gap (FIGG) in Nigeria (Adegbite and Machete, 2020)

Figure 11 shows the trends in FIGG over time and the decline in recent years. This study by Adegbite and Machete, 2020 states that account ownership at financial institutions helps the access to formal financial services. At the same time, mobile account ownership facilitates direct access

to financial services through digital financial inclusion. Nigerian female smallholder farmers fall behind in the access and usage of formal and digital financial services in addition to the benefits of having a savings account. In all indicators regarding financial inclusion, female smallholder farmers are disadvantaged and lack adequate access.



## CHAPTER 6

### VALUE CHAIN ACTORS INTERVIEW ANALYSIS

The information presented throughout the following chapter stems from semi-structured interviews with value chain actors and individuals outside the value chain, such as researchers, academics, or economists. This chapter will provide context relevant to the roles of women within the value chain. It will present the gender dynamics that affect value chain performance and will provide commentary on the pathways to improving the value chain.

A focus group interview was conducted with 30 members of the ‘Idera de’ cooperative, made up over 100 female cassava producers and processors based in Oyo State. The name Idera de loosely translates to ‘the easy life has come,’ which in itself shows the hope for the future that the women of the cooperative believe cassava can bring. They, like many cassava producers across the country, are subject to the same social, cultural, and political constraints that stop female farmers from realizing the market potential of their crops. Household dynamics in Nigeria are one of the prominent factors affecting the performance of women within the cassava value chain. Women within a male-headed household, whether it be their fathers or husbands, lack decision making power or control over their earnings. The women of the Idera de cooperative also spoke of not having control of their earnings. One respondent mentioned how she was unable to “hold” her own money, and all funds she received were immediately remitted to her husband. The latter then decided what the money would be used for within the home, which did not always coincide with the needs of the family at the time.

Professor Temidayo Gabriel Apata, a Professor of Agricultural Economics and Extension Services at the Federal University Oye Ekiti and a lead researcher in the field on cassava value chains and gender in Nigeria, also echoed this statement when interviewed. He countered that men often spent a significant amount of household income on their individual needs and not those of the family and that women often accept this because of cultural, social, and often religious norms that placed men as the '*pater familias*' or unchallenged authority in the household. Professor Apata also asserted that female farmers were further beholden to their male relatives because of their lack of access to land and credit. He noted that even with the death of the male head of the household, women are unlikely to inherit the land even if the land belonged to their husbands.

Another point raised by the cooperative focus group is the lack of control they had overpricing. The middlemen in the cassava value chain have a lot of influence over the price of cassava and could arguably be said to have the most power in the value chain. The women of Idęra de cooperative stated that prices are typically determined between their husbands/fathers and middlemen/traders. Middlemen often come to the farms and purchase directly from the producers and agree upon the price with the male head of the household. They typically visit several farms to purchase cassava products, thereby establishing a market price that is reinforced through farmer social networks. These middlemen then go on to sell to the commercial market and, in some cases, sell raw materials to large scale producers at a sizeable profit. Not surprisingly, interviews and focus group discussions revealed a widely held perception that middlemen enjoy the most benefit. At the same time, small scale farmers are the most disadvantaged actors in the cassava value chain.

Some acknowledged, however, that middlemen do provide a service. The female owner of one of Oyo State's largest cassava processors, Psaltry International, with an annual processing output of 15000MT, highlighted how middlemen are both vital and exploitative. The Psaltry International owner mentioned that she purchases raw cassava in bulk from middlemen who do the cassava aggregation on her behalf. Even though she paid considerably more for the products than she would pay if buying directly from smallholder farmers, the time and logistical demands associated with acquiring raw material herself would delay processing and would decrease her output.

