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Market System Analysis, Identification and Selection of Intervention for Opportunities to Improve Nutrition Through Processing and Preservation (OPTINUP) Project in Nigeria

Presented By: O'wales 360 Global Service Ltd

Table of Contents

Table of Contents

Table of Contents

Table

Figures

Acronyms

Acronym	Meaning
ADP	Agriculture Development Program
AFGEAN	Agricultural Fresh Produce Growers and Exporters Association of Nigeria
APPEAL	Project Agro-Processing, Productivity Enhancement and Livelihood Improvement Support Project
ASF	Animal-Sourced Foods
CAFAN	Catfish Farmer Association of Nigeria
FHSA	Food Health Systems Advisory
FIIRO	Federal Institute of Industrial Research
NISPRI	Nigerian Stored Products Research Institute
FV	Fruit and Vegetables
GAP	Good Agricultural Practices
GMP	Good Manufacturing Practices
KADEP	Kaduna Department of Extension Program
MA	Market Actors
MILCOPAL	Kaduna Federation of Milk Producers Cooperative Association
MPC	Multi-purpose clusters
NAFDAC	National Agency for Food and Drug Administration Control
NIFST	Nigerian Institute of Food Science and Technology
OGADEP	Ogun Agency Department of Extension Program
OPTINUP	Opportunities to Improve Nutrition through Processing and Preservation
PWD	People With Disabilities
QAQC Quality	Assurance and Quality Control
NSPRI	Nigerian Stored Products Research Institute
SMEDAN	Small Medium Enterprise Development Agency of Nigeria
VC	Value Chain

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Executive Summary

The Market System Analysis, Identification, and Selection of Intervention for Opportunities to Improve Nutrition through Processing and Preservation (OPTINUP) Project in Nigeria is aimed at understanding and providing the Food Health System Advisory (FHSA) team with context-specific information and insights on how different market actors relate in the value chain (dried tomatoes, dried okra, smoked/dried fish, yoghurt, and fura-de-nono) and how the economic prosperity of these market actors is shaped by supporting functions such as access to finance, cold-chain infrastructure, packaging, and relationships such as rules and norms within the market ecosystem.

Insights into the market system in selected locations include Lagos (Alimosho, Badagry, Agege); Ogun (Abeokuta North, Abeokuta South, Odeda); Oyo (Ibadan Northwest, Ibadan Southwest, Oluyole); Kaduna (Kubau, Kaduna North, Zaria) and Anambra (Anambra East, Onitsha North, Ogbaru). Quantitative data were collected from 785 households; FGDs with producers (41) and microprocessors (41); IDIs with aggregators (22), transporters (43), cold chain enterprises (25), SME processors (131), wholesalers (58), retailers (73); and KIIs with regulators (42).

The OPTINUP project aimed to use the findings to provide evidence-based information on how the market functions: how it affects business setup and operational challenges within the value of the social and economic barriers preventing women, youths, and persons with disabilities from maximizing opportunities within the FV and ASF markets is limited due to barriers including access to finance, skills on good manufacturing practices (GMP), input supply, technologies, etc., which are influenced by gender roles and norms in the marketplace. The key findings are discussed briefly under the themes:

Key socioeconomic and demographic findings

The average monthly income of microprocessors and SMEs processors varied from state to state. For microprocessors, the ranges of monthly income across the five value chain (VC) commodities (dried tomatoes, dried okra, dried/smoked fish, fura-de-nono, and yoghurt), were 77,938-141,688 Naira in Anambra; 28,579-118,750 Naira in Kaduna; 68,714-89,063 Naira in Lagos; 30,526-55,625 Naira in Ogun; and 17,900-109,333 Naira in Oyo. Of the value chain commodities, there was no observed microprocessor participation for

dried tomatoes and yoghurt in Lagos, yoghurt in Ogun, and yogurt in Oyo. Similarly, for SMEs, the ranges of monthly income across the 5 VC commodities (dried tomatoes, dried okra, dried/smoked fish, fura-de-nono and yoghurt), were 250,000 to 2 million Naira in the 5 states. Also, for SMEs there was no observed participation for dried tomatoes and yoghurt in Lagos. There was also a relationship between gender and some of the value chain commodities. This also varied for each state, with more participation of women in fura-de-nono processing, particularly in Anambra, Lagos, and Kaduna. In Anambra, women are mostly engaged in processing fish, dried tomatoes, and dried okra. In Kaduna, men are mostly involved in fish, dried okra, dried tomatoes, and yoghurt processing. In Lagos, women are mostly involved in fish, dried okra and fura-de-nono processing. For Ogun, women were mostly involved in fish, dried okra and yoghurt processing with equal level of engagement among men and women for fura-de-nono and dried tomatoes. Finally, in Oyo women were mostly involved in fish and dried okra processing. Men were mostly involved in fura-de-nono and yoghurt.

Consumers' Frequency of Commodity Consumption and Purchase

Peak consumption period for dried tomatoes ranged between 1-5 times in a week, but it was more consumed in Oyo and least in Anambra. The purchase of the commodity is done on a relatively weekly basis. The frequency of purchase was highest by consumers in Lagos, Anambra, and Kaduna, while those in Oyo that consume it more purchase it less frequently due to bulk purchases at a time or self-production or processing.

Consumption of dried okra had some patterns in the states (2-3 times a week) but was least consumed in Anambra (about once a week). Purchase is done almost each time they consume it. Again, frequency of purchase was lowest in Oyo (once between 1-2 weeks), probably due to bulk purchase or self-production and/or processing.

Smoked/dried fish was mostly consumed in Ogun/Lagos/Anambra (about 2-5 times a week). Consumers generally purchase a quantity that can only last for about 2 days. fura-de-nono was mostly consumed in Kaduna and Ogun (about 2-5 times a week). It was least consumed in Oyo (about once every 2 weeks). Consumers bought it every time they wanted to consume it, mostly from hawkers. For yoghurt, there seems to be almost equal consumption patterns in all the states (2-3 times a week) but least consumed in Anambra (1-3 times a week). Consumers purchase yoghurt each time they want to consume it.

Consumers' Cost of Commodity (Last Purchase) and Affordability Perceptions

Consumers of dried tomatoes in Lagos and Kaduna frequently spent more on dried tomatoes each time they bought (N1,971 to N2,438) and the least cost of purchase was in Ogun (N606). Amount spent purchasing the commodities was perceived to be expensive in the states except in Oyo where many perceived the amount spent was cheap.

Consumers of dried fish from the pond/wild (in Kaduna and Anambra) spent more to buy fish (between N2,060 to N3,436) than locations where the types of fish mostly consumed are imported (ranging from N888 to N1,852 in Lagos/Ogun/Oyo). Consumers in Anambra mostly perceived the cost to be expensive, while those in Oyo and Kaduna perceived the price to be either cheap or indifferent. The majority of the consumers perceived those dairy commodities (fura-de-nono and Yoghurt) are quite expensive to buy, ranging between N460 and N1,700.

Types of Commodities Consumed and Reasons for Consumption

Tomatoes: Fresh tomatoes are mostly consumed in Anambra/Lagos/Ogun, while consumers in Kaduna and Oyo mostly consume dried tomatoes. In terms of cheapness, all respondents in the states noted that the dried form is cheaper to buy, except in Ogun, where they perceived that fresh is still cheaper to buy. The majority prefer to buy dried tomatoes that have not been grinded and further process them at the household level. More consumers in Oyo State prefer to buy the ground tomatoes. Key reasons for consumption are affordability (especially in Anambra/Ogun/Oyo) and because it serves as an alternative to the fresh state, especially when the fresh are expensive to buy (see Table 7).

Okra: Fresh Okra is consumed most in Anambra/Lagos, while dried okra is a choice for consumption over the fresh in Kaduna/Ogun/Oyo. Interestingly, the majority of respondents in the states noted that dried okra is far cheaper to buy than fresh. The grinded dried okra is most preferred to buy, except for consumers in Anambra that prefer to purchase the dried okra that is not grinded. What drives consumption of dried okra are affordability (all states), availability (in Kaduna), and ease of preparation (in Oyo).

Smoked/Dried Fish: Interestingly, smoked or dried fish are more consumed by consumers than fresh fish, and they acknowledge that it's cheaper to buy. While catfish is mostly consumed in Anambra/Kaduna (from the pond/wild), European and Herring Fish (imported) are mostly consumed in Lagos/Ogun/Oyo. Reasons for consumption are affordability, taste, and ease of preparation.

Dairy products: What drives the consumption of fura-de-nono and Yoghurt is the nutritional benefits or value perceived to derive from their consumption. Consumers generally perceive that it's expensive to buy.

Key findings across the 5 value chains

Across the value chain, market actors reported that certification of processed products and discounting of the certification process, sensitization on good manufacturing practices (GMP), good agricultural practices (GAP), and standardizations were very weak. This means that though regulatory bodies statutorily reported that they provide some level of support, the impact is yet to be felt by the last mile market actors. The support function activities that were reported to be performed were traditional techniques for processing and linkage to output markets. The major markets where processed products were transported for sale include: Anambra (Ose market in Onitsha North, Igbariam Anambra East, Nkwo Awkuzu market of Oyi LGA, Ama Orie market in Umuowa village, Ifiteogwari Ayamelu LGA), Kaduna (Pambegua Market and Anchau Market, all in Kubau LGA), Lagos (Mile 12 market, Oshodi, Gberigbe market, Ikorodu), Ogun (Agbobiado, Bode Olude, Odeda; Lafenwa market, Lafenwa, Odeda; Kuto Market, Kuto, Abeokuta South; Elega market, Lafenwa market, Iberekodo market; Igbesa, Atan, Owode Yewa, Ado Odo Ota; Lusada, Agbara, Ado Odo Ota), Oyo (Oja oba, Sango market, Akinyele market, Bodija market, Oje market). The markets serve as functional points for buying and selling of the FV and ASF processed commodities. In addition, aggregators, wholesalers, retailers, distributors, and consumers connect their exchange of services with the markets as a rallying point for these businesses. In addition, processors (both micro and SMEs) prefer to sell to wholesalers and retailers because they want to maximize profit and recover their capital through bulk sales. This is often the way they are able to mobilize resources for the next cycle of processing.

Most MPCs and SMEs own farms where they grow okra and tomatoes. This further reveals the key driving factor seasonality plays in determining seasons of peak and low processing. For dried okra, fresh okra is accessed mostly during the rainy season, ranging between May to October. There is high demand for dried okra during the dry season when the fresh is either not available or expensive to buy. Consumers, however, indicated that the peak period for consumption is during the dry season. For dried tomatoes, access to fresh tomatoes as raw materials is peak during the dry/harvest season between September and March in Anambra and Kaduna, but in the rainy season in Lagos/Ogun/Oyo (May to October). There is high demand mostly during the dry season (November to May) due to scarcity of fresh tomatoes and during festive periods within the dry season. Consumers in Kaduna/Anambra indicated that they consume dried tomatoes more during the rainy season, while those in Lagos/Ogun/Oyo have peak consumption during the rainy season.

For dried/smoked fish, the fish producers play a pivotal role in producing table-sized fish for the SME and microprocessors. Most fish producers rear fish using pond fishing. Also, fishing from open water bodies and importation of fish such as hake fish (panla), herring fish (shawa), and mackerel (titus fish), etc. The SMEs source for fish mainly from fish producers and aggregators. The findings from market actors reveal that a functional cold room facility is very essential, especially with aggregators and small distributors that deliver fish to consumers and microprocessors. Fish farmers also supply fish to hotel owners. In addition, SMEs reported processing fish and exporting them to the USA and UK. At all phases of the value chain, consumers significantly source fish for household and personal consumption.

fura-de-nono is traditionally led by women, as it is often perceived by men not to bring “big” profit. Hence there is opportunity to support women by increasing their capacity to access capacity building, behaviour change on hygiene, provision of cold chain solar facilities to reduce drudgery and contamination due to a lack of power to extend the shelf-life of fresh or pasteurized milk. The quality of fura-de-nono may increase sales through capacity building on standardization, packaging, labeling, and guarantee of hygiene at critical control points (pasteurizing, storage in a cold room, and transportation). Oyo State has the potential to produce fura-de-nono to

scale. Reports from micro and SME processors show that the commodity is processed and transported to Ogun State, Ibadan, and other states. The main market, it is sold in Iseyin. In Kaduna, fura-de-nono has a major market both at the micro and SME processor level, and there is good demand for consumption. Also, the associations, such as MILCOPAL in Kaduna, play a significant role in facilitating the aggregation of milk in Kaduna State for processing into yoghurt and other dairy products.

The supply of fresh and pasteurized milk and availability of cold rooms were critical factors for yoghurt business among SMEs. SME processors in some states prefer to buy finished products for sale as a way to overcome the cost of processing, including cold room, power, and distance to the source for fresh milk. Also, use of powdered milk and "culture" for processing the milk are used by SMEs for processing powdered milk into yoghurt. SMEs prefer to sell their products to wholesalers and retailers.

Modern vs. Traditional Ways of Production

According to the findings of the market system study, the majority of microprocessors and SMEs of tomatoes and okra employ the traditional technique of processing by sun drying the item. This renders microprocessing highly dependent on the dry season and hot temperatures. While technology is not currently employed for processing, processors are prepared to experiment with and incorporate new technologies to better their processes. Respondents of one of the FGDs held in Anambra explained that "If we learn modern ways to process and dry it, it will generate more money. We need machines to learn modern ways to process.".

Seasonality in Production/Sales/Demand for the Market Actors/Consumers (access to raw materials, demand and consumption).

Dried Tomatoes: Access to fresh tomatoes as raw materials is peak during the dry/harvest season between September and March in Anambra and Kaduna, but in the rainy season in Lagos/Ogun/Oyo (May to October). There is high demand mostly during the dry season (November to May) due to scarcity of fresh tomatoes and during festive periods within the dry season. Consumers in Kaduna/Anambra indicated that they consume dried tomatoes more during the rainy season, while those in Lagos/Ogun/Oyo have peak

consumption during the rainy season (see Table 10).

Dried Okra: Generally, fresh okra is accessed mostly during the rainy season ranging between May and October. There is high demand for dried okra during the dry season when the fresh is either not available or expensive to buy. Consumers, however, indicated that the peak period for consumption is during the dry season.

Smoked/Dried Fish: Generally, there is access to fresh fish to process throughout the year, but processors have more access to fish during the rainy season (May-Oct) as the season favors the availability of more fish. During the rainy season, fish producers sell off most of the fish to avoid wastage as a result of flooding. Some respondents in Kaduna noted that access to fish in the dry season is better because of the low water level that allows easier access. There is higher demand for fresh fish during the dry/festive season (between November and May). Demand seems to be higher (festive/dry season) when there is a relative decline in production. Indicatively, imported fish are always available and accessible and are mostly consumed in Lagos/Ogun/Oyo, while fish from the pond/wild are more consumed in Kaduna/Anambra.

Dairy products (fura-de-nono and Yoghurt): During the rainy season (between May and November), there is abundant food for cows that enhances increased milk production. Demand is however high during the dry season, hot weather, or festive season (when milk production is on the decline) between November and June.

Ultimately, the season and time of year impact demand due to factors like scarcity, pricing, and festive occasions.

Cost of production, processing, total sales, and profit margins for producers and microprocessors

The average cost of production per kilogram (kg) was estimated per state. For Anambra, dried tomato (1,500 Naira), dried okra (840 Naira), smoked fish (1000 Naira), and fura-de-nono (400 Naira). In Kaduna, dried tomato (4,500 Naira), dried okra (2000 Naira), smoked fish (60 Naira), fura-de-nono (110 Naira). In Lagos, dried tomatoes (1,200 Naira), dried okra (840 Naira), smoked fish (100 Naira). And in Ogun, dried tomato (1,800 Naira), dried okra

(1350 Naira), smoked fish (50 Naira)

How market actors access finance to run their operations or businesses

Findings from the MSA show market actors access capital mainly through self-funding and savings/support from family and friends.

Roles of men, women, youth, PWD in each of the market actors

Marginalized groups actively participate in the early stages of the value chain, particularly in the production and processing of fresh okra and tomatoes. Female youth in Ogun State are involved in the entire okra production process, including harvesting, drying, and selling. However, in Lagos, they are only involved in okra processing if they express interest. Women play a significant role in purchasing and processing activities, particularly in ground dried okra and tomatoes. In Anambra and Oyo, women are responsible for cutting, drying, and selling okra, representing approximately 40% of the workforce. Youth, accounting for about 30% of participants, engage in both labor and innovative practices like technology adoption. Persons Living with Disabilities (PLWD) have limited involvement, about 5%, due to physical barriers, lack of access to resources, societal norms, and limited mobility.

Challenges faced by market actors and consumers in accessing commodities

1. Limited opportunities for business financing.
2. Limited opportunities to upgrade and upskill traditional technologies to modern technologies.
3. Weak supply chain of value chain commodities.
4. Limited access to opportunities for capacity building on standardization and certification of value chain commodities.
5. Product and market relativity in the 5 states (not all value chain commodities are commercially viable per state).
6. Seasonality impact on productivity.
7. Cross cutting challenge: gender and youth social norms.

Market Member Association, Relationship, Collaboration, or Engagements and Challenges

State Agricultural Development Program (ADP) has been the most influential government ministry among other statutory MDAs. They have performed various supporting functions, including facilitating access to inputs and linkage to off-takers, facilitating linkages between producers and processors, and supporting across value chains, including fisheries and their feeds. The next organization that has played significant support is the National Agency for Food and Drug Administration (NAFDAC). Their activities include sensitizing consumers in the market on how to get agricultural products. Thereby bringing producers and buyers together. Similarly, the Standard Organization of Nigeria has established relationships with IFAD, USAID Feed the Future, and FAO to collaborate in supporting improved food processing and best practices in fish processing and other activities to reduce post-harvest losses. Farmers' Associations (Tomato/Okra/etc.) have been mainly involved in enlightening on available agro-inputs and other products, such as fertilizer, to increase farm productivity.

Identified Interventions Based on Constraint Diagnosis

To address the diagnosed constraints, among other challenges, there are 3 intervention strategies identified to address key constraints; these include:

Partner with agribusiness technology firms to introduce improved technology equipment and build capacity of market actors: There are existing technologies that can be introduced using arrangements, such as **"cooperative, community, and private sector"** driven models for procurement and management of equipment. Improved technologies such as fabricated simple solar dryers for drying tomatoes, shade drying for processing okra to dried okra, and co-ownership of a government fish processing kiln. The feasibility of a business model that would be acceptable to the market actors should be based on what is acceptable and workable for the market actors.

Conduct comprehensive training on best practices in production, processing, and marketing for microprocessors and SMEs. This includes Good Manufacturing Practices (GMP), post-harvest handling, and value addition techniques. A good number of the respondents expressed willingness and

desire for capacity-building training to enable improved product quality, increase quantity, and reduce the cost of production. OPTINUP can provide technical support through the engagement of a business development services provider or facilitate private enterprises interested in aggregating the various commodities and willing to offer the training.

Facilitate collaboration with NAFDAC, SON, ADP and private sector partners for training on best practices in production, processing, and marketing for microprocessors and SMEs. This includes Good Manufacturing Practices (GMP), post-harvest handling, and value addition techniques. A good number of the respondents expressed willingness and desire for capacity-building training to enable improved product quality, increase quantity, and reduce the cost of production.

In conclusion, the approaches of processing tomatoes and okra into dried tomatoes and dried okra have great opportunity in providing a sustainable solution to the over 40% post-harvest losses to fruit and vegetables. Similarly, processing of fish through drying or smoking with appropriate good processing practices and linkage to the output market and consumers can unlock decent jobs with increased revenue for women and young people. Use of a modern portable, eco-friendly cold storage system can extend the shelf-life of diary processing. If the cooperative, community, and private sector model is employed, there would be an opportunity to create more jobs, increase volume of production, and strengthen the supply chain to support increased availability of quality dairy products all year round. Overall, facilitating partnerships that introduce improved technologies, training micro and SME processors on good manufacturing practices, certification, and standardization will increase the quality, quantity, and profitability of the selected value chains. The model to pilot can be “cooperative, community, and private sector” driven models where the market actors for respective value chain commodities will organize themselves into groups with constitutions for engagement and are supported by private sector partners fabricating the technology. In addition, there is a need to collaborate with SON and NAFDAC for certification, packaging, and proper marketing of products.

1. STUDY BACKGROUND

Nigeria as a country is unable to meet its domestic requirements for vegetables, fruits, floriculture, herbs and spices, dried nuts, and pulses. Vegetables are also highly perishable, as they start to lose their quality right after harvest and continue throughout the process until they are consumed. Hence, vegetable production is a risky investment activity. The riskiness of vegetable production may be attributed to several factors that are beyond the control of producers. Also, there is often a high record of harvest failure as a result of drought and other adverse climatic events . According to Statistica Market Insights, the revenue in the vegetable market in Nigeria is expected to amount to US$27.10bn in 2024. The market is expected to grow annually by 13.53%.

Tomatoes are a rich source of vitamins A and C, folic acid, as well as antioxidants (alpha-lipoic acid, lycopene, and lutein). Tomato consumption makes up approximately 18% of average daily consumption of vegetables in Nigerian homes . Nigeria is the largest producer of tomatoes in Sub-Saharan Africa and the 14th globally, with an estimated annual production of 1.8 million tonnes . Tomato is a highly perishable crop that can deteriorate within a few days after harvest, losing its required quality attributes and resulting in both food and economic losses. According to FMARD, over 45% of fresh tomatoes produced in Nigeria are lost due to poor handling practices, inadequate cold storage, and transportation facilities, as well as the lack of the required capacity to add value to tomatoes in order to extend their shell life . Postharvest losses of tomatoes can be drastically reduced if the fresh fruits are immediately processed into dry form and/or value is added to create new products within the tomato value chain . It exists in reports that drying of tomatoes in Nigeria reduces loss and can extend the shell life of tomatoes, thereby making them more accessible to consumers.

Okra is a potential oil and protein crop that also has an export value. All parts of the okra plant are useful; its leaves and tender shoots, which are equally rich in nutrients, can be cooked and eaten. The pods are either consumed in fresh or dried form . The edible portions of the pod are good sources of protein as well as an ascorbic acid content of 20g/100g and a high level of calcium, fiber, and ash, with mature seeds containing about 21% edible oil. Immature okra pods are commonly consumed as a vegetable. In addition, okra has attributes that could permit it to be used for other purposes. Leaves, buds, and flowers are edible; dried seeds could provide oil, protein,

vegetable curd, and a coffee additive or substitute. In Nigeria, there are two distinct seasons for okra production: the peak and the lean seasons. During the lean (dry) season, okra fruit is produced in low quantities, is scarce, and is expensive to get. In the peak (peak) season, it is produced in large quantities, much more than what the local populace can consume . AJ Farinde et al, reported that okra under tropical conditions during the rainy and dry seasons found that the highest ranked constraints to okra production were low output prices and high perishability in the rainy season and moisture stress and scarcity of cultivable farmland in the dry season.