The presence of government, both local and national, according to the Idęra de women, was limited or non-existent. There are few government interventions in strengthening the value chain, and the only interactions the Idęra de cooperative women noted was on farm days during which a local government official performed a cursory inspection of how they packaged their cassava products for sale and whether the items appeared to be 'clean.' There was a general sentiment among the women that the government at all levels did not care about what was going on with their livelihoods and demonstrated little interest in creating programs to empower them. One example raised was the poor water supply in the community, and the water provided by the local government was sporadic at best. Despite requests by the community to establish a well or borehole to service the community and ease their reliance on rainfed agriculture to farm their cassava, the local government had yet to address this issue. Professor Yemisi Jeff-Agboola, a professor in Gender-Responsive Agriculture at the University of Medical Sciences Ondo and the founder of the NGO A Voice of Women in the Development of Agriculture in Nigeria, noted in her interview that most government interactions with value chain actors came via the National Cassava Processors and Marketers Association (NCPMA) whose members are usually large scale farmers and producers

and typically male. Professor Jeff-Agboola stated that there is virtually no relationship between small scale producers and the government, and it often falls on NGO's to fill the role of government in aiding female smallholder farmers and providing them with the technology, education, and tools they need to carry out their labor.

It is clear that women hold a disadvantaged position in the cassava value chain. However, Professor Jeff-Agboola and Professor Apata both noted the need for education and better integration among value chain actors. They both stressed that the education of both male and female farmers could change ideas of communities, and by fostering further integration of value chain actors, the exchange of ideas will facilitate collaboration and build trust. One area the women of the Idera de cooperative felt could be improved upon was the government involvement in cassava. They felt that the government only interfaced with the larger cassava producers, and there was little the government was doing to help safeguard their livelihoods. One recommendation that was made was that the local governments have specific officers who would work with cooperatives in addressing their needs so that incidents like the inadequate water supply could be resolved with that officer.

The owner of Psaltry International echoed this view on the lack of integration in the value chain. She asserted that cassava value chain actors in Nigeria are seemingly siloed and, in most cases, disorganized. She believes that this disconnect and disorganization is a key reason why women smallholder farmers are unable to take advantage of the market and why predatory middlemen are the 'winners' in the cassava market. She felt that the government should increase training and capacity building exercises for female smallholder farmers, which will improve the quality of their products and guarantee uniformity of product. Once there was a standardization of output that the

government could link smallholder farmers to larger processors like herself, through organizations like NCPMA.

## CHAPTER 7

### RECOMMENDATIONS

Effective value chains hold the potential for strategically supporting production, value addition, and distribution of all agricultural products. In Nigeria's case, value chain function and access have consequences for a significant proportion of the population and economy. The role of women in value chains in Nigeria is both severely disadvantaged and incredibly important. If Nigeria wants to progress economically, it must address the issues facing women within its agricultural sector. Nowhere is this more needed than in the cassava value chain, an import sub-sector in guaranteeing food security and income generation within Nigerian. The development of higher-functioning and more inclusive value chains will require the engagement, education, and support of all value chain actors, both male and female. This chapter will present a list of the recommendations that can be used to address the main challenges revealed in this study.

**Improved Linkages within the Value Chain**—The Participatory Market Chain Approach (PMCA) is a proven process for advancing value chain development and linkages between actor, and a recommended first step toward the required capacity strengthening, collaboration, and coordination of actors.

The PMCA works with people who participate economically within an agricultural market chain or market chain actors. PMCA also includes public and private service providers. For example, researchers, credit providers, and development professionals are also invited to participate in a systemic process where market opportunities are mapped and developed ('A Pathway to Markets, the Participatory Market Chain Approach,' 2017). The PMCA process takes place in three phases implemented over 12 – 18 months (see Figure. 12).

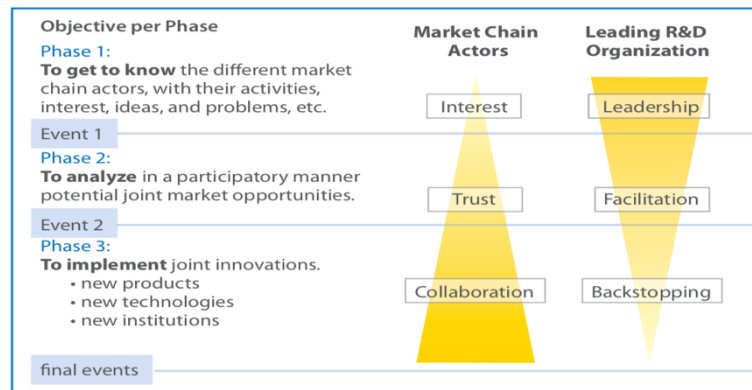


Figure 12: The three-phase structure of the PMCA methodology (Devaux et al., 2013)

At the core of the PMCA is the concept of building social responsibility among the market actors in the value chain. This concept can lead to positive results and effects for poor and subsistence farmers, who traditionally occupy the lowest rung in the value chain. PMCA facilitates the increased market access of subsistence farmers by creating impactful partnerships among the various market chain actors. With the objective of reversing the declining market competitiveness of small-scale farmers, and create a foundation for sustainable rural development (Bernet et al., 2006).

The PMCA is a systemic pro-poor research method that works to fuel innovation in agriculture, while also increasing the capacities of stakeholders within market chains. PMCA market chain actors gain new insights into their market chain by engaging with each other and are able to acquire new tools for communication, negotiation, facilitation, and teamwork. The participatory method also improves inclusion in regions as it engages economically and geographically marginalized actors, bringing them into the mainstream of the market chain and helping them to create connections with other market-chain actors (see Figure. 13). These connections are vital as they

not only disseminate knowledge and promote empowerment within the value chain, but they create new avenues for income.

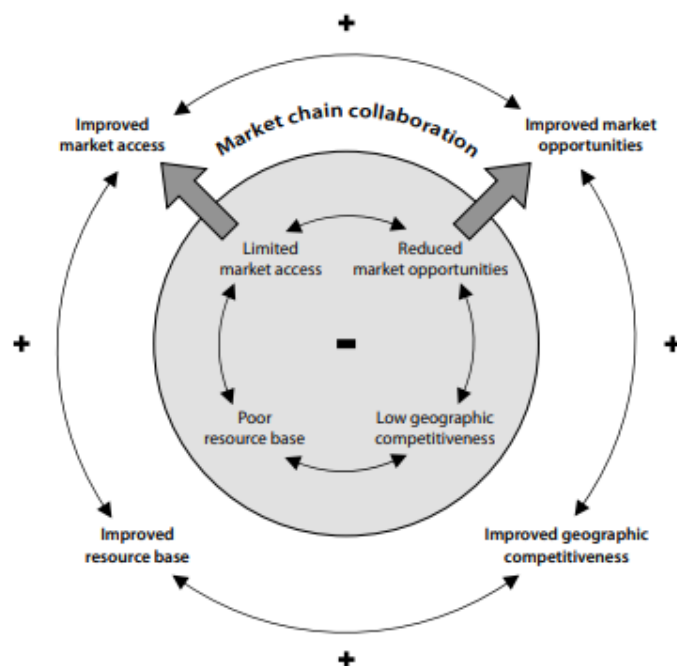


Figure 13: Market chain collaboration: overcoming the “competitiveness trap” that affects rural areas (Bernet et al., 2006)

In order to increase the opportunities and benefits available to female cassava farmers, aside from the PMCA, several initiatives need to be employed that raise productivity and improve production methods. The government needs to interface more with smallholder farmers, particularly female smallholder farmers, and adequately support their existing financial inclusion schemes with constant review. The PMCA encourages innovation, works to increase capacity, and brings stakeholders together. PMCA enables the value chain actors to create a roadmap that is inclusive and works to address the issues facing the cassava value chain<sup>1</sup>.

<sup>1</sup> A Participatory Market Chain Approach Phase 1 was originally planned as part of this research project. The author received support to carry out PMCA Phase 1 from the Einaudi Center for International Studies, the First Presbyterian International Food Security Grant, Cornell University’s AWARE Program, and the Frosty Hill Fellowship (in association with International Institute of Tropical Agriculture (IITA) a CGIAR Centre based in Ibadan), but due to the disruptions associated with the COVID-19 pandemic, the execution of this plan was prevented.



**Expanding Industrial Markets** — The potential for non-food cassava products is large and is a viable avenue for growth in cassava production and processing. By promoting non-food cassava products, the government can diversify the current sales outlets in the medium to long-term for cassava producers, creating new economic benefits for the entire Nigerian economy. Currently, industrial processors in Nigeria do not have a stable, sustainable supply of cassava for processing. There is an enormous local demand for modified starch (an estimated 230,000 tonnes annually of starch is required in Nigeria), and any efforts to strengthen local non-food cassava processing will decrease reliance on imports and boost the local economy (Daniels et al., 2011). Government enforcement of policies designed to support the cassava industry will have a positive impact on the entire value chain. Enforcement of existing policies such as increased import levies on wheat grain commodities and guidelines pertaining to the utilization of HQCF (replacement of wheat flour) will bolster production and utilization both at the small-scale and commercial levels of the cassava processing, plus expand the current industrial markets. By enforcing these policies, the cassava market can benefit from an additional 900,000 mt of finished product sales and nearly 4.5 million tons of cassava tubers, which is the equivalent of 10 % of total production in Nigeria (Daniels et al., 2011). By expanding industrial markets, women in the cassava value chain have the ability to increase production and gain access to more markets and improved economic returns for female farmers.