Touching animal-sourced foods, the drivers of the demand for animal-sourced foods are anticipated to dramatically change in the decades in Nigeria. For example, the domestic production and documented importation of cattle are, together, not enough to meet more than 60% of the actual demand. Transportation of cattle from the north to the south in Nigeria presents a daunting problem because it is both a costly and risky business. This provides support unities for livestock producers to establish profitable livestock enterprises because of the large increase in the demand for animal products .

A report by Nextzon stated that the market for fresh milk products in Nigeria may be segmented into a number of classes by two main criteria, namely character (i.e., individual or corporate) and income distribution. The various activities of the Nigerian dairy industry (viz., milk production, importation, processing, marketing, and consumption) have been going on in the country for over 100 years. These activities are, however, largely unorganized except for the relatively few processing powdered milk.

Though Nigeria is the largest producer of cow milk in West Africa and the third in Africa, the country is a net importer of the product, and in order to increase the percentage of the livestock sector and local milk production in Nigeria, massive investment is required in the dairy industry to meet up with the 1.45 billion liters estimated national milk requirement. Presently, the local production of milk is less than 1% of the total annual demand that has been estimated at 1.45 billion liters, making the total milk consumption in Nigeria less than 10 liters per head, whereas the global average is about 40 liters per head. In other parts of Africa, it is 28 liters per head. In a similar vein, Nigeria, with a population of over 170 million people, is grossly underprovided with essential food components like protein, which is important for the realization and development of human potentials both mentally and physically. Data

from the FOS, CBN, and FAO indicates that from cattle, less than 2 kg of beef is available to an average Nigerian per year, and just a little 4 kg of eggs per annum is available to each Nigerian. Infact, milk production has been nose-diving, or at best has remained constant, since 1994.
Fish is an important part of the household diet in Nigeria, which is the most populous country in Africa. Fish accounts for around 40 percent of the country's protein intake, with fish consumption at 13.3 kg/person/per year. Total fish production per year is close to 1 million metric tons (313,231 metric tons from aquaculture and 759,828 metric tons from fisheries). The majority of this fish is consumed domestically, while around 10 percent is exported. Around 94 million hectares are used for fishery production, according to the FAO, and 1,477,651 people work as fishers . As a result of increasing fish production activities, the downstream industry, such as fish smoking, is also fast developing to take advantage of readily available raw materials by adding value to the fresh fish through smoking. The supply of smoked is met by both traditional and modern smokers. Another factor is the increasing demand for smoked fish in the domestic market and international market .

The Opportunities to Improve Nutrition through Processing and Preservation (OPTINUP) project in Nigeria is currently being implemented by Food Health Systems Advisory Limited (FHSA) in partnership with the Bill and Melinda Gates Foundation (BMGF). The project aims to implement a multi-year gender transformative program that offers tailored technical, business, and financial assistance to Nigerian food processors, enhancing their capacity to deliver affordable, safe, and nutritious products to low-income consumers (LICs). The MSA study for the OPTINUP Project is commissioned to help in the project implementation plan design. The FHSA plans to understand the market dynamics, opportunities, and constraints limiting the growth of the value chains and their root causes for the design of interventions that will reshape the selected Fruits and Vegetables (FV) and Animal Source Food (ASF) sectors.

The selected FV includes dried tomatoes and dried okra, while the ASF includes smoked or dried fish, yoghurt, and fura-de-nono. The OPTINUP Project is engaging the technical assistance of the Consultancy Team (under the O'WALES 360 Global Services LTD) to conduct a market system assessment (MSA) and use the evidence generated from the assessment to select appropriate interventions that can improve competitiveness and inclusion through gender transformative approaches. To achieve these tasks, the team recognizes the complexities of commercial activities across the

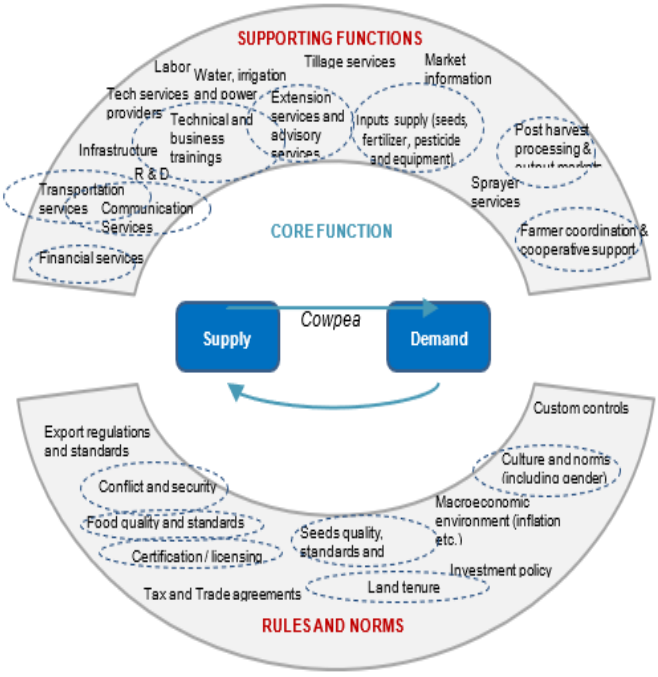
selected value chain. Part of the complexities is the gender dynamics and patterns that vary, especially by sociocultural norms, in different regions of Nigeria. The MSA will adopt a comprehensive approach, employing both a cross-cutting and targeted focus on gender and inclusion, to examine the market experience of the diverse range of market actors within the value chains. This examination aims to identify the most effective strategy for implementing inclusive intervention initiatives reaching marginalized groups.

The MSME sector is the growth engine of any economy, contributing to its development, job creation, and exports, amongst others. According to the World Bank, MSMEs represent about 90% of businesses and more than 50% of employment worldwide. Formal SMEs contribute up
to 40% of national income (GDP) in emerging economies. The latest SMEDAN/NBS MSME Survey indicates Nigeria's SMEs contribute nearly 50% of the country's GDP and account for over 80%
of employment in the country. No doubt, the sector is pivotal to Nigeria's growth, including reducing poverty levels. However, the sector continues to be weighed down with challenges, which ultimately impact the nation's growth. According to the National Bureau of Statistics, small and medium scale enterprises (SMEs) in Nigeria have contributed about 48% - on average - to the national GDP in the last five years. Totaling about 17.4 million enterprises, they account for about 50% of industrial jobs and nearly 90% of activities in the manufacturing sector, in terms of number of enterprises. Despite the significant contribution of SMEs to the Nigerian economy, challenges still persist that hinder the growth and development of the sector. Challenges encountered by the sector include lack of skilled manpower, multiplicity of taxes, and high cost of doing business, among others . Processors of FV and ASF are not shielded from these challenges but rather bear most of the brunt of them, including lack of skilled manpower, high cost of doing business, and lack of access to credit, among other challenges.

2. MARKET SYSTEM APPROACH AS A STRATEGY FOR A COMPETITIVE AND INCLUSIVE GROWTH

At the core of the Market Systems Development (MSD) Approach is a recognition that the extremely poor have unique circumstances that often preclude them from being able to take advantage of economic opportunities created in evolving market systems. The poorest have a greater vulnerability to risk, limited resources to invest in upgrading, fewer relationships with upwardly mobile people, and a heavy reliance on marginal amounts of income from a diversity of sources and systems. In addition, the extreme poor are often missed or under-considered in the analyses that drive program designs. Furthermore, markets are frequently fractured, with undeveloped potential for growth; a base level of skills, resources, behaviors, and/or geographic proximity is required for viable market engagement; and not all value chains or market functions are well suited to the poorest. Yet beneficial engagement in markets is essential to poverty reduction, inclusive economic growth, and the long-term health and resilience of a household .

The market system approach works with the system's thinking lens that the best way to help people out of poverty is to address the underlying causes of market failure. Rather than focus broadly on macroeconomic problems or individually on specific businesses or families, the market approach looks at the ways poor people and businesses interact in a particular sector like the FV and ASF. By analyzing and understanding this, they can



help make systemic changes that create lasting, inclusive growth. Considering the economic potential and opportunities within the market ecosystems for fruits and vegetables (FV) and animal-sourced foods (ASF), it is critical to understand the market constraints within the system. The market system includes the supply-demand transactions in the core value chain - from producer to processor to retailer to end consumer - and the 'supporting functions' and 'rules and regulations' that shape how businesses and employees work in this core chain. Understanding the market system through market system analysis will provide the Food Health System Advisory (FHSA) team with context-specific information and insights on how different market actors relate in the value chain and how economic prosperity of these market actors is shaped by supporting functions such as access to finance, cold-chain infrastructure, packaging; and relationships such as rules and norms within the market ecosystem. Insights into the market system in selected locations, of the OPTINUP project would provide evidence-based information on how the market functions: how it affects business setup and operational challenges within the value of the social and economic barriers preventing women, youths, and persons with disabilities from maximizing opportunities within the FV and ASP markets are limited due to barriers including access to finance, skills on good manufacturing practices (GMP), inputs supply, technologies, etc. are influenced by gender roles and norms in the marketplace.

3. PURPOSE OF THE MARKET SYSTEMS ASSESSMENT

The Market Systems Assessment (MSA) will help:

1. **Identify Systems Failures, Constraints, and Opportunities:** Conduct an analysis to identify constraints and systemic failures limiting the growth of selected processed food value chains across the target states while also assessing opportunities for expansion into new states in Nigeria.

2. **Map Market Actors and Dynamics:** Identify major value chain actors, understand their roles, and relationships, and assess market dynamics, including demand and supply, participation of marginalized groups, and drivers of change. Furthermore, identify the support functions and rules within the market systems for each food value chain.

3. **Identify and Analyze Potential Intervention Activities:** Determine critical intervention activities aligned with the Market Systems Development (MSD) methodology to address identified constraints and leverage opportunities for market system improvement.

4. **Identify Target Clusters for Intervention:** Identify formal and micro-processing clusters for pilot intervention, considering peculiar issues faced by women, youth, and marginalized groups and exploring opportunities for their inclusion.

5. **Evaluate Cost and Transaction Dynamics:** Analyze cost dynamics of raw produce versus processed products, including real transaction costs and price determinants.

4. RESEARCH OBJECTIVES AND KEY QUESTIONS

1. Who do market actors sell their commodities to, and where (supply chain)? Where do the consumers buy commodities from? What are the challenges in buying or selling the commodities to the people or locations? What are the roles of regulators in supporting the supply chain?
    a. What are the market dynamics and trends for the commodities in the 5 states?
    b. What are the opportunities for growth of these commodities?
    c. How do products from SMEs and microprocessing clusters get to the traditional markets?
    i. Distribution
    a. Who are the key players involved in the distribution of the products? Where are they located? (Possibly get their contacts)
    b. Are there any notable trends or innovations in the distribution chain?
    c. Are there any barriers to entry for new participants?
    d. What are the challenges the distributors face in reaching their target customers (LICs)?

2. What are the raw materials used for production and processing? Where do they buy/get raw materials from? What are the challenges in getting the raw materials?
    a. Identify the key constraints in the markets and their root causes.
    b. What are the opportunities for growth of these commodities?
    c. Where do you get your raw materials? (This will snowball to producers or aggregators of these raw materials.)
    d. How do you source your raw materials for processing? This will snowball to the suppliers of the raw materials.
    e. When do you source your raw materials (seasonality—off-season, peak season, time of the day—morning, noon, etc.)
    f. What are the varieties or types of raw materials (produce) you process for LICs?
    g. Could you describe how the raw materials move from the suppliers (or market) to the processing center?

h. What challenges are commonly faced in sourcing raw products?

3. What are the roles of men, women, youth, and PWD in each of the market actors? What are the roles of regulators towards encouraging involvement of these special groups in the commodity value chain?
   a. What are the opportunities for growth of these commodities?

4. What are the challenges facing the market actors and even the consumers in accessing the commodities? Analyze challenges in involving women, youth, and PWD.
5. What are the gender issues related to the 5 value chain commodities?
   a. What are the roles women, youth, and PLWD play in each of the value chains?
   b. Are there opportunities for their inclusion?
   c. How many women are involved?
   d. Are they in clusters? How do you describe the involvement of men and women in the processing and selling of processed products?
6. What are the modern vs. traditional ways of production, processing, and marketing as experienced by the market actors? Which one do they prefer, and why?
   a. What is the number of low-income consumers reached by each SMEs surveyed?
   b. Likewise, what is the average number of LICs reached by each member of the microprocessing cluster?

7. Analyze the seasonality of more production/sales/demand for the market actors/consumers.
8. What are the production/processing/marketing capacities of the market actors, and the consumption dynamics of the consumers? sales volume, profitability, affordability/frequency of consumption (consumers), production cost, etc.
   a. What is the cost of production, processing, and transportation vs. sales?
   b. What are the cost-benefit analyses of these commodities, including their value chain maps?
   c. How many microprocessing clusters can you identify for each value chain? (b) What is their membership size?

i. PROCESSING

a. Who are your major buyers of the processed product, and where are they located?

b. How many microprocessors do we have on average (cluster processors)? At what price do they sell processed products?

c. What are the main challenges encountered in processing What equipment and technology do processors use, and are there any associated challenges?

9. What motivates production, processing, marketing, and consumption?

10. What are the perceived health benefits of the commodities? What are the market actors and the consumers saying? What are the roles of regulators towards ensuring adherence to health and nutrition standards?

11. What are the types and varieties of commodities in each state? What is the awareness level of the market actors and the consumers of the varieties?

12. What forms of technologies are in use by the market actors for each commodity? What are the challenges and potential opportunity areas? For consumers, what form of finished products do they prefer, why, and can they afford it? Are there regulators that support the use of technology for any of the commodities?

13. How do market actors access finance to run their operations/business? What are the challenges they encounter in accessing finance? What other options do they prefer in accessing finance? What are the roles of regulators in assisting market actors to access loans and finance?

14. What are the suggestions provided by the market actors towards improving revenue? What are the roles of regulators in supporting market actors to improve revenue (via marketing, connectivity, support systems, policies, trainings, etc.)?

15. Are market actors members of any association? Do they have any form of relationship, collaboration, or engagement with other organizations? What benefits do they get from the association/orgs? What challenges do they often encounter in relating to them? What support are market actors requesting towards better engagement with the regulators?

16. What are the roles government agencies like NAFDAC, SMEDAN, ADP, Ministries of Agriculture & Rural Development, NISPRI, etc. play in the growth of the selected value chains?

    a. Also, what role do other private bodies like NIFST, AFAN, AFFAN, CAFAN, AFGEAN, Lady Ranchers, etc. play in the selected value chains development in Nigeria?

5. THE STUDY RESEARCH DESIGN METHODOLOGY

5.1 Data Collection Methods

Both quantitative and qualitative data collection methods were adopted in the study. Quantitative interviews were conducted with low-income consumers of the five selected value chain commodities at the household level. Households interviewed were those that consume at least one of the commodities, and eligible respondents were either adult men or women that engage in cooking and/or buy food items in the market. Interviews were conducted in three LGAs in each of the target states, which were determined after the mapping exercise to identify major commercial clusters of market actors for each of the value chain commodities. Table 1 presents the achieved sample distribution per State and value chain commodities:

Table 1: *Number of household interviews by State and LGAs*

STATE	LGA	No. of household interviews	Percentage
LAGOS	Alimosho	51	6.5%
	Badagry	52	6.6%
	Agege	50	6.4%
OGUN	Abeokuta North	54	6.9%
	Abeokuta South	52	6.6%
	Odeda	52	6.6%
OYO	Ibadan Northwest	53	6.8%
	Ibadan Southwest	55	7.0%
	Oluyole	51	6.5%
KADUNA	Kabau	50	6.4%
	Kaduna North	51	6.5%
	Zaria	51	6.5%
ANAMBRA	Anambra East	55	7.0%
	Onitsha North	51	6.5%
	Ogbaru	57	7.3%
TOTAL		**785**	**100%**

The qualitative data collection methods involved focus group discussions (FGDs), in-depth interviews (IDIs), and key informant interviews (KIIs). A purposive and referral/snowballing sampling approach were used to select FGD, IDI, and KII participants based on the mapping exercise conducted. Insights into the market system in selected locations include Lagos (Alimosho, Badagry, Agege); Ogun (Abeokuta North, Abeokuta South, Odeda); Oyo (Ibadan Northwest, Ibadan Southwest, Oluyole); Kaduna (Kubau, Kaduna North, Zaria) and Anambra (Anambra East, Onitsha North, Ogbaru). Quantitative data were collected from 785 households; FGDs with producers (41) and microprocessors (41); IDIs with aggregators (22), transporters (43), cold chain enterprises (25), major processors (131), wholesalers (57), retailers (74); and KIIs with regulators (42).

5.2 Field team management

The project team used experienced field teams, including quality control managers, supervisors, interviewers, moderators, notetakers, and transcribers across the target states with at least 3-5 years of experience related to this study. The field teams participated in the training and pilot stage of the study before the main data collection. For this study, a team for each state is composed of a lead state manager, a supervisor, recruiters, moderators, notetakers, and transcribers.

5.3 Pre-test, Piloting and Training of Field Team

Field teams are residents in the study states and LGAs with previous experience related to the study. During the training sessions, the study tools were pretested within the consultant team and the field team to ensure the questions are easy to understand, unambiguous, and to ensure it fully addresses the objectives of the study.

The training of the field staff/team was conducted at two levels: a three-day online training to all supervisors at the state levels (with the presence of the FHSA team) who were to oversee the day-to-day data collection and to ensure the quality of the data collected, especially as it relates to the focus of the study, objectives, methodology, quality control measures and processes, and data management checks, among others. The training session enabled supervisors to better prepare and field teams at the state level.

The second level of training was at the state level, and a member of the consulting team traveled to the states to have detailed training sessions with the field teams. Two days were used to brief the field teams on the objectives of the study, methodology, tools, pre-test sessions, and quality control measures, among others, towards ensuring that the tools are easy to understand and unambiguous, and also check the average interview time. On the second day of the training, the field team conducted a pilot test (conduct of a few interviews) of the tools in a location that was not selected for the main data collection. Feedback from the pilot tests was discussed, reviewed, and used to finalise the tools before deployment for the main data collection.

5.4 Data Quality Control and Assurance

The survey tools were reviewed by the supervisors, state managers, and the lead data manager to ensure that the data collected are valid, completed, and clear. All suggestions made by the field teams, FHSA team members, and the consulting team during the training, pre-tests, and the main data collection were taken with a top priority, and corrections were implemented promptly. There was daily debriefing to discuss experiences, challenges, and how to address them. A WhatsApp/online group was created for the field teams to share necessary information and learnings, all towards ensuring continuous, improved data collection.

5.5 Data Processing and Analysis

Quantitative data conducted with the low-income consumers and the IDIs conducted with the market actors were managed using the Kobo Toolbox, and the analysis was done using MS Excel and SPSS Version 25. FGDs conducted with the producers and microprocessors and the KIIs with the regulators along the value chain commodities were managed and analysed using ATLAS-Ti 24.

6. DEFINING CRITERIA FOR SELECTING GEOGRAPHIES FOR THE MARKET SYSTEM ANALYSIS: EVIDENCE FROM DESK REVIEW

At the inception phase of the consultancy service, an initial desk review was conducted with the aim of identifying geographies in the 5 focus states: Anambra, Kaduna, Lagos, Ogun, and Oyo, where livelihood activities are functional on a commercial scale. This informed:

1. Purposive selection of LGAs and communities as initial entry points
2. Developing market actor mapping data collection instruments
3. Planning for initial scoping with information collected from the Agriculture Development Program for each state.

Note: The information from the desk review was further complemented by information provided by the ADP department of agriculture for each state and snowballing by referral.

The key findings based on key socioeconomic indices have been summarized in the table for each state.