**Improved Infrastructure**— One of the critical factors that affect all cassava value chain actors, but especially the women smallholder farmers, is the lack of adequate infrastructure. Poor infrastructure in Nigeria results in high transaction costs for farmers and loss of products (Otekunrin and Sawicka, 2019). In addition to poor roads, there is also a lack of access roads that

lead to markets increase in transportation costs. Processors of cassava experience high transportation costs from transporters as cassava has a short shelf life span and is highly perishable and needs to be transported from the farm to be processed (Otekunrin and Sawicka, 2019). The power supply in Nigeria is also highly erratic, making the processing of cassava difficult. There is also a national shortage of potable water, which is vital to cassava processing. These issues need to be addressed by the Nigerian government in order for the cassava value chain to thrive. One way to tackle this is to prioritize rural internal road development. When designing policy for promoting agricultural growth in Nigeria, the government moving forward should include specific policies that address the ongoing infrastructure deficiencies.

**Improved Productivity**— Despite being the global leader in cassava production, the average cassava yield in Nigeria continues to drop, in recent years it has fallen drastically from 11.20 tons/ha to 8.7 tons/ha in 2017 alone (Otekunrin and Sawicka, 2019). The main reason for this is that the majority of cassava production is carried out by female subsistence farmers who have limited access to machinery or improved high yielding, disease-resistant cassava varieties, and are often excluded from trainings in good agronomic practices. Enhancing Nigeria's yield means improving the livelihoods of its female cassava producers. The government must promote the consistent use of improved cassava varieties and disseminate these varieties to cassava farmers. In order to promote good agronomic practices, the government must utilize viable and relevant extension services that address the key issues facing farmers.

### Case Study: Next Generation Cassava Breeding (NEXTGEN)

One program providing a roadmap for how to create and promote improved cassava varieties in a gender-responsive way is the Next Generation Cassava Breeding (NEXTGEN) based in Ibadan, Oyo State. This program is a private sector led initiative sponsored by the Bill and Melinda Gates Foundation implemented by the International Institute of Tropical Agriculture (IITA) and working with female smallholder farmers in Nigeria to create gender responsive varieties of cassava. These new cassava varieties will have certain trait preferences that help female farmers and consumers in Nigeria. An interview with Dr. Chidozie Egesi, the Project Manager for the NEXTGEN program highlighted how critical for the Nigerian market it is. The project takes steps to include and prioritise women who are the main stakeholders in the value chain. The researchers also carried out many research and extension activities within cassava communities to first understand the desirable traits that are prized in cassava by women, but also to get full community buy-in for the project from both men and women. This program is essential to women who are farming in Nigeria with limited access to new farming technologies. This approach to research and not only empowers female farmers in terms of their role in decision-making, but it will also empower them economically.

This program provides a roadmap for the Nigerian government on how to increase productivity in a sustainable and empowering way. It offers an improved alternative to the current system of government-farmer relationships and is an inclusive method for engaging women within the cassava value chain.

## CHAPTER 8

### CONCLUSION

It is clear from this analysis that Nigerian women are significant contributors to the country's agricultural sector, particularly the cassava sub-sector, while also maintaining their primary role in the household as caretakers and ensuring household food security. However, their engagement in multiple household economic activities has led to under-remuneration for their work. Women have been systematically denied access to productive resources such as land and machinery due to legally sanctioned gender bias in the labor markets and credit markets. Longstanding socio-cultural norms contribute to economic discrimination against women. The development of a gender-inclusive agriculture sector is essential for the next phase in Nigeria's growth.