***Table 2**: Summary from desk review: market actors, locations, constraints and opportunities for the 5 value chain commodities in Kaduna*

	Large scale/ commercial production locations	Average yield	Processing/ value addition locations	Profitability data	Constraints	Opportunities	Large markets
Dried/smoked fish	Chikun, Kaduna South, and Kaduna North LGAs	Nil	Kaduna south and north LGAs	The total average revenue realized from the total cost of production of N571, 231.79, was N5,853, 625.64, making a net income of N5,282, 393.85.	Lack of finance, lack of good market, pests and diseases, and water stress	Increasing the production capacity of women participating in fish processing by enabling women and other groups that are constrained due to culture and economic norms to access the products, thereby increasing their production capacity and income. Supporting fish processors with fish drying/smoking facilities that can process fish at a large scale, e.g., a government model kiln, a brick kiln, and a red clay kiln that can be co-owned by the fish cooperatives and also maintained. This will increase production capacity.	Kaduna North, Kaduna South, Igabi, and Chikum LGA have the largest and most organized dried and smoked fish markets in Kaduna State. Major fish markets in Kaduna south are Kakuri, Katin Kwari, and Central Market, and Kawo, Malali, and Ungwan Sarki Market in Kaduna north.
Dried tomato *The main crop planted during the dry season in Kaduna State is tomatoes.* *800,000 tonnes of tomatoes valued at N7.2bn, and providing tomatoes to some 5m customers in the state and beyond.* *Tomato cultivation employs approximately* ***73,500*** *male*	Ikara, Kajuru, Makarfi, Kudan, Soba, Ikara, Kaura, Kubau, and Igabi LGA	The average yield per hectare is 1.37 tons.	Ikara LGA, Humkuyi Ward of Kudan LGA, and Chika LGA	Nil	Lack of storage facilities and insecurity	Research has confirmed that the best approach for drying tomatoes to preserve its colour, nutrient content, and taste (sensory quality) is to oven dry as opposed to the traditional sun drying that is unhygienic with loss of taste, colour and texture[13]. There is an opportunity here for dried tomato processors to be formed as groups for co-owning oven drying technology for tomatoes. Also, there is an opportunity to train processors on these techniques. Also training on certification standards and provision or facilitation of access to	Kawo and Mando markets in the Kaduna metropolis

and ***8,500 female farmers.***						improved processing and storage equipment and improved packaging in line with good manufacturing practice (GMP).	
Dried Okra *Female dominance (64%) has been reported for dried okra trading)*	Kajuru LGA	Nil	Kajuru, Kaduna South LGAs	Average total cost of N765,000, gross margin of N145,674.25 per ha and NFI of N550,194.76 per ha was reported.	Poor storage and lack of packing facilities, transportation challenges,	Research has confirmed that the best approach for drying okra **is shade drying (**placed under a shade or shaded room with good ventilation**)**. Interestingly shade dried sample gave the best result in terms of colour and taste which maybe low temperature processing that retained its taste (sensory qualities). The result of the study suggests that drying improved the concentration of nutrients and preservation of okra all year round[14]. Also, there is opportunity to train processors on these techniques Also training on certification standards and provision or facilitation of access to improved processing and storage equipment and improved packaging in line with good manufacturing practice (GMP)	Kachia, Kafanchan, and Kaduna town
fura-de-nono	Zaria LGA	Nil	Zaria LGA and Kafanchan LGA	Nil	Lack of suitable improved breeds of dairy cattle, lack of modern dairy technologies and facilities, and dearth of such infrastructure as electricity and access road network and prevalence of diseases etc.	Opportunity to introduce cold storage system with co-ownership and fee systems for operations and maintenance as well as profitable marginal gain will increase the shelf-life, volume and storage capacity of dairy products. Capacity building on good hygiene practices (GHP), good manufacturing practices (GMP), and hazards analysis and critical control points (HACCP) in the dairy sectors to lower the degree of microbial contamination because food safety is a	Samaru and Sabon-Gari markets in Zaria LGA and Kafanchan LGA

						growing global public health concern. Promotion of cross breeding (to produce high milk yielding offspring). Promotion of improved feed fodder and feeding regime to increase feed conversion ratio and milk production.	
yoghurt	Kubau LGA, Zaria LGAs		Kubau LGA, Zaria LGA		Low milk production, low milk hygiene, use of local breeds, etc.	The opportunity to introduce a cold storage system with co-ownership and fee systems for operations and maintenance as well as profitable marginal gain will increase the shelf-life, volume, and storage capacity of dairy products. Capacity building on good hygiene practices (GHP), good manufacturing practices (GMP), and hazards analysis and critical control points (HACCP) in the dairy sectors to lower the degree of microbial contamination because food safety is a growing global public health concern. Promotion of crossbreeding (to produce high milk yielding offspring).	Kaduna north and Kaduna Metropolitan

Table 3: *Summary from desk review: market actors, locations, constraints and opportunities for the 5 value chain commodities in Anambra State*

Commodity	Large scale/ commercial production locations	Average yield	Processing / value addition locations	Profitability data	Constraints	Opportunities	Large markets
Dried/ smoked fish	Anambra West LGA, Otuocha, Ose and Ogbakuba in Anambra East and Ogbaru LGAs.	Average fish production in the communities ranged between 20 kg /day to 50kg/day per boat, producing an income of between N6,000.00 to N15,000 per day.	Adazi Nnukwu in Anaocha LGA	Total average returns from the sale of 25 cartons (containing 43 fish per carton) of fresh fish was N141, 269.59 with a net return was N14, 590.64 per month. For dried fish, total average revenue from the sale of 10 baskets of 36 pieces per basket per month at an average selling price of N150 per fish was N55, 744.76 and a net return was N9, 376.40 per month.	Lack of capital, poor transportation and storage facilities, poor market systems structure.	Direct capital support and/ or facilitation of access to appropriate capital bundled with capacity development on business development and management and literacy. Supporting fish processors with fish drying/smoking facilities that can process fish at a large scale e.g. government model kiln, brick kiln, and red clay kiln that can be co-owned by the fish cooperatives and also maintained. This will increase production capacity. Access to output markets through linkages with a group of processors to leverage economies of scale.	Eke-Awka market in Anambra State trades smoked/ dried fish such as bonga, cat, cod, tilapia and croaker fishes. Ogbaru area of Anambra state.
Dried tomato *Most to tomato sold in Anambra markets come from northern Nigeria*	Onitsha, Ayamelum LGA, Ogbaru and Idemili south		Onitsha, Ogbaru and Idemili south	An average gross margin and net farm income of N670,103.72 and N657,454.62 for tomato intercrop farmers respectively; average gross margin and net margin of N589,910.14 and N577,261.04 respectively, for sole tomato enterprise	Inadequacy of credit facilities, lack of access to inputs	Access through direct support or linkage to improved seeds bundled with capacity development of good production practices. Direct capital support and linkage to appropriate financial services and products (formal and informal financial products).	Onitsha, Awka Town
Dried Okra	Ayamelum Local Government Area, Anambra West LGA,	low yield of about 1.8 tons per hectare especially in dry season cultivation.	Anambra West LGA	The Gross Margin and Net Farm income of okra production were reported at N266,356 and N265,356 respectively	Poor cultural practices and high costs of labor, unavailability of improved okra varieties and pests and diseases. Others are unavailability of	Research has confirmed that the best approach for drying okra **is shade drying (**placed under a shade or shaded room with good ventilation**)**.	Awka metropolitan, Anambra West

		Total average revenue of N720,000 from 6000 kg of okra that was harvested per hectare.			improved okra varieties and pests and diseases, inadequate fertilizer application, drought etc.	Interestingly shade dried sample gave the best result in terms of colour and taste which maybe low temperature processing that retained its taste (sensory qualities). The result of the study suggests that drying improved the concentration of nutrients and preservation of okra all year round[15]. Also, there is opportunity to train processors on these techniques Also training on certification standards and provision or facilitation of access to improved processing and storage equipment and improved packaging in line with good manufacturing practice (GMP) Input-bundling support (improved and climate-adapted seeds, fertilizer, capital, training on climate smart and good production practices and extension services.	

Table 4: *Summary from desk review: market actors, locations, constraints and opportunities for the 5 value chain commodities in Oyo State*

Commodity	Large scale/ commercial production locations	Average yield	Processing / value addition locations	Profitability data	Constraints	Opportunities	Large markets
Dried/ smoked fish *The size of production, cooperative association and educational level had a positive effect on the profitability of smoked fish marketing.* *Most of the processed fish products marketed were sold directly to consumers because it is believed that selling directly to consumer's commands a higher price compared to others and at the same time higher marketing margin.* *Most of the processed fish marketed were sourced from producers because it is considered the cheapest when compared to others.* *Shawa, Alaran, Panla and Kote, Tilapia, Sardine and Titus in that order are the common marketable*	Ibadan metropolitan, Ido and Oluyole LGAs		Egbeda, Ido, Ibarapa East, Ibadan metropolis	An average gross margin profitability of N 913,000 per annum and the Benefit Cost Ratio was N1.5 was reported in a research which means an investment of N1.50 in smoked fish enterprise will yield 50% profit on investment as return. Earthen fish ponds users earned mean revenue of N3,322,189.85 with gross margin of N2,188,397.89 while concrete tank users earned N2,412,271.08 with gross margin of N1,413,299.46. In another study, the reported average revenue of fish farming was N549, 858.00 and a net farm income was N374100.09. Benefit cost ratio was 2.4.	Lack of capital and transportation, high tax rate, poor marketing system, poor storage facility, inadequate technical knowhow and lack of modern Processing equipment.	Increasing production capacity of women participating in fish processing buy enabling women and other groups that are constrained due to culture and economic norms to access the products thereby increasing their production capacity and income. Supporting fish processors with fish drying/smoking facilities that can process fish at a large scale e.g. government model kiln, brick kiln, and red clay kiln that can be co-owned by the fish cooperatives and also maintained. This will increase production capacity	Akinyele LGA, Ibarapa east, Ibarapa North, and Ibarapa central. Note: prominent markets are, the 5- day Maya market, Okolo in Eruwa, Ilado in Lanlate, Talabi in between Tapa and Igangan and Towobowo market in Igboora. *There are daily, evening, morning and periodic market in each of the town in Ibarapa region.* *The average net marketing margin for the processed fish products' marketers per week was reported at N5, 184 and a marketing efficiency was above one 1.35.*

types of fish in Ido LGA, Oyo State.							
Dried tomato *Most preferred tomato varieties among farmers in Oyo State were Plum and Grape because of their improved productivity, high market demand and early maturity.*	Ibadan/Ibarapa and Ogbomosho agricultural development zone in Oyo State		Ibadan metropolis, Ogbomoso South and Ogbomoso North	Average annual earning per farmer is reported at N385,229.27.	Knowledge and access to improved varieties that are resistant to insect pests and diseases. Rapid deterioration in quality and unstable market price were challenges encountered by tomato marketers and consumers. High cost of processing equipment, Lack of funds to buy efficient processing equipment, NAFDAC registration and Poor policy on value addition	Access to improved seed varieties (disease and insect-pest resistance) and capacity development of good agronomic practices and integrated pest management. Access to market and price information and access to improved storage technologies. Market linkage through groups and clusters. Research has confirmed that the best approach for drying tomatoes to preserve its colour, nutrient content and taste (sensory quality) is to oven dry as opposed to the traditional sun drying that is unhygienic with loss of taste, colour and texture[16]. There is an opportunity here for dried tomato processors to be formed as groups for co-owning oven drying technology for tomatoes. Also there is opportunity to train processors on these techniques. Also training on certification standards and provision or facilitation of access to improved processing and storage equipment and improved packaging in line with good manufacturing practice (GMP)	Ibadan, Ogbomoso South and Ogbomoso North
Dried Okra	Akinyele LGA, Afijo, Lagelu Ido and Ibadan LGAs	Okra production is lucrative in the State with an average	Ibadan metropolitan, Akinyele LGA	The estimated costs and return of Okro producers realized per okra farmer per	Lack of credit facilities, Pest and diseases, Poor storage facilities, Weather condition, Inadequate capital, High cost of input and	Research has confirmed that the best approach for drying okra **is shade drying (**placed under a shade or shaded	Ibadan metropolitan, Akinyele LGA

		profitability index of 56.38 and a rate of return on investment of 117.50% and operating cost ratio of 38.59%.		annum were N161,137.00 and N 77,317.76 respectively.	Inadequate transportation facilities. Climate change: late onset and dry-spell which paved the way for pests to consume the farm.	room with good ventilation). Interestingly shade dried sample gave the best result in terms of colour and taste which maybe low temperature processing that retained its taste (sensory qualities). The result of the study suggests that drying improved the concentration of nutrients and preservation of okra all year round[17]. Also, there is opportunity to train processors on these techniques Also training on certification standards and provision or facilitation of access to improved processing and storage equipment and improved packaging in line with good manufacturing practice (GMP)	
fura-de-nono	Ibarapa, Oyo and Oke-Ogun towns	Nil	Nil	Nil	Poor milk hygiene practices and storage/pasteurization hygiene.	Opportunity to introduce cold storage system with co-ownership and fee systems for operations and maintenance as well as profitable marginal gain will increase the shelf-life, volume and storage capacity of dairy products Capacity building on good hygiene practices (GHP), good manufacturing practices (GMP), and hazards analysis and critical control points (HACCP) in the dairy sectors to lower the degree of microbial contamination because food safety is a growing global public health concern. Promotion of cross breeding (to produce high milk yielding offspring). Promotion of improved feed fodder and feeding regime to	Nil

						increase feed conversion ratio and milk production.	
yoghurt	Ibadan metropolitan	Nil	Ibadan metropolitan	Nil	Nil	Opportunity to introduce cold storage system with co-ownership and fee systems for operations and maintenance as well as profitable marginal gain will increase the shelf-life, volume and storage capacity of dairy products Capacity building on good hygiene practices (GHP), good manufacturing practices (GMP), and hazards analysis and critical control points (HACCP) in the dairy sectors to lower the degree of microbial contamination because food safety is a growing global public health concern. Promotion of cross breeding (to produce high milk yielding offspring).	Ibadan metropolitan

Table 5: *Summary from desk review: market actors, locations, constraints and opportunities for the 5 value chain commodities in Ogun State*

Commodity	Large scale/ commercial production locations	Average yield	Processing/ value addition locations	Profitability data	Constraints	Opportunities	Large markets
Dried/ smoked fish	Abeokuta zone of the State: Abeokuta North (Akomoje), Abeokuta south (Ake), Ewekoro (Itori), Ifo (Ifo), Obafemi owode (Owode egba) and Odeda (Odeda) as well as Obafemi Owode LGA.	Nil	Nil	Mean income is N1, 035,352.50k with a return of 3.78k for every N1.00 spent on production.	Nil	Increasing production capacity of women participating in fish processing buy enabling women and other groups that are constrained due to culture and economic norms to access the products thereby increasing their production capacity and income. Supporting fish processors with fish drying/smoking facilities that can process fish at a large scale e.g. government model kiln, brick kiln, and red clay kiln that can be co-owned by the fish cooperatives and also maintained. This will increase production capacity.	Abeokuta,

Table 6: *Summary from desk review: market actors, locations, constraints and opportunities for the 5 value chain commodities in Lagos State*

Commodity	Large scale/ commercial production locations	Processing/ value addition locations	Profitability data	Constraints	Opportunities	Large markets
Dried/ smoked fish *(Production of fresh fish is dominated by males in Lagos but small scale processing is dominated by females).* *Dominant fish species:* *mullets (atoko), soles (abo), the Hake fish, Chrysichthysnigrodigitatus (obokun), Tilapia guineensis (Tilapia), shrimps and Heterotisniloticus(aika)*	Ikorodu LGA Epe LGA Badagry Ibeju-Lekki, Eti-osa Akaraba, Etiagbo, Ajegunle, itwagoh, Olokun, Kodomeh, and Ajido (primary source of fish for the Liverpool market)	Badagry Ibeju-Lekki, Eti-osa Makoko, Lagos Lagoon Epe LGA	An annual average total revenue of N6,533,844.33 and total cost of N5,140,797.33 was reported among small scale fish farmers practicing aquaculture.	Lack of credit facilities, disease problems, cost of materials, inadequate infrastructure, lack of power supply, labor scarcity, and technical issues Lack of access to loans and modern smoking equipment. Also health hazard from smoke.	Direct support with capital or linkage to formal financial service providers bundled with training to ensure they are bankable (strengthening the demand side). Increasing the production capacity of women participating in fish processing by enabling women and other groups that are constrained due to culture and economic norms to access the products thereby increasing their production capacity and income. Supporting fish processors with fish drying/smoking facilities that can process fish at a large scale e.g. government model kiln, brick kiln, and red clay kiln that can be co-owned by the fish cooperatives and also maintained. This will increase production capacity. Access to renewable energy and improved processing equipment such as solar dryers, the altona smoking kiln that uses less fuel.	Apapa (Liverpool Market—controlled by a woman plus the presence of a cold room in the market). Olowu market in Epe. Fish species sold: Ethmalosa fimbriata (Bonga fish), Cynoglossus senegalensis, (Sole), Pseudotolithus senegalensis (Croaker), Galeoides decadactylus (Threadfin), Polydactylus quadrifilis (West African Threadfin), Drepane Africana (African sicklefish), Elops lacerta,(Ten ponder), Chysichthys nigrodigitatus, (Silver Catfish), Pomadasys jubelini (Grunter), Brachydeuterus auritus (Big eye grunt), Vomer sp. (Moon fish) Carcharchinus spp (Shark), Sphyma sp (Hammerhead shark), Liza and Mugil species (Grey mullets), Tympanotonus / Pachymelania spp (Periwinkle), Sphyraena spp (Barracuda), Penaeus notialis (Pink shrimp), Sepia sp.(Squid), Nematopalaemon hastatus (Crayfish), Callinectes sp (Swim crab), Thunus obesus (Bigeye tuna), Ephinephelus sp (Grouper), Dasyatis sp (Sting ray), Palunurinus sp. (Spiny lobster), Pentanemus quinquarius (Threadfin) and Lutjanus sp.(Red snapper). **Other markets are located in**: Oyingbo, Iyana-Ipaja, Ajegunle, Sura, Ketu. **White sand market situated between Iddo and Oyingbo.**

Dried tomato	Nil	Nil	Nil	Climate change impacting the upstream sector Lack of access to finance and strenuous process of getting loan	Access (direct or through facilitation) to climate-adapted seeds and climate aware information. Research has confirmed that the best approach for drying tomatoes to preserve its colour, nutrient content and taste (sensory quality) is to oven dry as opposed to the traditional sun drying that is unhygienic with loss of taste, colour and texture[18]. There is an opportunity here for dried tomato processors to be formed as groups for co-owning oven drying technology for tomatoes. Also, there is opportunity to train processors on these techniques. Also training on certification standards and provision or facilitation of access to improved processing and storage equipment and improved packaging in line with good manufacturing practice (GMP) Access to financial services and products and strengthening the demand side to support the participants to be bankable.	Badagry
Dried Okra	- Ojo LGA	No specific research paper identified for commodity & location	No specific research paper identified for commodity & location	No specific research paper identified for commodity & location	Similar opportunities identified for other states are applicable	Oju iwoye market/ Alasalatu in mushin. Mile 12 market at kosi Ketu.
fura-de-nono	No specific research paper identified for commodity & location	No specific research paper identified for commodity & location	No specific research paper identified for commodity & location	No specific research paper identified for commodity & location	Similar opportunities identified for other states are applicable	Agege AP market in Lagos
yoghurt	No specific research paper identified for commodity & location	No specific research paper identified for commodity & location	No specific research paper identified for commodity & location	No specific research paper identified for commodity & location	Similar opportunities identified for other states are applicable	Oshodi-Agege market

7. KEY FINDINGS

7.1 Socio-demographic and economic characteristics producers and micro-processing market actors producing and processing fruits and vegetables (F&V) and animal sourced foods (ASFs)

Table 7: *Average Monthly Income for Producers and Micro-processors (by Commodity by State and Gender)*

Market actors	Value chain-commodity	Anambra		Lagos		Kaduna		Ogun		Oyo	
		Male (Naira)	Female (Naira)	Male (Naira)	Female (Naira)	Male (Naira)	Female (Naira)	Male (Naira)	Female (Naira)	Male (Naira)	Female (Naira)
Producers	Fresh okra	131,250.00	127,500.00	56,250.00	36,875.00	138,500.00	19,800.00	49,375.00	*	165,000.00	*
	Fresh tomatoes	*	59,667.00	74,166.67	*	215,000.00	12,666.67	114,200.00	*	21,300.00	122,500.00
	fura-de-nono	55,000.00	262,500.00	128,571.43	*	*	47,200.00	43,000.00	*	*	*
	Fish	196,428.57	*	90,428.57	*	281,250.00	*	46,667.00	*	297,500.00	166,250.00
Micro-Processors	Dried okra	142,125.00	141,250.00	181,333.33	39,285.71	38,333.33	19,800.00	*	36,250.00	59,500.00	55,500.00
	Dried tomatoes	*	85,133.00	*	*	90,000.00	*	55,625.00	*	19,000.00	16,800.00
	fura-de-nono	*	46,428.57	*	74,687.50	*	85,405.00	*	42,777.78	181,250.00	66,250.00
	Dried/smoked fish	*	91,800.00	88,333.33	77,500.00	92,778.00	*	*	31,000.00	148,750.00	78,571.43
	yoghurt	92,500.00	81,250.00	*	*	118,750.00	*	*	*	*	*
	*Asterisks indicates that the gender were not participating in the business value chain of the commodity										

The geographic locations (including LGAs, communities and identified associations supporting the value chain) where the target commodities are produced and processed have been listed (in a separate Excel attachment). Table 7 shows the analysis on average monthly income of producers and processors by commodity, state and gender. Also, it shows the significant effect of gender norms and roles on livelihood and value chain activities for market actors. The extent of women participation in livelihood and economic value addition is influenced by norms within the context.

In Anambra okra is produced by both men and women in Anambra East (Omasi, Anaku and Ifiteogwari) engage in planting and harvesting opera-

tions. Both men and women are engaged in micro-processing to dry okra. The pattern is not the same for tomato production and processing. In the same Anambra East but in different communities (Igbariam, Nsugbe and Agulari) women are mainly responsible for planting and harvesting operations. Women are also the main processors for dried tomatoes. Men are less involved in fura-de-nono processing. During the FGD session for fura-de-nono processors, the participants mentioned "Men hardly gets fully involved in the business because they assume it has lesser income". The perception that processing milk into fura-de-nono will generate less income/low marginal profit was a reason for men participating less than women. This is also consistent with the average income of 55,000 naira per month compared to women who reported they generated an average of 262,500 naira per month. For fish, the data reported the space for producers and processors mainly dominated by men. There is likely strong stereotyped perception by both women and men that women are incapable of leading and managing the fish production and processing value chain since they will be perceived to be rude to men if women manage the production and processing control points such as managing the installation and cleaning of the pond, reticulation to water, transportation etc. This is also confirmed from FGD male participants "women will have challenges of workers because the workers cannot obey their instructions the way they obey men. Again, just like the way we were having headmaster in school those days, things were going on well but since we started having only headmistress in schools there is no discipline again so in fish production it will reduce the output or it will affect the revenue" --- FGD Men Fish Producers.

Insights from yoghurt processing showed a significant participation of young people in the yoghurt processing activities. yoghurt producers reported that the more youths that are engaged in yoghurt production, the more production capacity increases. One of the male FGD processors shared that "The youth are involved in all stages of production if they are the producer but if they are factory workers, they act based on the instructions from the main producer."

In Kaduna, there is a significant disparity in monthly income among male and female producer and processor market actors. This could imply a significant limitation linked to productive assets such as raw materials, land,

seeds, ponds, cattle and even processing equipment. Women are often limited to participating in limited aspects of the value chain. For instance, they can only do business within their homestead. They are likely to depend on men to further actively extend their business activities beyond their homes. This is often due to gender norms and cultural restrictions. These have a significant impact on their income generation capacity and competitiveness. Further the FGDs conducted also revealed that women are perceived as having less energy and won't be active to run business effectively. Hence across the value chain commodities, women have limited opportunities to increase their business scale like men. A quote from the FGD reported: "women don't participate in farming due to the level of energy needed. Women not fully allowed to participate came from our religion to us due to religion, our women don't farm." The data on average income shows that, for fresh okra production, men earn 7 times higher than female market actors while for dried okra male market actors earn approximately twice compared to female market actors. For processing of dried tomatoes, only men dominated the business. This is similar for dried fish and yoghurt except that of fura-de-nono which is culturally acceptable for women to participate. However, the estimated income for women involved in fura-de-nono business was the highest compared with other states.

In Lagos, male and female market actors are involved in fresh okra production. Men dominated the fresh tomato production in Badagry communities (Agadangba, Ajara farm settlement, Toga/Avia and other tomato cultivating communities). The main reason for the male domination was that women won't be able to go through the mechanical stress of preparing the land and other on-farm operations. Women and men are also involved in dry okra processing. Neither male nor female market actors were reported to engage in dried tomato processing. This can be further supported by the LiC consumption of dried tomatoes which is as low as 8%. Also, women and men are actively involved in fish processing and profit margin for both genders are not significantly different compared to states like Kaduna and Anambra. Also, women processing smoked/dried fish reported that they were not facing significant challenges relating to gender norms. Similarly, production of fresh okra, fresh tomatoes, milk production, fura-de-nono and fish were dominated by men. There were perceptions reported by FGD participants such as: "women do not have money to buy equipment like canoe,

net and they believe that going to the river to fetch fish is men's duty while women buy and process". Another group participant said "They believe women who engage in farming get older than their age because of the physical aspect of it ."