To address these challenges it is first essential for Nigerian society to recognize the contribution of women in agriculture and its allied fields and work towards granting women sufficient access to land, prioritize women's access to credit, and to take measures to improve women's access to extension and advisory services. It also clear from this study that their needs be intentional development programs focused on gender mainstreaming in agriculture. A robust and more inclusive cassava industry has the potential to advance Nigeria's economic revitalization goals. Despite great local demand and high export potential, of the cassava sub-sector, Nigeria must first address the glaring constraints and inequities facing the majority of its agricultural workforce and work towards promoting more equitable access to value chain entrepreneurship opportunities.

## APPENDIX

### **Action for Enterprise Interview Questions for Value Chain Analysis**

Sourced via: <http://www.actionforenterprise.org/app-interview.php>

#### Market Access, Trends, and Governance

1. What do you see as your main needs/opportunities in accessing markets?
2. To whom do you sell your product or service (large firms, small firms, wholesalers, exporters, retailers, direct to consumers, etc.)? What percentage goes to each?
3. Describe the relationships you have with these buyers (who determines what to produce, product specifications, prices, and amount purchased?). How much input do you have?
4. How do you promote and market your products/services?
5. How strong is the market for your products/services right now? Next year? What trends do you see?
6. Are some customer groups better than others in terms of sales and revenue growth? Which ones?
7. Do you ever collaborate with other firms on promotion and/or marketing?
8. Who are your major competitors?
8. Do you have a means of communicating information about your firm to others? (Attach any brochures, list of products, etc.)

#### Standards and Certifications

1. What standards or certification requirements do your products need to conform to?
2. Who sets these standards and requirements?
3. Who helps you to conform to these standards and requirements?
4. Do you have any problems in this regard?

#### Technology / Product Development

1. What are your major needs/ opportunities in product design and manufacturing (or service delivery)?
2. What other products do you produce/sell? What percentage does each product represent in terms of your gross revenue?
3. What have you done recently to improve your products or services?
4. Is your current equipment or machinery an impediment to growth? Explain. If so, what kind of equipment or machinery could improve your business?
5. Is the current level of your workers training holding back growth? If so, what additional training do they need?

#### Management/Organization

1. In the area of organization and management, what are your major needs/opportunities?
2. Who does most of the work in the areas of: general management/supervision, product design, purchasing, production, shipping, accounting, marketing, repairs, etc. (owner, employees, or external)?
3. What functions do you subcontract/outsource?
3. Do you sometimes collaborate with other firms to produce and deliver customer orders?

4. Which aspects of your business do you intend to change in the next 2 years (machinery, equipment, computers, new products, marketing strategy, quality control, management system, worker skills, etc.)?
5. What management skills would you like to strengthen in order to grow your business?

#### Input Supply

1. What are your major needs/opportunities in the areas of input cost, quality, and availability?
2. Who are your most important suppliers and what do you buy from each?
3. Are there problems in obtaining some important inputs? Explain.
4. Have you ever purchased inputs jointly with other businesses? Explain.

#### Finance

1. Where do you go when you need money for your business?
2. Do you get credit from input suppliers? What are the terms?
3. Do you get production financing from your buyers? What are the terms?
4. What sources (formal or informal) have you approached for loans, and what have been the key problems, if any?
5. Other (repayment rates in the sector, risk management insurance, etc.)

#### Policy/Regulation

1. What government policies/regulations benefit your business (registrations, inspections, subsidies, incentives, etc.)?
2. What government policies/regulations are obstacles to growing your business?

#### Infrastructure

1. What are the most important infrastructure constraints affecting your business' growth and profitability (road/transport conditions, telephone service, electric supply, crime/corruption, storage, etc.)?
2. What is your industry doing about these problems?

#### Business Membership Organizations

1. Is your industry/trade sector represented by national or local business associations? If so, please name them.
2. Are you a member? If not, why?
3. What are the primary functions and benefits of these associations?
4. What additional services should they provide?

#### Open Ended Questions

1. What are the major incentives you have for investing in / promoting change in the value chain?
2. What risks or constraints do you face in making these investments?
3. What do you think are the strengths of your industry locally and/or internationally?
4. What are the main weaknesses of your industry?
5. What do you think is the greatest challenge facing your industry today?
6. Can you name some business owners in your industry who are leaders –for example, in terms of technology, product design, quality, or marketing?