In Oyo, the main producers of fresh okra are male market actors. Female market actors are mainly involved in fresh tomato production while male market actors are less involved in fresh tomatoes production. Male market actors are more involved in fish production and processing of smoked/dried fish compared to female market actors.

Table 8: Socio-demographic and economic characteristics across market actors and Low Income Consumers (LiCs)

STATE	Anambra					Kaduna					Lagos					Ogun					Oyo				
	Dried Tomato	Dried Okra	Smoked/Dried Fish	fura-de-nono	Yoghurt	Dried Tomato	Dried Okra	Smoked/Dried Fish	fura-de-nono	Yoghurt	Dried Tomato	Dried Okra	Smoked/Dried Fish	fura-de-nono	Yoghurt	Dried Tomato	Dried Okra	Smoked/Dried Fish	fura-de-nono	Yoghurt	Dried Tomato	Dried Okra	Smoked/Dried Fish	fura-de-nono	Yoghurt
Producers	59,667	123,125	137,500	55,000	218,462	100,737	79,150	265,625	47,200	…	60,833	44,063	83,500	128,571	…	48,200	49,372	47,667	43,000	…	66,278	152,500	231,875	…	…
Microprocessors	85,667	141,688	77,938	46,875	85,000	36,000	28,579	67,778	60,548	118,750		68,714	81,333	89,063	…	55,625	36,250	30,526	42,778	…	17,900	57,500	109,333	78,750	…
SME Processors	250,000 to 500,000	250,000 to 500,000	250,000 to 1 Million	250,000 to 500,000	250,000 to 2 million	250,000 to 1 Million	<250,000	250,000 to 2 million	<250,000	250,000 to 2 million		250,000 to 1 Million	250,000 to 1 Million	500,000 to 2 million		500,000 to 2 million	250,000 to 1 Million	250,000 to 500,000	250,000 to 2 million	1 million to 2 million	500,000 to 2 million	250,000 to 2 million	500,000 to 2 million	<1 million	500,000 to 2 million
Aggregators	100,000 to 200,000	50,000 to 200,000	…	…	…	100,000 to 500,000	50,000 to 100,000	…	…	…	100,000 to 200,000	50,000 to 100,000	…	…	…	100,000 to 200,000	100,000 to 500,000	>200,000	…	…	100,000 to 500,000	200,000 to 500,000	…	…	…
Transporters	50,000 to 100,000	50,000 to 100,000	50,000 to 200,000	50,000 to 100,000	…	50,000 to 200,000	<50,000	50,000 to 100,000	100,000 to 200,000	…	>500,000	>500,000	>500,000	…	>500,000		50,000 to 200,000	50,000 to 500,000	100,000 to 200,000	…	50,000 to 200,000	100,000 to 200,000	…	…	50,000 to 200,000
Cold Chain	…	…	250,000 to 2 million	<250,000	<250,000	…	…	250,000 to 2 million	250,000 to 2 million	…	…	…	1 million to 2 million	1 million to 2 million	…	…	…	250,000 to 2 million	>2 million	…	…	…	500,000 to >2 million	500,000 to 1 million	…
Wholesalers	50,000 to 100,000	50,000 to 100,000	50,000 to 200,000	50,000 to 100,000	50,000 to 100,000	200,000 to 500,000	DK	50,000 to 500,000	50,000 to 200,000	100,000 to 1 million	200,000 to 500,000	50,000 to 100,000	50,000 to 100,000	>1 million	100,000 to 1 million	100,000 to 500,000	100,000 to 200,000	200,000 to 1 million	100,000 to 1 million	100,000 to 1 million	>1 million	50,000 to 100,000	50,000 to 200,000	DK	500,000 to 1 million
Retailers	50,000 to 100,000	<50,000	50,000 to 200,000	<50,000	50,000 to 100,000	50,000 to 100,000	50,000 to 200,000	50,000 to 200,000	200,000 to 500,000	100,000 to 200,000	100,000 to 200,000	<50,000	50,000 to 100,000	200,000 to 500,000	<50,000	50,000 to 200,000	100,000 to 200,000	50,000 to 200,000	50,000 to 200,000	50,000 to 100,000	100,000 to 500,000	50,000 to 200,000	50,000 to 500,000	DK	50,000 to 200,000
LiC	20,000-50,000 (32%)	20,000-50,000 (34%)	20,000-50,000 (26%)	20,000-50,000 (38%)	50,000-100,000 (32%)	20,000-50,000 (46%)	20,000-50,000 (37%)	20,000-100,000 (70%)	20,000-50,000 (35%)	20,000-100,000 (65%)	50,000-100,000 (62%)	50,000-100,000 (44%)	50,000-100,000 (34%)	20,000 to 50,000 (35%)	50,000-100,000 (34%)	50,000-100,000 (37%)	50,000-100,000 (38%)	50,000-100,000 (41%)	50,000-100,000 (52%)	50,000-100,000 (40%)	20,000-100,000 (67%)	20,000-100,000 (64%)	20,000-50,000 (46%)	20,000-50,000 (47%)	20,000-50,000 (47%)

---**3 dots** indicates that the market actors did not participate in the business value chain of the commodity

7.2 Socio-demographic and economic characteristics of SME processors market actors producing and processing fruits and vegetables (F&V) and animal sourced foods (ASFs)

Table 9: *States Sex and Age Group Distribution of SME Processors*

		Anambra					Kaduna					Lagos			Ogun					Oyo				
		Dairy product (Fura-de Nunu)	Dairy product (Yoghurt)	Dried Okra	Dried Tomato	Dried/smoked fish	Dairy product (Fura-de Nunu)	Dairy product (Yoghurt)	Dried Okra	Dried Tomato	Dried/smoked fish	Dairy product (Fura-de Nunu)	Dried Okra	Dried/smoked fish	Dairy product (Fura-de Nunu)	Dairy product (Yoghurt)	Dried Okra	Dried Tomato	Dried/smoked fish	Dairy product (Fura-de Nunu)	Dairy product (Yoghurt)	Dried Okra	Dried Tomato	Dried/smoked fish
Female age group	**18-25(%)**	1(17)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*	*	*
	26-35(%)	1(17)	1(17)	1(17))	*	1(14)	2(40)	2(33)	*	*	*	*	*	2(29%)	*	*	1(20)	0	3(60)	1(17)	1(20)	*	*	*
	36-45(%)	2(33)	3(50)	3(50)	3(60)	1(14)	1(20)	0	1(20)	0	0	4(80)	1(14)	2(28)	3(50)	2(40)	2(40)	1(25)	1(20)	1(17)	1(20)	1(20)	2(33)	3(60)
	46-60(%)	1(17)	*	2(33)	*	3(43)	*	*	*	*	*	*	2(29)	1(14)	*	1(20)	*	1(25)		*	*	1(20)	1(17)	*
	61+(%)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	1(20)	*	*
	Don't know	*	*	*	*	*	*	*	1(20)	*	*	*	*	*	*	*	*	*		*	*	*	*	*
Female Total	**#(%)**	5(83)	4(67)	6(100)	3(60)	5(71)	3(60)	2(33)	2(40)	0	0	4(80)	3(43)	5(71)	3(50)	3(60)	3(60)	2(50)	4(80)	2(33)	2(40)	3(60)	3(50)	3(60)
Male age group	**18-25(%)**	*	*	*	*	*	*	*	*	*	*	*	1(14)	*	*	*	*	*		*	*	*	*	*
	26-35(%)	*	*	*	*	*	*	2(33)	*	*	3(50)	*	1(14)	*	*	*	*	*		*	1(20)	*	*	*
	36-45(%)	*	*	*	*	*	2(40)	2(33)	2(40)	1(20)	1(17)	1(20)	2(29)	1(14)	1(17)	1(40)	*	*	1(20)	3(50)	2(40)	*	3(50)	2(40)
	46-60(%)	1(17)	2(33)	*	1(20)	1(14)	*	*	1(20)	4(80)	2(33)	*	*	1(14)	1(17)	*	2(40)	2(50)	0	1(17)	*	2(40)	*	*
	61+(%)	*	*	*	1(20)	1(14)	*	*	*	*	*	*	*	*	1(17)	*	*	*		*	*	*	*	*
Male Total	**#(%)**	1(17)	2(33)	0	2(40)	2(29)	2(40)	4(67)	3(60)	5(100)	6(100)	1(20)	4(57)	2(29)	3(50)	1(20)	2(40)	2(50)	1(20)	4(67)	3(60)	2(40)	3(50)	2(40)
Grand Total		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The Table 10 below shows the age and sex distribution of SME processors across states. In Anambra, most SME processors in mapped locations are females. Also the female market actors are within the young age group compared to male market actors that are at least 46 years and above. In Kaduna, male SME processors are main market actors for yoghurt, dried okra, dried tomatoes and dried/smoked fish. Most of the male market actors are in the age bracket of (26-45). For Lagos, there were only SMEs for fura de nonno, dried okra and dried/smoked fish. Female SME processors were the main actors for dried/smoked fish and fura-de-no no.

There were no SME processors for dried tomatoes and yoghurt in locations of interviews. In Ogun, female SME processors dominated dried/smoked fish, dried okra and yoghurt while both male and female SME processors are engaged in fura de nono and dried tomatoes business in equal proportion. In Oyo state, SME processors are evenly distributed among males and females.

7.3 State Monthly Revenue of SME processors (by value chain commodity and gender)

Table 10: State Monthly Revenue of SME processors (by value chain commodity and gender)

		Anambra					Kaduna					Lagos			Ogun					Oyo				
	State/Value chain commodity	Dairy product (Fura-de Nunu)	Dairy product (Yoghurt)	Dried okra	Dried tomato	Dried/ smoked fish	Dairy product (Fura-de Nunu)	Dairy product (Yoghurt)	Dried okra	Dried tomato	Dried/smoked fish	Dairy product (Fura-de Nunu)	Dried Okra	Dried/smoked fish	Dairy product (Fura-de Nunu)	Dairy product (Yoghurt)	Dried Okra	Dried Tomato	Dried/smoked fish	Dairy product (Fura-de Nunu)	Dairy product (Yoghurt)	Dried Okra	Dried Tomato	Dried/smoked fish
Monthly revenue among female SMEs	**Min**	250,001.00	562,501.00	250,001.00	250,001.00	416,667.67	*	*	*	*	*	500,001.00		250,001.00	250,001.00	1,333,334.00	250,001.00	750,001.00	250,001.00			625,001.00	500,001.00	500,001.00
	Max	375,000.00	950,000.00	375,000.00	362,500.00	600,000.00	250,000.00	250,000.00	250,000.00	*	*	1,000,000.00	250,000.00	450,000.00	500,000.00	2,000,000.00	500,000.00	1,500,000.00	375,000.00	100,000.00		916,666.67	1,000,000.00	1,333,333.33
Monthly revenue among male SMEs	**Min**	*	*	*	*	*	*	666,667.67		400,001.00	250,001.00	1,000,001.00	500,001.00	500,001.00	583,334.33	2,000,000.00	375,001.00	750,001.00		1,000,001.00	500,001.00	250,001.00	500,001.00	1,000,001.00
	Max	*	*	*	250,000.00		250,000.00	1,062,500.00	250,000.00	800,000.00	666,666.67	2,000,000.00	625,000.00	1,000,000.00	1,166,666.67		750,000.00	1,500,000.00	250,000.00	2,000,000.00	1,666,666.67	1,250,000.00	1,000,000.00	2,000,000.00

Fura-de-nono: As shown in the table 10, the monthly average revenue among SMEs of fura-de-nono ranges from NGN250, 001 to NGN375, 000 in Anambra State, NGN250, 000 in Kaduna State, NGN500, 001 - NGN1, 000, 000 among female-owned SMEs and NGN1, 000, 000 to NGN2, 000, 000 reported by the male -owned SMEs of fura-de-nono. In Ogun State, the monthly average income among the female-owned SMEs range between NGN250, 000 - NGN 500, 000 and between NGN 583, 334.33 to NGN1,166,666.67 among the female-owned SMEs in Ogun State. In Oyo State, the monthly average is NGN100, 000 among female-owned SMEs and a range of NGN1, 000, 001 to NGN2, 000, 000 among the male -owned SMEs in Oyo State. Overall, the male-owned SMEs of Fura ne nono reported higher monthly average income than their female counterparts. The study could not capture income from some of the respondents because which may indicate that they do not keep records of their enterprises which is critical for business decision and measure of business performance.

Yorghurt: The monthly average income among female-owned SMEs of yoghurt in Anambra is from NGN562, 501 to NGN950, 000. No data was reported for the male-owned SMEs. In Kaduna, the average monthly income range reported by the female-owned SMEs was NGN 250, 000 and a range of NGN666, 667.67 to NGN1, 062, 500 among the male -owned SMEs of yoghurt indicating a higher return for the male -owned SMEs than their female counters in Kaduna State. In Ogun State, the female-owned SMEs reported an average monthly income of NGN1, 333, 334 to NGN2, 000, 000 while the average monthly income reported by their male counterparts was NGN2, 000, 000. In Oyo State, the male -owned SMEs of yoghurt reported an average monthly income of NGN500, 001 to NGN1,666,666.67. No data was reported from their male counterparts.

Dried Okra: The table shows that the average monthly income among female -owned SMEs of okra in Anambra State range between NGN250, 001 to NGN375, 000 while no data was reported by their male counterparts. In Kaduna State, the reported average monthly income for both female-owned SMEs and male -owned SMEs of Okra is NGN250, 000. The female-owned SMEs of dried okra in Lagos State reported an average monthly income of NGN205, 000 while their male counterparts reported a range of NGN500, 001 to NGN625,000 indicating higher return among the male processors of dried okra than the female-owned SMEs in Lagos State. In Ogun State, an average monthly income of NGN250, 0001 to NGN500,000 was reported by

female-owned SMEs of dried okra and a range of NGN375, 001 to NGN750,000 among the male-owned SMEs of okra. A monthly average income of NGN625,001 to NGN916,666.67 was reported by female-owned SMEs of dried okra in Oyo State and a range of NGN250,001 to NGN1,250,000 was reported by their male -owned SMEs which shows a higher return on investment among the male-owned SMEs of dried okra in Oyo State.

Dried tomato: In Anambra State, the female-owned SMEs of dried tomato reported an average monthly income of NGN250,001 to NGN362,500 and an average of NGN250,000 reported by the male-owned SMEs of dried tomato in the same state. The female-owned SMEs get higher income from dried tomato enterprises than their male counterparts in Anambra State. The female-owned SMEs of dried tomatoes in Kaduna did not report any average monthly income while their male counterparts reported an average monthly income of NGN400,001 to NGN800,000. This indicates that there is poor record keeping among the female-owned SMEs of dried tomato in Kaduna State despite being one of the leading producers of tomato in Nigeria. The female-owned SMEs or dried tomato in Ogun State reported an average monthly income of NGN750,001 to NG1, 500, 000 while their male counterparts reported an average monthly income of NGN750,001 to NGN1,500,500 as well showing no difference the monthly income between the male-owned SMEs and female-owned SMEs of dried tomato in Ogun State. In Oyo state, the average monthly income reported by both female-owned SMEs and male -owned SMEs was NGN500,001 to NGN1,000,000.

Smoked/ dried fish: The male-owned SMEs of smoked/ dried fish in Anambra State did not record any data on their average monthly income while their female counterparts reported an average monthly income of NGN416,667.67 to NGN600,000. In Kaduna state, an average monthly income of NGN250,001 to NGN666,667.67 was reported among the male-owned SMEs of smoked/ dried fish with no data reported by the female-owned SMEs. In Lagos State, the female-owned SMEs of smoked/ dried fish reported an average monthly income of NGN250,001 to NGN450,000 while a range of NGN500,001 to NGN625,000 was reported by their male counterparts. The female-owned processors of smoked/dried fish in Ogun State reported an average monthly revenue of NGN250,001 to NGN375,000 while their male counterparts reported an average monthly income of NGN250,000. In Oyo

state, the reported average monthly revenue by female-owned SMEs of smoked/ dried fish was NGN500,001 to NGN1,333,333.33 while the male-owned SMEs reported an average monthly revenue range of NGN1,000,001 to NGN2,000,000 showing higher revenue among the male processors of smoked/ dried fish in the state.

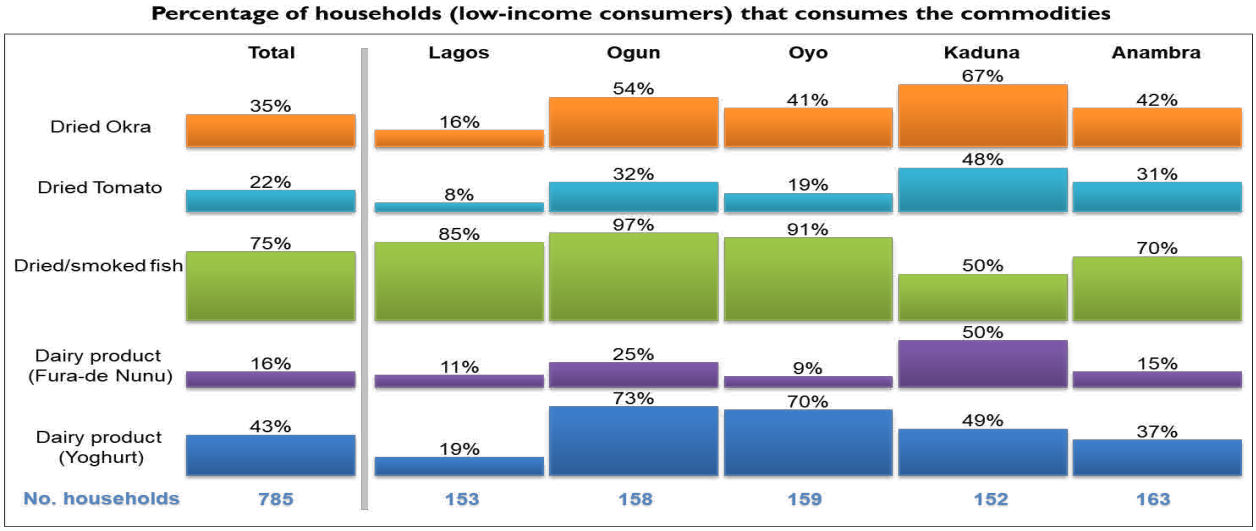
7.4 Low-Income Households consumption pattern for Fruits & Vegetables (Dried Okra and Dried Tomatoes) and Animal Sourced Foods (Smoked/Dried Fish, Fura-de-nono and Yoghurt)

Three LGAs were surveyed in each of the study states. An average of 52 households were interviewed in each of the selected LGAs (a total of 785 interviews with low-income households that consume at least one of the commodities (Dried okra, Dried tomato, Dried/smoked fish, Yoghurt or fura-de-nono).

The selection of who to interview at the households was based on adults (18+) that are most often involved in cooking and/or buying food items from the market. Overall, 7 in 10 (70%) of the respondents were females [highest in Ogun and Oyo (>80%) and lowest in Kaduna (53%)].

At least three quarters (77%) of the respondents are married and living together with their spouse. Youth respondents aged 18-35 years are 40%. Most of the interviewed households reside in the urban settlements (60%) while others in the semi-urban areas (40%). Majority (78%) of households earn monthly income less than N100,000. Overall close to half (47%) have attained secondary level education (highest in Oyo state-60% and lowest in Kaduna-22%). Not more than 2.5% of the total interviewed households have at least someone with a form of disability (highest in Kaduna-6.6%).

Figure 1: *Household consumption preference for selected commodities*



Note: Households interviewed are low-income households that consumes at least one of the five focus commodities

7.5 Consumers' Frequency of Commodity Consumption and Purchase

Peak consumption period for dried tomatoes ranges between 1-5 times in a week but is more consumed in Oyo, and least in Anambra. Purchase is done on relatively a weekly basis. Frequency of purchase is highest by consumers in Anambra that least consumes it, while those in Oyo that consumes it more purchase it less frequently due to bulk purchase at a time or self-production or processing (Table 11).

Consumption of dried okra has similar patterns in the states (2-3 times a week), but least consumed in Anambra (about once a week). Purchase is done almost each time they consume it. Again, frequency of purchase is lowest in Oyo (once between 1-2 weeks) probably due to bulk purchase or self-production and/or processing.
Smoked/dried fish is mostly consumed in Ogun/Lagos/Anambra (about 2-5 times a week). Consumers generally purchase a quantity that can only last for about 2 days.
fura-de-nono is mostly consumed in Kaduna and Ogun (about 2-5 times a week). It's least consumed in Oyo (about once in 2 weeks). Consumers buy it every time that they want to consume it, mostly from hawkers. For Yoghurt, there seems to be almost equal consumption patterns in all the states (2-3 times a week) but least consumed in Anambra (1-3 times a week). Consumers purchase Yoghurt each time they want to consume it.

Table 11: Consumers' Frequency of Commodity Consumption and Purchase

STATE	COMMODITY	Freq of consumption during **peak period/season** (avg)	Freq of consumption during **off/low season** (avg)	Highest frequency of purchase
Anambra	Dried Tomato	1-3 times a week (88%)	Once a week or less frequently (82%)	1-3 times a week (49%)
	Dried Okra	Once a week (55%)	Once a week or less frequently (94%)	1-3 times a week (50%)
	Smoked/Dried Fish	2-5 times a week (69%)	1-3 times a week (88%)	1-3 times a week (70%)
	fura-de-nono	2-3 times a week (43%)	Once a week (65%)	2-3 times a week (43%)
	Yoghurt	1-3 times a week (75%)	Once in a month (42%)	1-3 times a week (75%)
Kaduna	Dried Tomato	2-3 times a week (42%)	Once a week (83%)	Once a week (50%)
	Dried Okra	2-3 times a week (93%)	1-3 times a week (96%)	2-3 times a week (44%)
	Smoked/Dried Fish	2-3 times a week (57%)	Once a week (51%)	1-3 times a week (28%)
	fura-de-nono	2-5 times a week (60%)	1-3 times a week (44%)	2-5 times a week (60%)
	Yoghurt	2-3 times a week (35%)	Once in a month (48%)	2-3 times a week (35%)
Lagos	Dried Tomato	2-3 times a week (85%)	1-3 times a week (84%)	1-3 times a week (69%)
	Dried Okra	2-3 times a week (45%)	Once a week (36%)	2-3 times a week (45%)
	Smoked/Dried Fish	2-5 times a week (75%)	1-5 times a week (89%)	2-3 times a week (38%)
	fura-de-nono	1-3 times a week (72%)	Once a week (45%)	1-3 times a week (72%)
	Yoghurt	2-3 times a week (52%)	Once a week (38%)	2-3 times a week (52%)
Ogun	Dried Tomato	2-3 times a week (61%)	Once a week (63%)	Once a week (33%)
	Dried Okra	2-3 times a week (51%)	Once a week (60%)	1-3 times a week (44%)
	Smoked/Dried Fish	2-5 times a week (79%)	1-3 times a week (86%)	2-3 times a week (38%)
	fura-de-nono	2-5 times a week (76%)	Once a week (50%)	2-5 times a week (76%)

	Yoghurt	2-3 times a week (31%)	Once a week (43%)	2-3 times a week (31%)
Oyo	Dried Tomato	2-5 times a week (67%)	Once a week (48%)	2-5 times a week (67%)
	Dried Okra	2-3 times a week (42%)	Once a week (49%)	Once in two weeks (31%)
	Smoked/Dried Fish	2-3 times a week (49%)	1-3 times a week (77%)	2-3 times a week (50%)
	fura-de-nono	Once in 2 weeks (43%)	Once a month (43%)	Once in two weeks (43%)
	Yoghurt	2-3 times a week (43%)	1-3 times week (68%)	2-3 times a week (43%)

7.6 Cost of Commodity (Last Purchase) and Affordability Perceptions

Consumers of dried tomatoes in Lagos and Kaduna frequently spend more on dried tomatoes each time they buy (N1,971 to N2,438) and the least cost of purchase was in Ogun (N606). Amount spent purchasing the commodities was perceived to be expensive in the states except in Oyo where many perceived the amount spent was cheap (Table 7).

Consumers of dried fish from the pond/wild (in Kaduna and Anambra) spend more to buy fish (between N2,060 to N3,436) than locations where the types of fish mostly consumed are imported (ranging from N888 to N1,852 in Lagos/Ogun/Oyo). Consumers in Anambra mostly perceive the cost to be expensive while those in Oyo and Kaduna perceive the price to be either cheap or indifferent.

The majority of the consumers perceived that dairy commodities (Fura-de-nono and Yoghurt) are quite expensive to buy ranging between N460 and N1,700.

Table 12: Average amount spent on the buy commodities (last purchase) and perception of cheapness or expensiveness

STATE	COMMODITY	Avg amount spent each time or purchase (NGN)	Perception of cheapness or expensiveness
Anambra	Dried Tomato	1,075	Neither (48%)
	Dried Okra	502	Neither/Cheap (71%)
	Smoked/Dried Fish	2,060	Expensive/very (73%)
	fura-de-nono	500	Neither (57%)
	Yoghurt	603	Expensive (60%)
Kaduna	Dried Tomato	1,971	Expensive (75%)
	Dried Okra	396	Neither/Expensive (74%)
	Smoked/Dried Fish	3,436	Cheap/Neither (85%)
	fura-de-nono	476	Expensive (50%)
	Yoghurt	1,700	Expensive (74%)
Lagos	Dried Tomato	2,438	Expensive (69%)
	Dried Okra	295	Cheap (40%)
	Smoked/Dried Fish	1,852	Expensive (59%)
	fura-de-nono	448	Neither (54%)
	Yoghurt	1,080	Neither/Expensive (76%)
Ogun	Dried Tomato	606	Expensive (53%)
	Dried Okra	660	Expensive (60%)
	Smoked/Dried Fish	1,523	Expensive (59%)
	fura-de-nono	684	Expensive (50%)
	Yoghurt	1,165	Expensive (59%)
Oyo	Dried Tomato	1,088	Cheap (47%)
	Dried Okra	295	Cheap (60%)
	Smoked/Dried Fish	888	Cheap/Neither (60%)
	fura-de-nono	867	Expensive (43%)
	Yoghurt	460	Expensive (34%)

7.7 Types of Commodities Consumed and Reasons for Consumption

Tomatoes: Fresh tomatoes are mostly consumed in Anambra/Lagos/Ogun, while consumers in Kaduna and Oyo mostly consume Dried Tomatoes. In terms of cheapness, all respondents in the states noted that the dried form is cheaper to buy, except in Ogun where they perceived that fresh is still cheaper to buy. Majority prefer to buy dried tomatoes that have not been grinded and further process it at the household level. More consumers in Oyo state prefer to buy the grinded tomatoes. Key reasons for consumption are affordability (especially in Anambra/Ogun/Oyo), and because it serves as an alternative to the fresh state especially when the fresh are expensive to buy (See Table 8).

Okra: Fresh Okra is consumed most in Anambra/Lagos, while dried okra is a choice for consumption over the fresh in Kaduna/Ogun/Oyo. Interestingly, the majority of respondents in the states noted that dried okra is far cheaper to buy than fresh. The grinded dried okra is most preferred to buy, except for consumers in Anambra that prefer to purchase the dried okra that is not grinded. What drives consumption of dried okra are affordability (all states), availability (in Kaduna), and ease of preparation (in Oyo).

Smoked/Dried Fish: Interestingly, smoked or dried fish are more consumed by consumers than fresh fish and they acknowledge that it's cheaper to buy. While Catfish is mostly consumed in Anambra/Kaduna (from the pond/wild), European and Herring Fish (imported) are mostly consumed in Lagos/Ogun/Oyo. Reasons for consumption are affordability, taste, and ease of preparation.

Dairy products: What drives the consumption of fura-de-nono and Yoghurt is the nutritional benefits or value perceived to derive from its consumption. Consumers generally perceive that it’s expensive to buy.

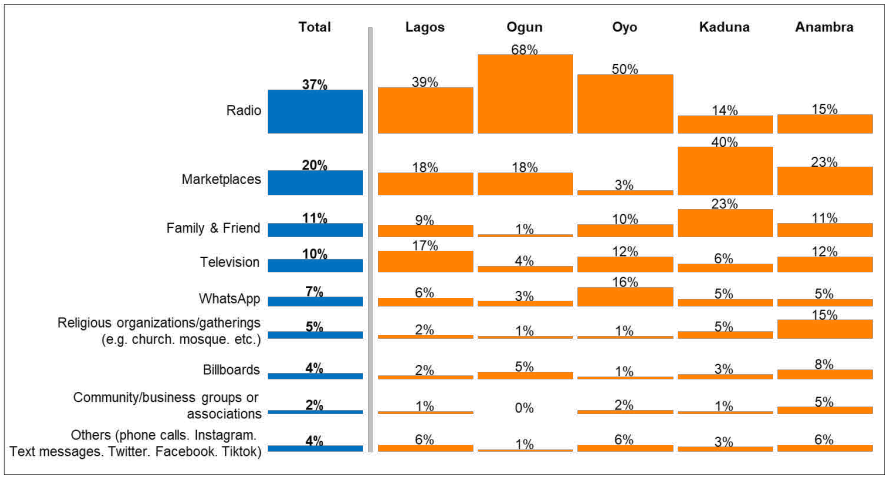
Table 13: *Type of Commodities Consumed and Reasons for Consumption*

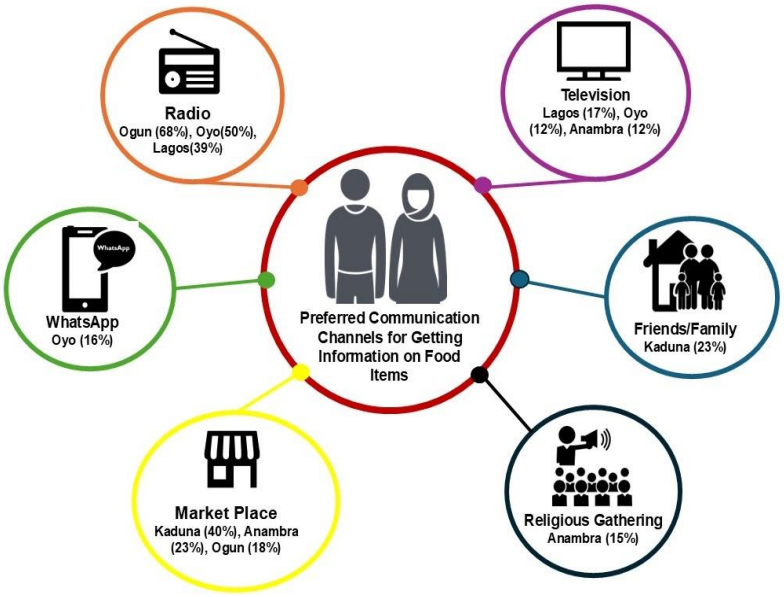
STATE	COMMODITY	Type consumed most	Type cheaper to buy	Form of commodity purchase form the market	Reason for consumption
Anambra	Dried Tomato	Fresh (77%)	Dried (76%)	Not grinded dried (76%)	Affordability
	Dried Okra	Fresh (71%)	Dried (86%)	Not grinded Dried (84%)	Affordability
	Smoked/Dried Fish	Dried Fish (67%), Catfish (36%)	Dried fish (65%)	Already dried/smoked fish	Affordability, Taste
	fura-de-nono	…	…	…	No reasons were provided
	Yoghurt	…	…	…	No reasons were provided
Kaduna	Dried Tomato	Dried (63%)	Dried (58%)	Not grinded dried (63%)	Alternative to fresh
	Dried Okra	Dried (95%)	Dried (85%)	Grinded/Not grinded dried (70%)	Affordability, Availability
	Smoked/Dried Fish	Dried Fish (79%), Catfish (64%)	Dried fish (75%)	Already dried/smoked fish	Affordability, Ease of preparation, Taste
	fura-de-nono	…	…	…	No reasons were provided from consumer perspective
	Yoghurt	…	…	…	No reasons were provided from consumer perspective
Lagos	Dried Tomato	Fresh (62%)	Dried (77%)	Not grinded Dried (77%)	Alternative to fresh
	Dried Okra	Fresh (75%)	Dried (96%)	Grinded dried (86%)	Affordability
	Smoked/Dried Fish	Smoked fish (65%), European (62%)	Smoked fish (61%)	Already dried/smoked fish	Affordability, Ease of preparation
	fura-de-nono	…	…	…	No reasons were provided from consumer perspective
	Yoghurt	…	…	…	No reasons were provided from consumer perspective
Ogun	Dried Tomato	Fresh (67%)	Fresh (62%)	Not grinded Dried (66%)	Affordability

	Dried Okra	Dried (54%)	Dried (54%)	Grinded/Not grinded dried (94%)	Affordability
	Smoked/Dried Fish	Smoked fish (63%);, European/Herring (66%)	Smoked fish (49%)	Already dried/smoked fish	Affordability, Ease of preparation, Taste
	fura-de-nono	…	…	…	No reasons were provided from consumer perspective
	Yoghurt	…	…	…	No reasons were provided from consumer perspective
Oyo	Dried Tomato	Dried (61%)	Dried (74%)	Not grinded dried (61%), grinded dried (45%)	Affordability, Alternative to fresh
	Dried Okra	Dried (59%)	Dried (94%)	Grinded dried (86%)	Affordability, Ease of preparation
	Smoked/Dried Fish	Smoked fish (71%), European (64%)	Smoked fish (74%)	Already dried/smoked fish	Affordability, Ease of preparation
	fura-de-nono	…	…	…	No reasons were provided from consumer perspective
	Yoghurt	…	…	…	No reasons were provided from consumer perspective

7.8 Preferred Communication Channels for Getting Information on Food Items

Figure 2: *Most Preferred Communication Channels to Getting Information on Food Items*





- **Radio** is the most preferred source of information in Ogun (68%), Oyo (50%), and Lagos (39%). Nine in 10 (91%) of those that prefer Radio indicated that they get information about food items from the radio daily or any time they have access to it, which is often in the morning, evening, or anytime of the day. Three-quarters (75%) prefer communication via the Radio in "Yoruba' language.

- **'Marketplaces'** are most preferred by respondents in Kaduna (40%), and Anambra (23%). and is the second preferred communication channel by respondents in Ogun State (18%). Three-quarters (75%) of those that get information from marketplaces get food items-related information anytime they visit the markets mostly daily or at least once a week.

- **'Television'** as a communication channel is preferred more in Lagos (17%), Anambra (12%), and Oyo (12%).

- Aside from 'marketplaces' as a top preferred channel in Kaduna, another communication channel is through family/friends (23%).

- The second preferred communication channel in Oyo is 'WhatsApp' (16%).

- **'Religious organizations/gatherings'** (15%) is most preferred in Anambra when compared to other states.

7.9 Market Systems and Value Chain Maps for the Commodities (dried tomatoes, dried okra, dried/smoked fish, fura-de-nono and yoghurt)

The value chain maps describe the relationships and linkages among different market actors across each phase of the value chain. The vertical direction of the value addition describes the strength of the relationships as color-coded with the "keys". The "key" categorizes the strength of the relationship as "very strong relationship", "strong relationship", and "moderate relationship". In a similar manner, it describes the linkage between these market actors and consumers. The value chain maps were described based on information shared/reported by market actors on how they source for raw materials including productive assets, fresh forms of the F&V and ASF for processing into commodities which are either off-taking by wholesalers and retailers, and also bought by consumers for consumption.

The market systems for the 5 value chain commodities have been described in figures 3 to 6. The vertical relationships and linkages (counter intuitively described as horizontal in the figures) show the patterns and functional value addition activities engaged by the key market actors in adding value to the

commodities at each phase of the value chain. Similarly, the functional supports are highlighted at each phase of the value chain with identified support the market actors either said they receive or are not receiving. The strength of the support received from support activities are colour coded as described in the keys: very weak, fairly performing and strong performing support function activities. The regulatory functions are described horizontally (counter intuitively described as vertically in the figures) with the same keys like the supporting function activities. In all value chain commodities, most of the supporting functions are either very weak and fairly strong.

Across the value chain, market actors reported that certification of processes products and discounting of certification process, sensitization on good manufacturing practice (GMP), GAP and standardization as very weak. This means that though regulatory bodies statutorily reported that they provide some level of support, the impact is yet to be felt by the last mile market actors. The support function activities that were reported to be performing were traditional techniques for processing and linkage to output markets. The linkage to major markets in Anambra (Ose market in Onitsha North, Igbariam Anambra East, Nkwo Awkuzu market of Oyi LGA, Ama Orie market in Umuowa village ifiteogwari Ayamelu LGA), Kaduna (Pambegua Market And Anchau Market ,all in Kubau LGA), Lagos (Mile 12 market, Oshodi, Gberigbe market, Ikorodu), Ogun (Agbobiado, Bode Olude, Odeda; Lafenwa market, Lafenwa, Odeda; Kuto Market, Kuto, Abeokuta South; Elega market, Lafenwa market, Iberekodo market; Igbesa, Atan, Owode Yewa, Ado Odo Ota; Lusada, Agbara, Ado Odo Ota), Oyo (Oja oba, Sango market, Akinyele Market, Bodija Market, Oje market). The markets serve as functional points for buying and selling of the FV and ASF processed commodities. In addition, aggregators, wholesalers, retailers, distributors and consumers connect their exchange of services with the markets as a rallying point for these businesses. In addition, processors (both micro and SMEs) prefer to sell to wholesalers and retailers because they want to maximize profit and recover their capital through bulk sales. This is often the way they are able to mobilize resources for next cycle of processing.

Dried Tomatoes & Dried Okra Value Chain Map

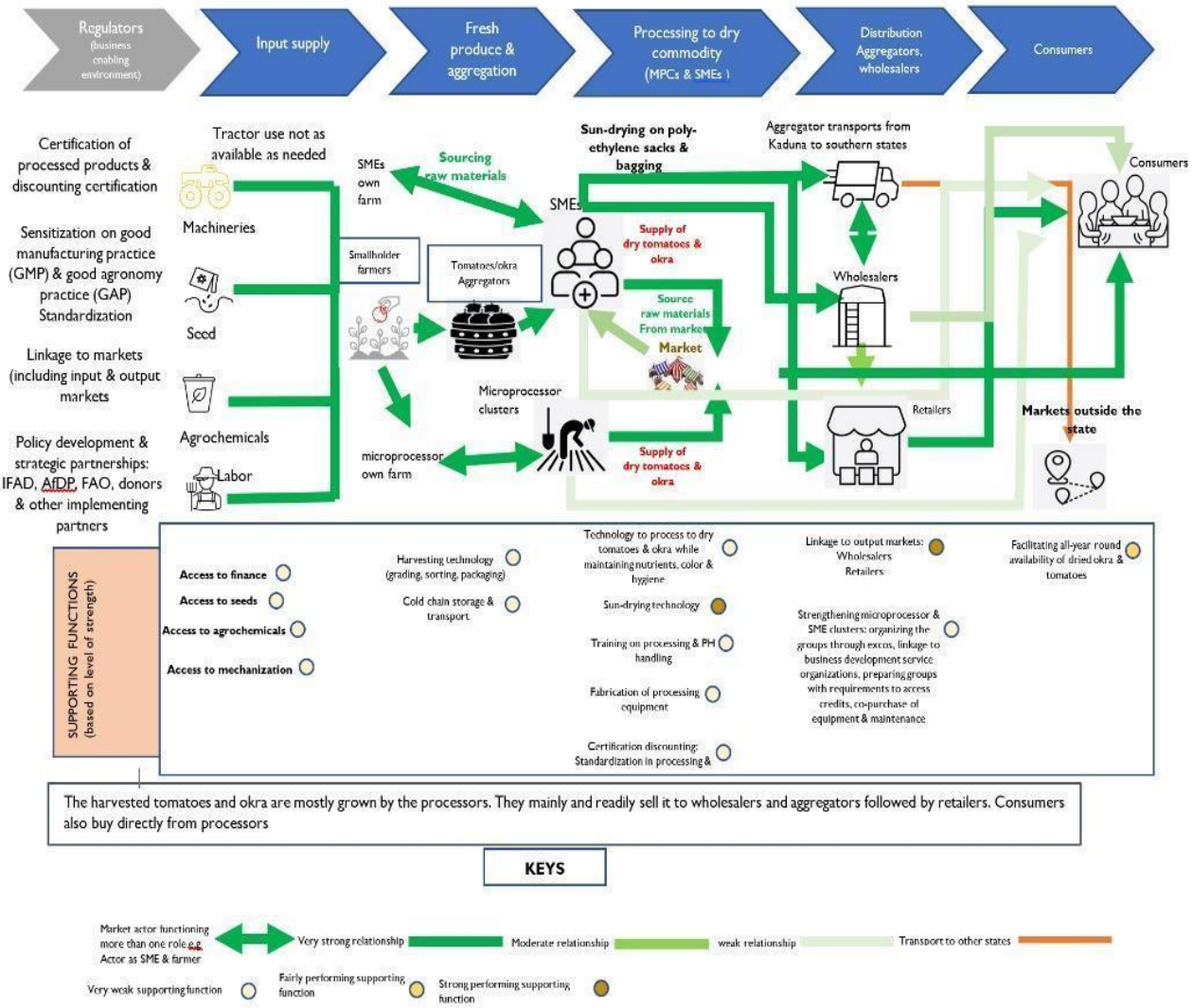
As discussed in Table 11, seasonality is a key factor that determines availability or shortage of fresh okra and fresh tomatoes. Also, since the technologies used for processing dried okra and tomatoes are mainly reliant

on sunshine and weather, the processors are at the mercy of weather conditions including the effect of climate change. This would have been a different supply chain performance if both micro-processor clusters (MPCs) and SME processors could access techniques and technologies that would enhance processing outputs both in turn-over and independent of seasons or weather conditions. However, processors have continued to use traditional technologies for preparing, drying and bagging the commodities.

Most MPCs and SMEs own farms where they grow okra and tomatoes. This further reveals the key driving factor seasonality plays in determining seasons of peak and low processing. For dried okra, fresh okra is accessed mostly during the rainy season ranging between (May to October). There is high demand for dried okra during the dry season when the fresh is either not available or expensive to buy. Consumers however indicated that the peak period for consumption is during the dry season. For dried tomatoes, access to fresh tomatoes as raw materials is peak during the dry/harvest season between September and March in Anambra and Kaduna, but in the rainy season in Lagos/Ogun/Oyo (May to October). There is high demand mostly during the dry season (November to May) due to scarcity of fresh tomatoes and during festive periods within the dry season. Consumers in Kaduna/Anambra indicated that they consume dried tomatoes more during the rainy season, while those in Lagos/Ogun/Oyo have peak consumption during the rainy season.