7. How did you get into your business?

## BIBLIOGRAPHY

- A pathway to markets, the Participatory Market Chain Approach. (2017, October 12). *International Potato Center*. <https://cipotato.org/blog/pathway-markets-participatory-market-chain-approach/>
- A review of cassava in Africa with country case studies on Nigeria, Ghana, the United Republic of Tanzania, Uganda and Benin*. (n.d.). Retrieved 26 May 2020, from <http://www.fao.org/3/a0154e/A0154E00.HTM#TOC>
- Abila, N. (2012), Labour Arrangements in Cassava Production in Oyo State, Nigeria, *Tropicultura*, 30(1), pp. 31-35.
- Adegbite, O. O., & Machethe, C. L. (2020). Bridging the financial inclusion gender gap in smallholder agriculture in Nigeria: An untapped potential for sustainable development. *World Development*, 127, 104755. doi:10.1016/j.worlddev.2019.104755
- Ajewole, O. O., Ayinde, O. E., Ojehomon, V. E. T., Agboh-Noameshie, R. A., & Diagne, A. A. (2015). Gender Analysis of Agricultural Innovation and Decision Making among Rice Farming Household in Nigeria. *Journal of Agricultural Informatics*, 6(2). doi: 10.17700/jai.2015.6.2.179
- Anyanwu, J. C. (2010). *Poverty in Nigeria A Gendered Analysis*. 11, 24.
- Apata, T. G. (2019). Analysis of cassava value chain in Nigeria: Pro-poor approach and gender perspective. *International Journal of Value Chain Management*, 10(3), 219. doi:10.1504/ijvcm.2019.10022069
- A Otekunrin and Sawicka—2019—Cassava, a 21st Century Staple Crop How can Niger.pdf*. (n.d.). Retrieved 21 July 2020, from <https://actascientific.com/ASAG/pdf/ASAG-03-0586.pdf>



- A Otekunrin, O., & Sawicka, B. (2019). Cassava, a 21st Century Staple Crop: How can Nigeria Harness Its Enormous Trade Potentials? *Acta Scientific Agriculture*, 3(8), 194–202.  
<https://doi.org/10.31080/ASAG.2019.03.0586>
- A pathway to markets, the Participatory Market Chain Approach. (2017, October 12).  
*International Potato Center*. <https://cipotato.org/blog/pathway-markets-participatory-market-chain-approach/>
- Agriculture Finance & Agriculture Insurance*. (n.d.). [Text/HTML]. World Bank. Retrieved 25 July 2020, from <https://www.worldbank.org/en/topic/financialsector/brief/agriculture-finance>
- Badiru, I. O. (n.d.). *Review of Small Farmer Access to Agricultural Credit in Nigeria*. 6.  
*Bridging the financial inclusion gender gap in smallholder agriculture in Nigeria: An untapped potential for sustainable development* | Elsevier Enhanced Reader. (n.d.).  
<https://doi.org/10.1016/j.worlddev.2019.104755>
- Cassava Value Chain Analysis*. (n.d.). 91.
- Does institution type affect access to finance for cassava actors in Nigeria?* | Elsevier Enhanced Reader. (n.d.). <https://doi.org/10.1016/j.jafr.2020.100023>
- Food and Agriculture Organization of the United Nations. (2011). *The State of Food and Agriculture 2010-2011: Women in Agriculture - Closing the Gender Gap for Development*. UN. <https://doi.org/10.18356/ca0215ed-en>
- Gabriel, T. (n.d.). *Analysis of Cassava Value Chain in Nigeria, From a Pro-poor and Gender Perspective of Farming Households in Southwest, Nigeria*. 24.
- Ho, K. L. P., Nguyen, C. N., Adhikari, R., Miles, M. P., & Bonney, L. (2019). Leveraging innovation knowledge management to create positional advantage in agricultural value

- chains. *Journal of Innovation & Knowledge*, 4(2), 115–123.  
<https://doi.org/10.1016/j.jik.2017.08.001>
- Howeler, R. H., Lutaladio, N., & Thomas, G. (2013). *Save and grow: Cassava: a guide to sustainable production intensification*. Food and Agriculture Organization of the United Nations.  
*I9930en.pdf*. (n.d.). Retrieved 13 July 2020, from <http://www.fao.org/3/I9930EN/i9930en.pdf>
- Linh, T., Long, H., Chi, L., Tam, L., & Lebailly, P. (2019). Access to Rural Credit Markets in Developing Countries, the Case of Vietnam: A Literature Review. *Sustainability*, 11(5), 1468. <https://doi.org/10.3390/su11051468>
- Nigeria at a glance | FAO in Nigeria | Продовольственная и сельскохозяйственная организация Объединенных Наций*. (n.d.). Retrieved 13 July 2020, from <http://www.fao.org/nigeria/fao-in-nigeria/nigeria-at-a-glance/ru/>
- Oluwamayokun, A. F. (2018). Smallholder agricultural finance in Nigeria: The research gap. *Journal of Development and Agricultural Economics*, 10(11), 367–376.  
<https://doi.org/10.5897/JDAE2018.0976>
- Oseni, G., Goldstein, M., & Utah, A. (2013a). *Gender Dimensions in Nigerian Agriculture*. 6, 4.
- Oseni, G., Goldstein, M., & Utah, A. (2013b). *Gender Dimensions in Nigerian Agriculture*. 6, 4.
- Palacios-Lopez, A., Christiaensen, L., & Kilic, T. (2017). How much of the labor in African agriculture is provided by women? *Food Policy*, 67, 52–63.  
<https://doi.org/10.1016/j.foodpol.2016.09.017>
- (PDF) *Analysis of cassava value chain in Nigeria: Pro-poor approach and gender perspective*. (n.d.). ResearchGate. Retrieved 18 July 2020, from

- [https://www.researchgate.net/publication/333941874\\_Analysis\\_of\\_cassava\\_value\\_chain\\_in\\_Nigeria\\_pro-poor\\_approach\\_and\\_gender\\_perspective](https://www.researchgate.net/publication/333941874_Analysis_of_cassava_value_chain_in_Nigeria_pro-poor_approach_and_gender_perspective)
- (PDF) *FINANCING SMALL SCALE FARMERS FOR INCREASED FOOD PRODUCTION IN NIGERIA*. (n.d.). ResearchGate. Retrieved 25 July 2020, from [https://www.researchgate.net/publication/328027343\\_FINANCING\\_SMALL\\_SCALE\\_FARMERS\\_FOR\\_INCREASED\\_FOOD\\_PRODUCTION\\_IN\\_NIGERIA](https://www.researchgate.net/publication/328027343_FINANCING_SMALL_SCALE_FARMERS_FOR_INCREASED_FOOD_PRODUCTION_IN_NIGERIA)
- Sell, M., & Minot, N. (2018). What factors explain women's empowerment? Decision-making among small-scale farmers in Uganda. *Women's Studies International Forum*, 71, 46–55. <https://doi.org/10.1016/j.wsif.2018.09.005>
- The Role of Agriculture in the Development Process* | IGI Global. (n.d.). Retrieved 25 July 2020, from <https://sci-hub.tw/https://www.igi-global.com/gateway/chapter/201757>
- The Role of Cassava Production in Improving Food Security in Delta State of Nigeria* | Request PDF. (n.d.). ResearchGate. Retrieved 22 July 2020, from [https://www.researchgate.net/publication/317009149\\_The\\_Role\\_of\\_Cassava\\_Production\\_in\\_Improving\\_Food\\_Security\\_in\\_Delta\\_State\\_of\\_Nigeria](https://www.researchgate.net/publication/317009149_The_Role_of_Cassava_Production_in_Improving_Food_Security_in_Delta_State_of_Nigeria)
- Swanson, B. E., Bentz, R. P., Sofranko, A. J., & undefined, undefined undefined. (2005). Chapter 9- Improving women farmers' access to extension services. In *Improving agricultural extension: a reference manual*. Rome: Food and Agriculture Organization of the United Nations.
- Swamikannan, D., & Jeyalakshmi, C. (2015). Women Labour in Agriculture in India: Some Facets. *International Journal of Business and Economics Research*, 1(1), 22–28

Women in agriculture: closing the gender gap for development. (2011). *The State of Food and Agriculture 2010-2011 The State of Food and Agriculture*. doi: 10.18356/92fc9546-en  
*World Poverty Clock*. (n.d.). Retrieved 28 May 2020, from <https://worldpoverty.io>