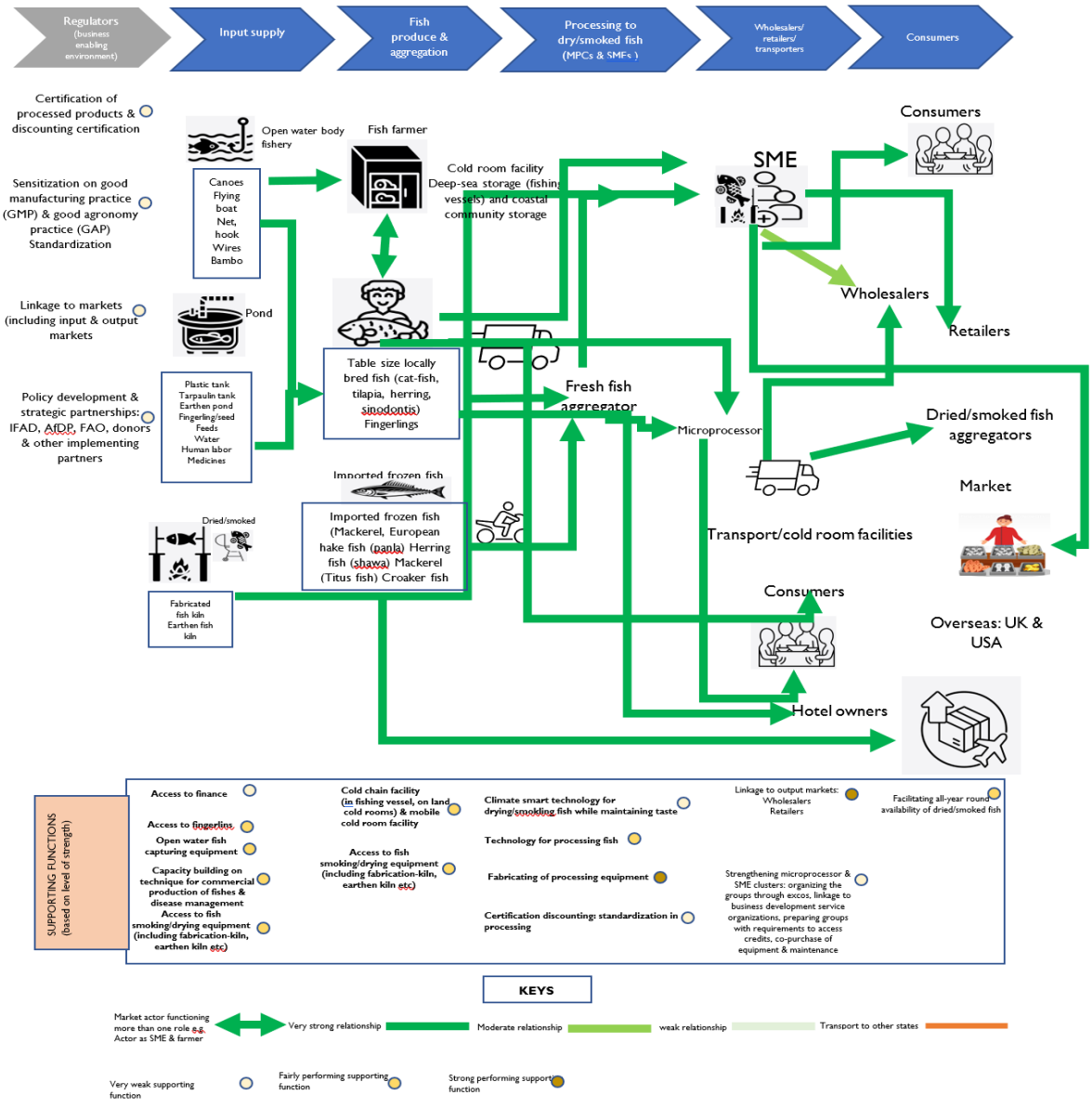
The common markets for these FV commodities include Anambra (Ose market in Onitsha North, village market, Nkwo market Awkuzu, Omo market in Anambra East Igbariam Ifiteogwari Ayamelu LGA). Kaduna (Pambegua Market in Kubau LGA). There was scarcely dried tomato processing in Lagos. In the same vein the consumption preference for dried tomatoes is relatively low in Lagos (8% consumption rate among LiC). The main market for dried okra in Lagos is Mile 12 Market. Ogun (Lusada, Agbara, Ado Odo Ota, Yawa North Ayetoro), Oyo (Oyo farm, Omin Adio, Ayetoro, Iwo, Akufo farm settlement, Ajase farm settlement, Akanran, Dagbolu farm settlement)

Figure 3: *Dried Tomatoes & Dried Okra Value Chain Map*



7.9.1 Dried/smoked Fish Value Chain Map

Figure 4: *Dried/smoked Fish Value Chain Map*

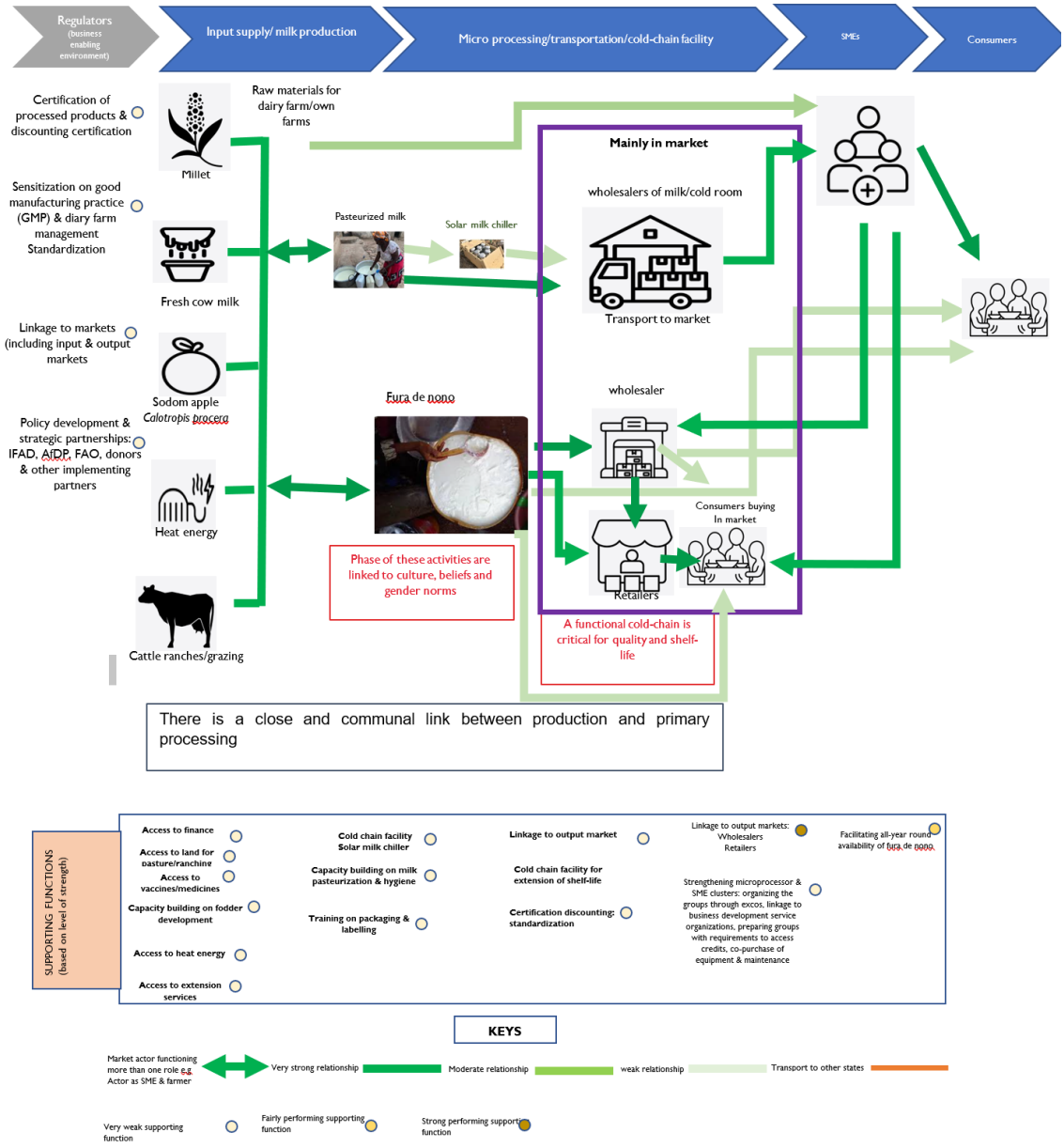


For dried/smoked fish the fish producers play pivotal relationships in producing table size fish for the SME and micro-processors. Most fish producers rear fish using pond fishing. Also, fishing from open water bodies and importation of fishes such as hake fish (panla), herring fish (shawa) & mackerel (titus fish) etc. The SMEs source for fish mainly from fish producers and aggregators. The findings from market actors reveals that a functional cold

room facility is very essential especially with aggregators and small-distributors that deliver fish consumers and micro-processors. Fish farmers also supply fish to hotel owners. In addition, SMEs reported processing fish and exporting them to the USA and UK. At all phases of the value chain, consumers significantly source for fish for household and personal consumption.

7.9.2 Fura-de-nono Value Chain Map

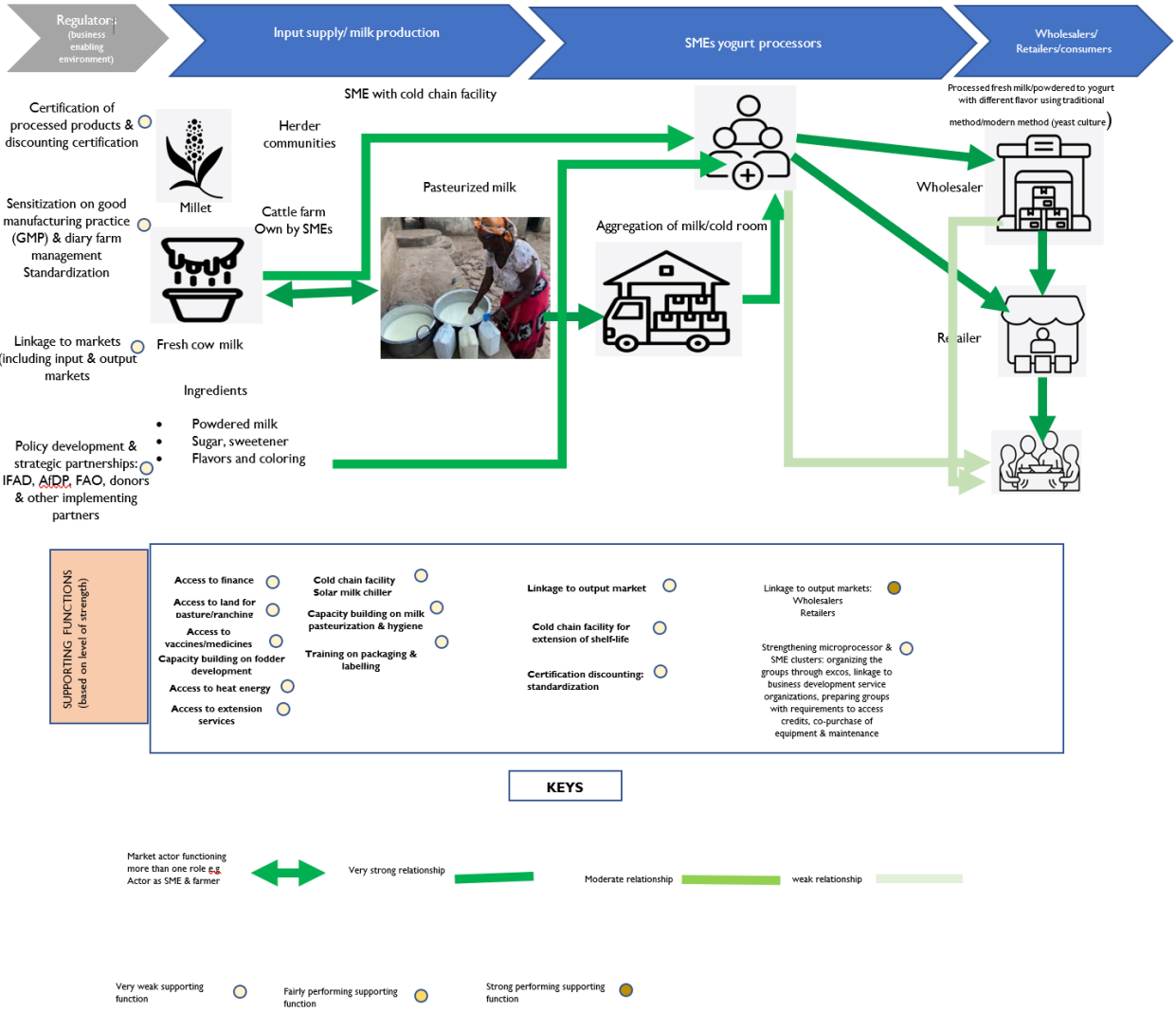
***Figure 5**: Fura de nono Value Chain*



Fura-de-nono is traditionally led by women, as it is often perceived by men not to bring “big” profit. Hence there is opportunity to support women by increasing their capacity to access capacity building, behaviour change on hygiene, and provision of cold chain solar facilities to reduce drudgery and contamination due to lack of power to extend the shelf-life of fresh or pasteurized milk. The quality of fura-de-nono may increase sales through capacity building on standardization, packaging, labelling and guarantee of hygiene at critical control points (pasteurizing, storage in cold room and transportation). Oyo State has the potential to produce fura-de-nono to scale. Reports from micro and SME processors show that the commodity is processed and transported to Ogun State, Ibadan and other states. The main market it is sold in is in Iseyin. In Kaduna, fura-de-nono has major market both at the micro and SME processor level and there is good demand for consumption. Also, the associations such as MILCOPAL in Kaduna and they play significant role in facilitating aggregation of milk in Kaduna state for processing to yoghurt and other diary products

7.9.3 Yoghurt Value Chain Map

Figure 6: *Yoghurt Value Chain Map*



The supply of fresh and pasteurized milk and cold rooms were critical factors for yoghurt business among SMEs. SME processors in some states prefer to buy finished products for sale as a way to overcome the cost of processing, including cold room, power, and distance to the source for fresh milk. Also, use of powdered milk and "culture" for processing the milk are used by SMEs for processing powdered milk into yoghurt. SMEs prefer to sell their products to wholesalers and retailers.

7.10 Raw materials used for production and processing, where they are accessed and the Challenges

Table 14: *Locations where raw materials are sourced and who processors sell to*

	Where do processors get raw materials?	**Who processors sell it too**	**Who are the main buyers of the products**
Anambra			
Dried tomatoes	Anambra East, Igbariam, Anyalemeum		
Dried okra	Anambra north, Anyalemeum	Wholesalers, retailers and consumers	Wholesalers and retailers
Dried/smoked fish	Aggregators from Anambra East, Enugu, Owerri, Benin, Awka use to bring fish for them to buy and they will buy other materials like fire wood and the rest within their community.	Wholesalers, retailers and consumers	Wholesalers, retailers and consumers
fura-de-nono	Awka and Onitsha market	Wholesalers, retailers and consumers	Wholesalers and retailers
Yoghurt	Awka and Onitsha market	Wholesalers, retailers and consumers	Wholesalers and retailers
Lagos			
Dried tomatoes		Wholesalers, retailers and consumers	Wholesalers and retailers
Dried okra	Zaria, Iwo LGA, Ayedire LGA, Osun State, Ola-Oluwa LGA in Osun State, Wushishi in Niger State; Okoga and Agumo in Lagos, Iwo in Osun State, Ilorin, Abeokuta, Benue, Lokoja, Sokoto, Abuja, Zaria, Minna in Niger State. Ibaji, Appa Cotonu Benin	Wholesalers, retailers and consumers	Wholesalers and retailers
Dried/smoked fish	Abateur, and Ijaiye markets, Alimoso LGA, Agege LGA in Lagos Sango-Ota Ogun State	Wholesalers, retailers and consumers	
fura-de-nono	Fulani community in Badagry, Agege market, From the North: Kano, Zamfara, Sokoto, Niger, Kogi.	Wholesalers, retailers and consumers	Wholesalers and retailers
Yoghurt		Wholesalers, retailers and consumers	Wholesalers and retailers
Kaduna			
Dried tomatoes	Tomatoes are grown in their communities (Dan Kaura, Anchau, Kubau, Barde)	Wholesalers, retailers and consumers	Wholesalers and retailers
Dried okra	Kubau, local market in Haskia	Wholesalers, retailers and consumers	Wholesalers and retailers
Dried/smoked fish	Sticks are gotten from Kano, Katsina, and Zamfara, ovens from welders who construct them based on the desired size. Fire wood are gotten from community.	Wholesalers, retailers and consumers	Wholesalers, retailers and consumers
fura-de-nono	Panganu in Zaria	Wholesalers, retailers and consumers	Wholesalers and retailers
Ogun			
Dried tomatoes	The processors of tomatoes in this area often get their inputs from Imala local government Some of the processors claim to get theirs from Abeokuta local government Others claim to get from Lagos and Ibadan. Processors in this area often source their inputs from their farms,nearby markets in Imala,Abeokuta,Obada local government and Imala local government	Wholesalers, retailers and consumers	Wholesalers and retailers
Dried okra	The processors often get raw materials from local governments like Imala local government,Abeokuta local government	Wholesalers, retailers and consumers	Wholesalers and retailers
Dried/smoked fish	The processors in this area source for raw materials in Imala,Apojila	Wholesalers, retailers and consumers	Wholesalers, retailers and consumers

	The processors of the commodity often source their raw materials/inputs from Oyan dam,Imala,Abeokuta		
fura-de-nono	The processors of this commodity sell to Imala community The processors often get raw materials from Thlmala,Olodo community	Wholesalers, retailers and consumers	Wholesalers and retailers
Oyo			
Dried tomatoes	Community Markets within Ibadan Oyo state	Wholesalers, retailers and consumers	Wholesalers and retailers
Dried okra	AYEYE Community we also get it from neighboring communities within this local government	Wholesalers, retailers and consumers	Wholesalers and retailers
Dried/smoked fish	Fish market Egbeda Egbeda LG, major market, cold room	Wholesalers, retailers and consumers	Wholesalers, retailers and consumers
fura-de-nono	Fulani settlements Otu / Itesuwaju LG	Wholesalers, retailers and consumers	Wholesalers and retailers

1. **Anambra**
   a. **Microprocessors:** microprocessors of dried tomatoes use fresh okra and available solar energy to produce dried tomatoes. They purchase both from the farm and producers of fresh okra in An ambra East Igbariam. The microprocessors reported that they lack enough tomatoes to dry sometimes, which impacts their enterprise.

   Fish microprocessors reported using raw materials such as fresh fish, table salt, and tools like basins, wire mesh, drums, and knives to process fresh fish into smoked or dried fish. Processors source through aggregators from Anambra East, Enugu, Onitsha, Owerri, Benin, and Awka. Additionally, processors also purchase fresh fish from fishermen, especially around the October period at the River Niger. Other materials, like firewood and others, are sourced from the communities. Processors of smoked and dried fish reported some challenges, including the high cost of fuelwood and fresh fish, the use of wrong measurement scales by aggregators, and health hazards from smoke during processing. Other challenges reported by the processors include a need for a specific location for processing and inadequate financial muscle to buy fish directly from producers, among others.

   Microprocessors of dried okra reported fresh okra as the major raw material used to produce fresh okra sourced from the farm or the market in Anambra North, Anyalemeum in the state.

The challenges reported by the processors of dried okra include inadequate solar energy to dry okra, often spoiling the okra in the process of drying, and insect-pest infestation.
Microprocessors of yoghurt in Anambra State use the cold room and ice block sometimes as raw materials, which they buy directly from producers or aggregators—wholesalers from the Awka and Onitsha areas of the state. Cost of power, raw materials, and transportation have been reported as major challenges faced by the processors in the state.
Microprocessors of fura-de-nono access fresh milk from abattoirs in Onitsha to produce fura-de-nono. They also access fresh milk from locations where cows are kept and reared within Onitsha town, even though inadequate quantity has been a challenge for the processors.

b. SMEs: SME processors of fura-de-nono in Anambra State said they use fresh cow milk, millet, spices, fuelwood, and powdered milk as raw materials to produce fura-de-nono. They access these raw materials from the local markets in the state and also from cattle farms within the state. The high cost of transportation for cattle and the limited number of cattle are some challenges in getting enough fresh milk. Storage to prolong the shelf life of fresh milk is also a challenge for SME processors.
SME processors of yoghurt in the state make use of sugar, fresh cow milk, milk flavor, sweetener, and colors and other flavors as raw materials for producing yoghurt which are often sourced from the local markets. Lack of enough power for storage and processing impacts the activities of the SME processors. Additionally, the inability of some SMEs to maintain quality has been reported as a challenge.
SME processors of dried or smoked fish in Anambra use constructed ovens with wire mesh, fresh fish, fuelwood, and salt as raw materials, which are sourced from within the neighborhood store or local markets. Challenges reported include health hazards from the smoke and lack of access to finance for investment.

2. Kaduna

a. Microprocessors: the microprocessors of dried okra make use of a knife, sack, bowl, firewood, basket, fresh okra, sieve, and local

tray, as well as pestle and mortar, which they get from their farm and sometimes from local markets in Haskiya. They also buy from aggregators. Challenges reported include lack of access to modern drying equipment and high cost of input, poor market access, insufficient storage facilities, and poor storage facilities. Microprocessors of dried tomatoes reported using fresh tomatoes in baskets, buckets to wash, knives to cut, and packaging materials like bags. They source these materials from their farmlands (we don't buy outside our community, said one of the FGD male participants), local markets, and aggregators. They also harvest it from the farms of producers, as reported by the female FGD participants. Climate change, like unpredictable weather conditions, affects the quality of the finished products. They also reported having limited space to dry the tomato. Microprocessors of fura-de-nono reported using cow milk, millet, fuelwood, and pot to process cow milk into fura-de-nono. They source the milk from owned cows as reported by women and their spouse's cattle or from cattle owners in their communities. The major challenge reported was storage challenges during the hot seasons.

Processors of smoked/dried fish use the oven, which is fabricated locally, salt, and fresh fish from the community and state and outside (Zamfara, Kano, and even Katsina States), fuelwood, and spices. Fire regulation during smoking, lack of specific areas with shade, and access to capital to buy enough fresh fish.

The microprocessors of yoghurt in Kaduna state reported using water, sugar, containers, milk, powdered milk, energy, and processing containers, which are usually stainless steel. Most raw materials are sourced from Sabon-Gari and Zaria in the state. They also get milk (cow milk) from Adauka in Jama'a, Jamil yoghurt, Zango Shanu, Rafin Guza and Rigachukun and powdered milk from the central market in Kaduna state. Some challenges mentioned include getting bottle covers that don't cover the bottles properly and the challenge of getting NAFDAC approval because their requirements are too much. There is also said cow milk scarcity, lack of contact power, and storage issues.

b. SMEs: In Kaduna state, SME processors of smoked or dried fish reported using fresh fish, salt, and sometimes spices or

flavorings depending on the recipe and choice of customers, as well as a knife, a traditional oven with drying trays, firewood, charcoal, cartons, and containers for packaging and axes to process fish into smoked or dried form. The processors get most of their raw materials from Kabalan doki Kaduna North within the state. Electricity or fuel for running processing equipment, refrigeration units, and drying systems have been their major challenges, including processing equipment, which includes machinery for fileting, smoking, drying, freezing, and caning. There is also a lack of skilled workers for handling, processing, and packaging fish. Other reported constraints are difficulty in obtaining loans and financial support, restricting the ability to purchase modern equipment and expand operations. Seasonal fluctuations and supply chain disruptions lead to inconsistent availability of raw materials. Challenges in accessing local and international markets have reduced the potential for growth and profitability. Processors dealing with dried fish often face challenges such as maintaining product quality during drying and controlling moisture. Getting firewood is really hard and very expensive, which affects business, and most people prefer the one made from firewood and charcoal. The one processed with gas doesn't look good and is usually not well-dried.

The fura-de-nono SME processors reported accessing raw materials such as millet, cow milk, powdered milk, pot, and firewood from the local markets or in Zaria markets. Some reported challenges include a few cattle for milking, post-harvest challenges, and hygiene-related issues. Addressing these requires an integrated approach that mainstreams messages on improved handling practices.

SME processors of dried tomatoes accessed raw materials such as fresh tomatoes, knives, sacks, etc from the farms or local markets in Kubau, Iga, and Anchau within the state. Climate change such as irregular rainfall patterns, shorter growing seasons, insect pests, and lack of capital to invest in processing are major challenges faced by the microprocessor in the state.

The raw materials used by SME processors of dried okra include fresh okra, knives, solar energy, and trampoline which are sourced from Fegi, Kudumi, Renau, Kanwa, Kubau, Anchau, and

Goberawa in the state. Lack of modern processing tools and reduced drying time in the rainy season. The lack of improved varieties is also a challenge reported by the processors.

3. Lagos

a. Microprocessors: The microprocessors of dried okra in Lagos sourced fresh okra from Iwo in Osun State, Ilorin, Abeokuta, Benue, Lokoja, Sokoto, Abuja, Zaria, and Minna. They also source fresh okra from Aria, Iwo LGA, Ayedire LGA, Osun State, Ola-Oluwa LGA in Osun State, and Wushishi in Niger State. They reported that rainfall often disturbs the processing of drying, the drying time is short, and patronage is low during the rainy seasons.

The raw materials used by microprocessors of smoked or dried fish include oven, seasoning, pepper, garlic, and ginger, which are sourced mostly from the Alimoso and Agege areas of Lagos State. The high cost of production nowadays (fish feeds, high electricity bill, fuel to pump water, etc) has been our major challenge.

Microprocessors of fura-de-nono in Lagos make use of fura, millet, sorghum, sugar, ice block, millet, and fresh milk as raw materials sourced from the market in Badagry as well as the Agege market and from Kano, Zamfara, Sokoto, Niger, and Kogi States. Challenges reported include high costs of transportation and raw materials. Inflation is a serious challenge faced by the processors, for example, the cost of millet increased from NGN34,000 to NGN 65,000 per 100kg bag, and the cost of grinding inputs like gender, sorghum, or millet has also increased.

b. SMEs: SMEs of smoked/dried fish in Lagos reported using charcoal grills, aromatic woods, charcoal, wood chips, and fish as raw materials sourced from Oke Agbo, Ikorodu, in the state. Some challenges reported by the SME processors are the high cost of charcoal and fuel and health hazards from smoke, which also affect neighbors.

The SME processors of dried okra use fresh okra as major raw materials, which they source from Mile 12 in Lagos State and from Ogun, Osun, and Sokoto States. Processing and handling injuries from knives while cutting is a major challenge, especially

among women processors. Others are lack of drying facilities due to reduced solar radiation time, high cost of fresh okra, lack of capital to invest, and processing machines to increase efficiency.

fura-de-nono SME processors in Lagos use maize, garlic, ginger, pepper, milk, cow milk, coco pot, and water as raw materials to make fura-de-nono. There seems to be increased use of spices in southwestern states as compared to Kaduna State by processors, which could be because of consumer taste and preference. They source these raw materials from the state and outside the state, such as Kano, Sokoto, Kaduna, Kwara, Kogi, Ogun, and Osun States. The major challenge reported is the stress involved in the processing, likely due to the use of traditional methods of processing.

4. Ogun

a. **Microprocessors:** Microprocessors of dried okra mentioned fresh okra as major raw materials sourced from nearby community markets such as Abeokuta,Obada local market, Olodo local government of the state. Disturbances by animals and rainfall during drying have been reported as challenges. Transportation and processing drudgery have been reported as challenges also.

Microprocessors of dried tomatoes sourced their raw materials such as tomatoes and sacks majorly for drying and storage from their farms and nearby markets in Imala, Abeokuta,Obada local government of the state. The challenges they face include difficulty in getting drying space, access to markets, discoloration of the product which impacts the market value, stress in process due to lack of modern processing equipment and tools.

Microprocessors of fura-de-nono accessed fresh milk from Imala market if not available in the farm and also from ThImala, Olodo community to process and produce fura-de-nono. They face challenges involving water problems, transporting of the product to the market and from the farm and high cost of raw materials.

b. **SME processors:** the SME processors of fura-de-nono in Ogun state reported using cow milk, sodom apple (boomu-boomu), leaf extract, salt, pepper, grains like millet, sugar and ginger sourced from Agbobiado village, Bode Olude and Odeda in the state State. The SMEs reported insufficient milk due to shortage of feed (forage), lack of water and high cost of transportation, inadequate water and poor road network as challenges impacted their processing activities.

SME processors of smoked/ dried fish use live fish such as Catfish, European hake Fish (panla), oven, fuelwood and salt as raw materials used to process fish. They source these materials from Araromi community, Bode Olude, Odeda local government and Yesma cold room as well as well as Lafenwa, Abeokuta North, Ogun state Atan, Lusada, Ado Odo-Ota, Idiroko, Ado Odo Ota in Ogun State Eruwa Ibarapa central Oyo state. Challenges of access to raw materials have impacted their capacity to process and distribute these products.

The SME processors of dried okra use fresh okra, water, plastic containers, baskets, cooking pots, slicers and grinders for processing which they source from Agbara, Lusada, Atan, Ado Odo Ota in the State. Identified and reported challenges include lack of enough space to dry okra and insect-pest infestation as well as distance where they access the raw materials. There is an indication of the use of improved tools and equipment to increase efficiency in processing.

Those processing dried tomatoes use fresh tomatoes, dryers, heater, pots and solar energy for drying mostly accessed from local markets in Ogun state such as Agbara and Lusada in the State. Its perishability especially during transportation, high cost of fresh tomato and scarcity are the major challenges faced by processors in Ogun State.

5. **Oyo**

a. **Microprocessors:** the microprocessors of smoked/ dried fish use raw materials such as fresh fish, salt, firewoods, toothpicks and cooking gas are raw materials used by the processors in the state which are often sourced from local fish market, major market and cold room in the case of fish. Challenges mentioned

by the processors include lack of access to finance, high cost of raw material and high cost of machines among others. For dried tomatoes, the microprocessors reported using fresh tomatoes from their own farm and/ or purchase from other farmers within the community or markets in Ibadan city. Sometimes, the microprocessors go to the villages to source for the raw materials, especially tomatoes. The major challenge especially among the female microprocessors is the heavy reliance on solar energy for drying which makes it challenging during dry season. Access to modern closed-chamber dryers will enhance their ability to maintain functionality all season and maintain income stream.

The microprocessors of fura-de-nono in the state use fresh Nunu (fresh cow milk), firewoods and Sodom Apple leaf (ewe bomubomu) as major raw materials to produce fura-de-nono which are sourced from cattle ranch around or the local markets. The male processors mentioned lack of access to finance and high cost of raw materials as their major challenges. The processors of okra use fresh okra as major raw materials sourced from own farms and/ or other farmers in the community markets. Limited access to purchase fresh okra on farmlands and even having access to farmlands to cultivate okra was a challenge mentioned by the women processors in the state.

b. **SME processors:** SME processors of dried okra in Oyo state have reported using fresh tomatoes often sourced from the local farms and markets (Akufo farm settlement, Ikoyi farm, Olode, Olojuoro, Akanran farm settlement, Araromi farm settlement, Apasan, kila farm settlement etc) and even outside the state from Katsina state in northwest Nigeria. Additionally, they also source mat for drying the okra. Difficulty drying during the rainy season is a challenge because they dry in the open which indicates lack of modern drying equipment. Transportation is a challenge where fresh tomatoes get damaged due to mechanical issues associated with movements of perishable commodities.

SME processors of smoked/ dried fish make use of fresh fish such as the Shawa breeds or the African Catfish and even

shellfish mostly sourced from Wharf in Apapa in Lagos state. A combination of traditional sun drying or cabinet and tunnel sun drying, mechanical drying using barrel and smoke drying have been reported in Oyo state by processors of smoked/dried fish showing a better use of technology compared to other states in southwest, Kaduna and Anambra States. High cost of operations especially the cost of gas, charcoal and electricity. They reported that most processors in the state use charcoal for smoking. Drying time is a challenge also, especially in the rainy season due to reliance on open drying by other processors in the state.
The SME processors of dairy products (yoghurt) in Oyo state use fresh milk which is often treated with a transglutaminase yoghurt made by conventional methods sourced from Chana and other locations within the state. Major constraints mentioned by the processors include issues around quality which are affected by different factors such as heat processing, incubation temperature.
The SME processors of dried tomatoes in Oyo state mentioned fresh tomatoes as the major raw materials they use to produce dried tomatoes sourced largely from the northern part of Nigeria. The sundry produce dried tomato and have faced challenges including difficulty in drying during rainy season and lack of modern equipment like ovens for closed-chamber drying. Tomatoes get damaged during transit and make it difficult to prolong their shelf life before processing.

7.11 Modern vs. Traditional Ways of Production, Processing, and Marketing as Experienced by the market actors and their Preference

Anambra

Use of Technology in Tomatoes & Okra Processing

According to the findings of the market system study, the majority of microprocessors of tomatoes and okra employ the traditional technique of processing by sun drying the item. This renders micro-processing highly dependent on the dry season and hot temperatures. While technology is not currently employed for processing, processors are prepared to experiment

with and incorporate new technologies to better their processes. Respondents of one of the FGDs held in Anambra explained that "If we learn modern ways to process and dry it will generate more money. We need machines to learn modern ways to process".

Use of Technology in Fish Processing

There was no mention of improved technology for fish processing in Anambra state, but habits have changed over time. Previously, processors would fold the fish into a round shape (known as the round method), but now they either cut the fish or fold it into the round method during processing. Respondents to the FGD also assumed that adopting technology would reduce their profit margins.

Use of Technology in fura-de-nono Processing

The use of cooking gas over firewood is the only notable improved technology mentioned by microprocessors of fura-de-nono in Anambra State. This adoption resulted from the scarcity of firewood in the assessment location (Onitsha), and respondents noted that it is more expensive to process with cooking gas.

Use of Technology in yoghurt Processing

In the preservation of yoghurt, respondents noted that cold rooms or refrigerators are locally fabricated. While respondents acknowledged that these locally fabricated solutions are capital-intensive, they also mentioned that they are cheaper than imported machines or refrigerators.

Lagos

Use of Technology in Okra Processing

Microprocessors reported that they still rely on traditional methods, which involve cutting the okra into pieces and sun-drying it.

Use of Technology in fura-de-nono Processing

The assessment highlighted improved methods used by some fura-de-nono microprocessors in Lagos. Respondents noted that they now use technologies such as blenders, hand mixers for whisking, and grinding engines, compared to the old method of using hands. However, in the absence of electricity, they revert to manual pounding and mixing.

Use of Technology in Fish Processing

A significant technological advancement adopted by some respondents in fish processing is the use of smoking kilns. Although this method is cost-intensive, it enhances the processing quality and reduces health hazards associated with smoke exposure.

Kaduna

1. **fura-de-nono:** The data shows that the respondents still make use of plastic containers and traditional sieves apart to process fresh milk (fura da Nuno). Lack of awareness and access to improved techniques of sieving was reported by the respondents.
2. **Fresh fish:** The respondents reported the absence of a fish hatchery where young fish (fingerlings) are produced. They rely on someone who hatches the fish, and they purchase fingerlings from him in the neighborhood. The producers still use concrete ponds and trampolines to raise fish to table size. They have access to borehole water and pumps, as well as a nearby stream from where they get water for fish farming (culture fishery).
3. **Fresh tomato:** The male producers of fresh tomatoes in Kaduna have reported using used water pumps for irrigation in the dry season. They also use knapsack sprayers to spray crop protection chemicals. To boost yield, the producers reported they apply inorganic fertilizer during the vegetative production phase. The female producers make use of simple farm tools such as hoes and cattle for land preparation in a rainfed production system.
4. **Fresh okra:** The study shows that okra farmers still use the traditional way of farming on loamy soil and use agrochemicals and crop protection chemicals such as pesticides and some farmers could harvest up to most times 5 per season. Cultivation methods are still manual and some farmers apply inorganic fertilizers to increase yield and productivity even though there is poor knowledge of the application of fertilizer and poor germination of locally sourced seed varieties especially among women producers.

Kaduna

1. **Fura de Nunu:** From the study, it was discovered that pasteurization (boiling of fresh milk) is a technology used by processors of fura de nuno in Kaduna State. They however add powdered milk to increase the quantity of the fura-de-nono.
2. **Dried okra:** The data shows that dried okra processors still use traditional methods to process fresh okra into dried okra in Kaduna State.
3. **Dried tomato:** processors make use of local kitchen knives to cut and slice fresh okra into smaller pieces before sun-drying to make drying faster.
4. **Smoked/ dried fish:** Processors in Kaduna reported that they have always relied on traditional methods for processing fresh fish into smoked fish, without using any type of technology or machinery.
5. **Dairy (yoghurt):** Processors have reported using silver stainless containers and buckets and an electric-powered mixer especially when we are mixing dry powder with liquid. To ensure zero contamination, the process has been using Personal Protective Equipment (PPE). Packing is done in one-liter containers and less to ensure low-income consumers can patronize.

Oyo state

1. **Fresh okra:** the female producers of fresh okra in Oyo State could access and use mechanical weeding machines and tractors for weeding and land preparation respectively on rent. Their male counterparts reported using water pumping machines for irrigation, sprayers as well and tractors for land preparation on rent which is often complemented with simple tools like rakes and shovels for land preparation.
2. **Fresh tomato:** the male producers reported using tractors for land preparation and weeding machines which has been challenging to have enough, especially at the peak of land preparation and weeding which makes them wait on other farmers. This makes the cost expensive and unaffordable. In

addition to the tractors, the female producers make use of simple implements such as rakes and shovels for production. Availability at the last mile is a challenge as reported by the female producers.

3. **Fresh fish:** both the male and female fish producers of fresh fish Oyo state reported using equipment such as concrete tanks and pumping machines for pumping water into the pond. Some use storage tanks to culture fish and cover them with killer nets to protect against predators like snakes. The high cost of equipment and the presence of counterfeit in the markets have constrained the acquisition and usage by fish producers in Oyo State.
4. **fura-de-nono:** no technology reported by female and male producers being used in Oyo state which indicates that traditional methods are still being used.

Oyo

1. **Dried/ smoked fish:** The use of technology especially locally fabricated closed-smoking ovens was reported among female and male processors of smoked/ dried fish in Oyo. Lack of funds to purchase industrial ovens which are much better and more efficient is a challenge reported by both the male and female processors.
2. **Dried tomato:** The use of technology to process dried tomatoes was not reported by the respondents in Oyo State. The major challenge is weather. It is very stressful and difficult to dry tomatoes during the rainy season, said one of the female respondents in Oyo State.
3. **Dried okra:** no technology was reported of any technology used by processors of dried okra in Oyo State
4. **Fura-de-nono:** no technology was reported of any technology used by processors of fura-de-nono in Oyo State.

Ogun State

1. **Fish Processing:** Fish processors in Ogun State noted that they still use traditional methods for processing fish, with no changes or new technology being utilized.

2. **Fura-de-nono Processing:** Processors explained that they continue to use the same old methods for processing the product, with no adoption of new technology.
3. **Okra Processing:** Traditionally, okra processing involves using mortar and pestle for grinding. In contrast, modern methods include drying and blending with machines, which are more efficient and easier when available.
4. **Tomato Processing:** Initially, there was no use of technology in tomato processing. However, the availability of modern technology has made the process easier and more preferable. Previously, tomatoes were dried using rocks, but now, boiling has become a more efficient method.

7.12 Seasonality in Production/sales/Demand for the Market actors/consumers (access to raw materials, demand and consumption).

Table 15: *Seasonality Analysis of the Commodities in Access to Raw Materials, Demand, and Consumption by Low Income Consumers*

STATE	COMMODITY	MARKET ACTORS (Producers, Microprocessors, SMEs, Aggregators, Transporters, Cold Chain Enterprises, Wholesalers, Retailers)		Period of Highest Consumption
		Seasons of High Access to Raw Materials	Seasons of High Demand	
Anambra	Dried Tomato	Dry/harvest season (Sep-Mar)	Festive/Dry Season (Nov-Jun)	Rainy (70%)
	Dried Okra	Rainy season/harvest (May-Aug)	Dry season (Jan-Apr)	Dry (83%)
	Smoked/Dried Fish	All seasons; but easier to get end of rain (Jun-Sep); others said more during rainy season	Festive/dry seasons - Nov-Apr; all season for imported	Dry (60%)
	fura-de-nono	Rainy season/cows feed well with grass and water (Apr-Aug)	Dry/hot/festive season (Nov-May)	Dry (93%)
	Yoghurt	Rainy season/cows feed well with grass and water (Apr-Aug)	Dry/hot/festive season (Nov-May)	Dry (93%)
Kaduna	Dried Tomato	Dry season-less insects-Oct to Dec	Nov/Dec-Festive season, dry season: Mar-Jun (scarce and expensive fresh)	Rainy (58%)
	Dried Okra	Rainy season: Jul-Oct	Jul-Sep: Rainy season; less fresh in Nov-Jun	Dry (92%)
	Smoked/Dried Fish	All seasons; more in rainy season- May-Jul: flood/slow growth/cold season. Dry season because of less water allowing easy fish catch	Festive/Dry season: Nov-Apr; season enhances processing; some during cold season	Dry (88%)
	fura-de-nono	Rainy season/cows feed well with grass and water (Jun-Nov)	Dry/hot/festive season (Nov-May)	Dry (80%)
	Yoghurt	Abundance milk-cow birth in Nov/Dec; Rainy season: Jun-Sep	All-time demand; Dry/hot/festive season (Nov-May)	Dry (92%)
Lagos	Dried Tomato	Rainy season (May-Sep)	Dry season - Feb-May	Dry (70%)
	Dried Okra	Rainy (May-Aug)	Dry season (Dec-Feb)	Dry (100%)
	Smoked/Dried Fish	All seasons, more access during rainy season; people sell off because of weather/flood, and less production follows;	Festive season (Nov-Jan); dry season; pond restock in Nov-Mar	Dry (64%)
	fura-de-nono	Rainy season/cows feed well with grass and water (Jun-Nov)	Dry/hot/festive season (Nov-May)	Dry (75%)
	Yoghurt	All time	Dec; Festive season; Dry season, Oct-May	Dry (100%)
Ogun	Dried Tomato	Rainy season (Jul-Oct)	Dry/Festive season (Nov-May)	Dry (78%)

	Dried Okra	Rainy season (May-Oct)	Dry season (Nov-May)	Dry (61%)
	Smoked/Dried Fish	All season; Rainy season (May-Oct); Dry season-lower water level; Frozen is always	Dry/festive season (Oct - Mar)	Dry (50%)
	fura-de-nono	Rainy season/cows feed well with grass and water (Apr-Nov)	No season/Dry season (Nov-Mar); Not common like the ordinary yoghurt; less supply in dry season	Dry (60%)
	Yoghurt	Abundance milk-cow birth in Nov/Dec; Rainy season: Jun-Sep	Dry/festive season (Nov-May)	Dry (78%)
Oyo	Dried Tomato	Rainy season (May-Oct); when SW is out of season, N will have	Nov-May (Dry season)-scarcity of fresh	Dry (79%)
	Dried Okra	Rainy (May-Sep), good okra for processing is Sep/Oct	Dry season (Oct-Apr)	Dry (93%)
	Smoked/Dried Fish	All/Rainy season (May-Oct), more fish in the river	Dry/Festive season (low production, high demand/low supply) - Nov-Jun	Dry (79%)
	fura-de-nono	Rainy season/cows feed well with grass and water (Apr-Nov)	All seasons, Dry/Festive Season (Dec-Apr)	Dry (67%)
	Yoghurt	Abundance milk-cow birth in Nov/Dec; Rainy season: Jun-Sep	Dec; Festive season; Dry season, Nov-May	Dry (96%)

Dried Tomatoes: Access to fresh tomatoes as raw materials is peak during the dry/harvest season between September and March in Anambra and Kaduna, but in the rainy season in Lagos/Ogun/Oyo (May to October). There is high demand mostly during the dry season (November to May) due to scarcity of fresh tomatoes and during festive periods within the dry season. Consumers in Kaduna/Anambra indicated that they consume dried tomatoes more during the rainy season, while those in Lagos/Ogun/Oyo have peak consumption during the rainy season (See Table 10).

Dried Okra: Generally, fresh okra is accessed mostly during the rainy season ranging between May to October. There is high demand for dried okra during the dry season when the fresh is either not available or expensive to buy. Consumers however indicated that the peak period for consumption is during the dry season.

Smoked/Dried Fish: Generally, there is access to fresh fish to process throughout the year, but processors have more access to fish during the rainy season (May-Oct) as the season favors the availability of more fish. During

the rainy season, fish producers sell off most of the fish to avoid wastage as a result of flooding. Some respondents in Kaduna noted that access to fish in the dry season is better because of low water level that allows easier access. There is higher demand for fresh fish during the dry/festive season (between November and May). Demand seems to be higher (festive/dry season) when there is a relative decline in production. Indicatively, imported fish are always available and accessible which are mostly consumed in Lagos/Ogun/Oyo, while fish from the pond/wild are more consumed in Kaduna/Anambra.

Dairy products (fura-de-nono & Yoghurt): During the rainy season (between May and November), there is abundant food for cows that enhances increased milk production. Demand is however high during dry season, hot weather, or festive season (when milk production is on the decline) between November and June.

Ultimately, the season and time of year impact demand due to factors like scarcity, pricing, and festive occasions.

7.13 Cost of production, processing, total sales, and profit margins for producers and microprocessors

Table 16: *Production Cost, Total Sales, and Profit Margins for Producers*

STATE	COMMODITY	Production Cost (NGN) - (Inputs, Land, Harvesting, Transportation etc.)	Total Sales	Total Sales- Production Cost	Profit Margin	Production (in Kg)	Cost per Kg (in Naira)
Anambra	Dried Tomato	270,000	400,000	130,000	33%	1,500	87
	Dried Okra	260,000	420,000	160,000	38%	840	190
	Smoked/Dried Fish	245,000	420,000	175,000	42%	1,000	175
	fura-de-nono	-	30,000	30,000	100%	400	75
	Yoghurt	-	-	-	-	-	-
Kaduna	Dried Tomato	355,000	900,000	545,000	61%	4,500	121
	Dried Okra	215,000	600,000	385,000	64%	2,000	193
	Smoked/Dried Fish	1,706,000	2,000,000	294,000	15%	60	4,900
	fura-de-nono	25,000	55,000	30,000	55%	110	273
	Yoghurt	-	-	-	-	-	-
Lagos	Dried Tomato	282,000	600,000	318,000	53%	1,200	265
	Dried Okra	157,000	280,000	123,000	44%	840	146
	Smoked/Dried Fish	528,000	900,000	372,000	41%	100	3,720
	fura-de-nono	-	-	-	-	-	-
	Yoghurt	-	-	-	-	-	-
Ogun	Dried Tomato	351,000	480,000	129,000	27%	1,800	72
	Dried Okra	225,000	315,000	90,000	29%	1,350	67
	Smoked/Dried Fish	38,000	250,000	212,000	85%	50	4,240
	fura-de-nono	4,000	150,000	146,000	97%	...	...
	Yoghurt	-	-	-	-	-	-
Oyo	Dried Tomato	310,000	500,000	190,000	38%	1,500	127
	Dried Okra	213,000	320,000	107,000	33%	2,400	45
	Smoked/Dried Fish	215,000	525,000	310,000	59%	...	...
	fura-de-nono	-	-	-	-	-	-
	Yoghurt	-	-	-	-	-	-

Dried Tomatoes: The profit margin for microprocessors of dried tomatoes (between 38% to 71%) in the states are higher than for producers (28% to 61%).

Dried Okra: Processing of Okra in Oyo and Kaduna has lower profit margins compared to the producers; while producers in Anambra/Lagos/Ogun recorded have higher profit margin than the processors.

Smoked/Dried Fish: It's only in Kaduna that processing of fish has a higher profit margin than the production.

Table 17: *Microprocessors' cost of raw materials, processing, sales and profit margin*

STATE	COMMODITY	Amount spent on raw materials (NGN)	Processing Costs (NGN)	Cost of Sales (NGN)	Total Cost of Raw Materials & Processing (NGN)	Total Sales (NGN)	Total Sales - Cost of Materials & Processing (NGN)	Profit Margin (NGN)
Anambra	Dried Tomato	15,000	30,000	100,000	45,000	100,000	55,000	55%
	Dried Okra	15,000	33,000	100,000	48,000	100,000	52,000	52%
	Smoked/Dried Fish	130,000	140,000	400,000	270,000	400,000	130,000	33%
	fura-de-nono	30,000	10,000	70,000	40,000	70,000	30,000	43%
	Yoghurt	100,000	40,000	300,000	140,000	300,000	160,000	53%
Kaduna	Dried Tomato	7,000	22,000	100,000	29,000	100,000	71,000	71%
	Dried Okra	4,000	2,000	15,000	6,000	15,000	9,000	60%
	Smoked/Dried Fish	160,000	4,000	240,000	164,000	240,000	76,000	32%
	fura-de-nono	5,000	5,000	24,000	10,000	24,000	14,000	58%
	Yoghurt	550,000	500	750,000	550,500	750,000	199,500	27%
Lagos	Dried Tomato	–	–	–	–	–	–	–
	Dried Okra	120,000	12,000	250,000	132,000	250,000	118,000	47%
	Smoked/Dried Fish	200,000	17,000	350,000	217,000	350,000	133,000	38%
	fura-de-nono	70,000	750	200,000	70,750	200,000	129,250	65%
	Yoghurt	–	–	–	–	–	–	–
Ogun	Dried Tomato	350,000	25,000	600,000	375,000	600,000	225,000	38%
	Dried Okra	130,000	40,000	400,000	170,000	400,000	230,000	58%
	Smoked/Dried Fish	700,000	70,000	1,200,000	770,000	1,200,000	430,000	36%
	fura-de-nono	–	–	–	–	–	–	–
	Yoghurt	–	–	–	–	–	–	–
Oyo	Dried Tomato	38,000		84,000	38,000	84,000	46,000	55%
	Dried Okra	185,000		260,000	185,000	260,000	75,000	29%
	Smoked/Dried Fish	80,000	10,000	200,000	90,000	200,000	110,000	55%

	fura-de-nono	18,000	20,000	60,000	38,000	60,000	22,000	37%
	Yoghurt	–	–	–	–	–	–	–

Dried Tomatoes: The profit margin for microprocessors of dried tomatoes (between 38% to 71%) in the states are higher than for producers (28% to 61%).

Dried Okra: Processing of Okra in Oyo and Kaduna has lower profit margins compared to the producers; while producers in Anambra/Lagos/Ogun recorded have higher profit margin than the processors.

Smoked/Dried Fish: It's only in Kaduna that processing of fish has a higher profit margin than the production.

Table 18: *Number of customers served in a day by market actors*

STATE	COMMODITY	Producers	Micro-processors	SMEs	Aggregator	Cold Chain	Wholesalers	Retailers
Anambra	Dried Tomato	8 (6-10)	…	10 (5-15)	15 (15-15)	…	8 (2-20)	7 (5-10)
	Dried Okra	8 (5-10)	5 (1-5)	15 (10-25)	13 (10-15)	…	9 (3-14)	13 (10-15)
	Smoked/Dried Fish	1 (1-1)	5 (2-10)	22 (11-47)	…	23 (10-50)	13 (10-15)	14 (8-19)
	fura-de-nono	7 (7-7)	…	20 (5-50)	…	…	18 (10-30)	13 (10-15)
	Yoghurt	8 (5-10)	50 (2-100)	48 (15-100)	…	12 (4-20)	15 (10-20)	15 (10-20)
Kaduna	Dried Tomato	2 (1-3)	2 (1-3)	6 (5-7)	9 (5-15)	…	9 (2-15)	6 (3-9)
	Dried Okra	3 (2-5)	3 (1-5)	2 (1-4)	2 (2-2)	…	10 (6-13)	13 (3-30)
	Smoked/Dried Fish	50 (20-100)	15 (1-30)	16 (3-25)	…	20 (15-25)	10 (7-12)	13 (6-20)
	fura-de-nono	2 (1-3)	10 (1-30)	5 (1-10)	…	47 (20-70)	6 (3-8)	13 (10-15)
	Yoghurt		15 (15-15)	14 (1-35)	…	…	3 (3-3)	10 (7-13)
Lagos	Dried Tomato	15 (2-30)		…	27 (10-40)		70 (70-70)	…
	Dried Okra	2 (1-3)	3 (1-5)	16 (2-30)	20 (10-30)		25 (25-25)	20 (20-20)
	Smoked/Dried Fish		2 (1-4)	25 (3-75)		38 (25-50)	8 (6-10)	20 (20-20)
	fura-de-nono	60 (50-70)	25 (10-40)	70 (50-85)		60 (55-65)	150 (150-150)	40 (40-40)
	Yoghurt	…	…	…	…	…	24 (24-24)	38 (15-60)
Ogun	Dried Tomato	4 (3-4)	10 (5-15)	61 (9-100)	10 (10-10)	…	10 (3-20)	20 (10-30)
	Dried Okra	5 (4-5)	12 (5-20)	37 (10-78)	8 (6-10)	…	12 (8-15)	12 (10-13)
	Smoked/Dried Fish	3 (3-3)	13 (10-15)	55 (40-85)	15 (15-15)	85 (30-140)	68 (56-80)	33 (30-35)
	fura-de-nono	1 (1-1)	11 (10-12)	67 (5-140)	…	21 (16-25)	35 (20-50)	38 (20-56)
	Yoghurt	…	…	139 (30-293)	…	…	31 (25-50)	60 (20-85)
Oyo	Dried Tomato	2 (1-3)	2 (1-3)	37 (15-107)	14 (12-15)	…	100 (80-120)	3 (2-3)
	Dried Okra	2 (1-3)	2 (1-3)	60 (13-85)	25 (20-30)	…	17 (13-20)	5 (3-7)
	Smoked/Dried Fish	15 (10-20)	35 (20-50)	82 (20-120)	…	95 (13-200)	28 (25-30)	45 (40-50)
	fura-de-nono	3 (2-4)	15 (20-50)	150 (150-150)	…	28 (20-35)	…	…
	Yoghurt	…	…	405 (120-500	…	…	30 (20-40)	15 (2-50)

---: the 3 dotted lines means that the market actors reported they did not trade in the commodity to customers or rarely happens

7.14 Sources of Commodity Purchase, Awareness of Nutritional Benefits and Purchased Varieties

Table 19: *Source of Commodity Purchase, Awareness of Nutritional Benefits, and Varieties Purchased*

STATE	COMMODITY	Source of purchase	Awareness of nutritional benefit	Awareness of commodity variety purchased
Anambra	Dried Tomato	General market/stalls	Yes (25%)	Yes (6%)
	Dried Okra	General market/stalls	Yes (28%)	Yes (11%)
	Smoked/Dried Fish	Gen. Market/Stalls	Yes (75%)	--
	fura-de-nono	Street vendors	Yes (73%)	---
	Yoghurt	Supermarket, Street vendors, Market stalls	Yes (71%)	---
Kaduna	Dried Tomato	General market/stalls	Yes (63%)	Yes (71%)
	Dried Okra	General market/stalls	Yes (30%)	Yes (33%)
	Smoked/Dried Fish	Gen. Market/Stalls & Street vendors	Yes (98%)	
	fura-de-nono	Street vendors	Yes (93%)	---
	Yoghurt	Market stalls	Yes (96%)	---
Lagos	Dried Tomato	General market/stalls	Yes (39%)	Yes (0%)
	Dried Okra	General market/stalls	Yes (23%)	Yes (0%)
	Smoked/Dried Fish	Gen. Market/Stalls & Street vendors	Yes (53%)	---
	fura-de-nono	Street vendors	Yes (73%)	---
	Yoghurt	Supermarket, Street vendors, Market stalls	Yes (72%)	
Ogun	Dried Tomato	General market/stalls	Yes (44%)	Yes (10%)
	Dried Okra	General market/stalls	Yes (37%)	Yes (15%)
	Smoked/Dried Fish	Gen. Market/Stalls & Street vendors	Yes (64%)	---
	fura-de-nono	Street vendors	Yes (50%)	---
	Yoghurt	Market stalls & Street vendors	Yes (50%)	---

Oyo	Dried Tomato	General market/stalls	Yes (7%)	Yes (10%)
	Dried Okra	General market/stalls	Yes (9%)	Yes (8%)
	Smoked/Dried Fish	Gen. Market/Stalls & Street vendors	Yes (17%)	---
	fura-de-nono	Street vendors	Yes (43%)	---
	Yoghurt	Street vendors	Yes (60%)	---

Dried tomatoes, okra, and smoked/dried fish commodities are often purchased by consumers from the general markets or stalls. Fura de nono products are mostly purchased from the street vendors while Yoghurt are purchased from designated locations such as supermarkets, and market stalls, and occasionally from street vendors especially in Lagos and Oyo States (See Table 5).

Less than half of dried tomatoes and okra consumers are aware of the nutritional benefits of the commodities they consume, especially in Anambra/Lagos, and worse in Oyo (less than 10%). At least three-quarters of consumers of smoked/dried fish in Anambra and Kaduna (fished sourced from Pond/wild) knows the nutritional benefits compared to about half of consumers of imported fish in Lagos/Ogun and 17% in Oyo.

Awareness of varieties of dried tomatoes and okra consumed is generally low, except in Kaduna, where they indicated the highest awareness level of varieties consumed.

OKRA

For the LIC only 25% are aware of the nutritional benefits, while 19.2% believe there are no nutritional benefits and 55.8% can't say of the nutritional benefits. From the data Ogun had the highest awareness of 36.8% and Ogun 29.6% respectively. While the lowest awareness was in Oyo 9.2% and Lagos 22.7% respectively. There were different views of Small and medium enterprises on the nutritional benefits of Okra, Anambra sees okra as a vegetable and also a source of vitamin and manages the sugar level, while for wholesalers/Retailers it is a vegetable with vitamins and proteins. Kaduna SMEs, sees it to boost immune system and support digestion and boost sexual health and wholesalers/Retailers said it's Good for sexual health and boost immune system. It also boosts the immune

system and is also a source of iron in Lagos. Ogun believes It makes child's delivery easier, reduces the risk of cancer and stroke, reduces the risk of sickness and disease and also control blood sugar and for wholesalers/retailers It help to support digestion and help to manage blood sugar levels while Ogun most of the responses were that It gives more protein and energy to the body for Wholesalers/retailers It help to support digestion and to manage blood sugar levels. For microprocessors in Anambra, it clears the voice, builds the immune system and cures ulcers. It serves as a vegetable and is beneficial for the digestive health for Kaduna LIC. For producers in Anambra, it is rich in vitamins, builds the immune system, heals ulcers and is good for fertility organs and okra has a chemical that builds the body and increases health, clears the body system for both women and men in Kaduna. It helps in digestion and boost the immune system in Lagos

A quote from Anambra producer "It gives blood. It is a vegetable, it nourishes the body. It builds the immune system, it clears sight, it heals ulcers and it is good for fertility organs."

TOMATOES

33.5% of the LIC's are aware of the nutritional benefits while 23.4% believe there are no nutritional benefits and 43.1% can't say. Kaduna had the highest with 62.5% and 44.0% in Ogun while the lowest was in Oyo 6.5% and Anambra 24.5%

SMES Nutritional benefits vary from state to state. In Kaduna it is a source of vitamin, cures high blood pressure and brightens the skin, while for wholesalers/retailers, it is good for the eyes and lowers blood pressure. It is a source of protein and vitamin for SME and wholesalers and retailers in Anambra and in Oyo it supports digestion, lower cholesterol and manages blood sugar levels for SMES but a source of protein for Wholesalers and retailers. For wholesalers and retailers in Ogun it is good for diabetics and boosts the immune system and it strengthens the body and makes it fresh for Lagos. Microprocessors in Anambra said it softens the skin a vitamin and gives energy and Ogun said it is rich in taste. Producers of tomatoes, reduces blood sugar and nourishes the body with vitamins

Quote from a tomato producer in Kaduna "It has benefit in reducing blood sugar, it also helps to nourish the body with vitamins, I don't think there is any difference between male and females, we both get the same nutrient

from the tomatoes"

SMOKED/DRIED FISH

LIC's are aware of the nutritional benefits with 54.7% and 16.3% believe there are no nutritional benefits. The nutritional benefits were more in Kaduna 97.9% and Anambra 74.6% while the least was in Oyo 17.2%.

Small and medium enterprises IDI on nutritional benefits are it contains vitamins and proteins for SMES, Wholesalers/Retailers in Anambra, Kaduna and Lagos while Ogun it reduces fat intake and it's a good source of protein. Oyo believes it to be used for hypertensive patients which is common among the old people. It helps those that are aging and it's more nutritional than the red meat for Wholesalers/retailers in Kaduna, for Lagos it is a source of protein and calcium. It has high protein and low fat for Ogun and Oyo. It clears sight and it's a source of protein and calcium for producers in Anambra, it is a source of protein and vitamin and makes the skin glow and fresh

FURA DA NUNU

76.3% know the nutritional benefits while just 2.6% believe there are no nutritional benefits while 21.1%. Kaduna had the highest with 93.3% and lowest in Oyo 42.9%

Fura da nono for SMES gives energy, vitamins, calcium and protein as reported and it is very nutritious, it gives protein, vitamins, and it builds the immune system by wholesalers/retailers respondents from Anambra and in Kaduna it used to treat cold and ulcer for SMES/Wholesalers and retailers, Lagos SMES, wholesalers/Retailers believes it makes you look young and it nourishes the skin. Ogun state nutritional benefits is that it gives more profit and boosts the sperm for both the SMES and wholesalers/retailers while Oyo SMES is that it contains all the classes of food. It is a source of protein and helps to cure ulcer for microprocessors in Kaduna while for Oyo Microprocessors it has low cholesterol and is rich in protein and vitamins

YOGHURT

62.2% are aware of the nutritional benefits while 37.8% can't say. SMES/Wholesalers and retailers at Anambra said, it contains protein and nourishes the body. Kaduna believes it makes the skin glow, improves health and cures malnutrition. It is high in protein and full of vitamins and

boosts the immune system for both the SMES, wholesalers/retailers in Ogun. Oyo said it contains all the 6 classes of food and some vitamins, protein and calcium for SME and wholesalers/retailers respectively. For microprocessors, it gives vitamins and protein to the body and for producers It is refreshing and aid children to grow, it is a source of protein, energy carbohydrates and oil, The perception is the same with men and women in Anambra, it Builds the immune system, gives energy and helps the skin in Kaduna

REGULATORS.

The regulators play a vital role in ensuring standards of quality and quantity of safe nutritious foods. From the market assessment, the regulators ensure the training of market actors on standards and quality of nutritious foods through different initiatives.

There are trainings for processors on how to go about their products and maintain it nutritional values and have the likes of Scaling Up Nutrition Through Production & Processing of some Biofortify crops initiative through GAIN. (Global Alliance for Improved Nutrition) and also conducted training to make available affordable nutritious food for low-income consumers in Oyo. While in Kaduna, attended trainings on how to collect milk, the processing and how to avoid contamination

Quote from a regulator in Kaduna “We attend many training sessions in Kaduna, Imo State, and Damau in Kaduna State. The training is on how to collect milk from the collection center and how to process it and not collect milk while an animal is on treatment and delay of collection can contaminate milk.”

Recommendations

- There is low awareness and inconsistent understanding of the nutritional benefits of the consumed value chains across the states, hence there is need for a consistent SBCC on the nutritional benefits of the value chain to trigger more demand by LIC’s and increase sales of market actors through the preferred channels of communication of LIC’s which is Radio, marketplaces and family and friends. This channel of

communication is obtained from the Low income consumers most preferred communication channels for getting information on food items they consume which 37.3% prefer radio, 20.1 marketplaces and 10.7% family and friends.

- There is a need to work with the regulatory bodies to support the market actors with training on value addition like packaging, branding labelling and good manufacturing practices.
- Lastly, the program should work with the NAFDAC and SON to subsidize the amount of the registration of food products and make the requirements flexible to accommodate more products to be registered

7.15 How Market Actors Access finance to run their operations/business, Challenges and Options. And Roles of Regulators in Assisting Market Actors to Access Loans/Finance?

Category	State	Areas they access Finance	Barriers
Aggregator	Anambra	Self-funding and savings/support from family and friends	No collateral and interest rate
	Kaduna	Self-funding and savings/support from family and friends	Lack of awareness on loan and high interest rate
	Lagos	Self-funding and savings/support from family and friends and from cooperatives and associations	No access to loan, too many requirements and high interest rate
	Ogun	Self-funding and savings/support from family and friends and from cooperatives and associations	The loan comes late, high interest rate and issue of guarantor
	Oyo	Self-funding and savings/support from family and friends and from cooperatives and associations	High interest, guarantor, no collateral
Wholesaler/Retailers	Anambra	Self-funding and savings/support from family and friends	High interest, short repayment time, no access to the loan, lack of collateral, not aware of the requirements
	Kaduna	Self-funding and savings/support from family and friends	No access to loan and information, Lack of trust, long procedures and high interest rate
	Lagos	self-funding and savings/banks/support from family and friends	Lack of collateral, short repayment, high interest, loan not timely, lack knowledge
	Ogun	self-funding and savings/banks/associations, support from family and friends	Not timely, no collateral, high interest rate and guarantor requirement, lack of trust
	Oyo	self-funding and savings/associations and support from family and friends	Collateral, high interest, difficult to access, you must be a member
SME Processors	Anambra	self-funding and savings/associations/cooperatives and support from family and friends	Long process for collection of loan, short repayment, no collateral, guarantor, many requirements, not timely, high interest rate, unable to pay on time
	Kaduna	self-funding and savings/associations and support from family and friends	Long process for collection, short repayment period, no collateral. No guarantor, many requirements, loan not timely, high interest
	Lagos	self-funding and savings/associations/banks and support from family and friends	It takes long, high interest rate, lack of collateral
	Ogun	self-funding and savings/cooperatives and support from family and friends	Lack of awareness on loan and high interest rate, religion

	Oyo	self-funding and savings/associations/banks and support from family and friends	lack of access to loan, no collateral, you have to belong to association, loan is not available and high interest
Microprocessors	Anambra	• Consignment arrangement (pay after processing and selling) • Loans from cooperatives or support from individuals • Family	Loan has much interest therefore its easy to collect products on credit (consignment agreement)
	Kaduna	• Self-funding/Personal saving • Reinvestment of profit/ sales of other farm produce • Payment after sales (consignment agreement) • Friends and family	Access to finance is ease for men compared to women. Lack of believe in loans
	Lagos	• Borrow from friends and family • Personal savings • Cooperative society/thrift (social funds), • Upfront payment from customers (consignment agreements)	
	Ogun	• Cooperative/thrift • Family and borrowing from friend	Mostly microfinance and not everybody has what it requires to borrow. Not being able to get a loan due to not having what to use as collateral.
	Oyo	• Personal savings/Friends and family • Upfront payment from customers • Loans from microfinance banks	

7.16 Suggestions by the Market Actors towards Improving Revenue and Roles of Regulators in Supporting Market Actors to Improve Revenue (via marketing, connectivity, support systems, policies, trainings, etc.)?

LAGOS STATE

Fish Processing
Fish processors in Lagos State believe that obtaining grants would significantly enhance their revenue from processing activities. They emphasize the need for banks and financial institutions to ease the lending process for fish farmers, as the current system is fraught with numerous bottlenecks that hinder loan access. Financial assistance is crucial for them, not only as their primary source of income but also because of their passion for the work.

Fura-de-nono Processing
Fura-de-nono processors express the importance of mutual assistance in scaling up high-volume processing and production. They are open to any form of support that can enhance their processing activities, including improvements in electricity supply and access to refrigerators, which would make fura-de-nono processing more efficient and enjoyable.

Okra Processing
Okra processors highlight the need for financial support to boost their business operations. They believe that such support would enable them to increase their revenue and better reach out to consumers.

ANAMBRA

Tomato Processing
Tomato processors in Anambra State suggest seeking help from the government and participating in collective savings schemes to access loans (VSLA). They emphasize the need for training on current tomato processing techniques and financial support to enhance their operations.
Okra Processors in Anambra State

Okra processors believe that learning modern methods for processing and drying okra will increase their revenue. They need machines to adopt these modern techniques, along with financial support and training on effective marketing strategies. They emphasize that modern processing methods could significantly boost their income.

Fura-de-nono Processing

Fura-de-nono processors highlight the need for more cows to increase milk production and additional space to keep the cows. Financial support is also crucial, as they currently rely on gas due to a lack of firewood, which is time-consuming and costly.

Fish Processing

Fish processors in Anambra State need support in obtaining space for processing, financial aid to purchase materials directly from producers, and equipment like ovens to improve efficiency. They also require permanent locations to sell their processed products as they are sometimes displaced from their temporary market locations.

Yoghurt Processing

Yoghurt processors stress the importance of steady electricity and distribution facilities. They need assistance because their processing business generates limited income, and transportation is essential for distribution. High electricity costs pose a significant challenge, making financial support critical for sustaining their operations.

OGUN STATE

Fish Processing

Fish processors in Ogun State believe that reinvesting profits and keeping capital within the business can boost revenue. They emphasize the importance of circulating information to reach a wider audience, making the commodity attractive, and improving packaging. Maintaining neatness in preparation and adopting improved technology are crucial steps to reach more customers and increase revenue.

Fura-de-nono Processing
Fura-de-nono processors suggest ensuring the freshness of nunu for processing and neat packaging to attract consumers. They recommend reducing prices to make the product more affordable and selling in large portions to marketers. Additionally, they highlight the need for financial support, transportation, electricity, and good water for processing to ease market access and improve their operations.

Okra Processing in Ogun State
Okra processors emphasize the importance of punctual delivery and sales, neat packaging, and maintaining cleanliness. They believe access to finance will aid in increasing production and revenue. Reliable access to men who sell fresh okra and the need for modern equipment are also crucial to making the business easier and more profitable.

Tomato Processing
Tomato processors believe that improved packaging and neat processing can significantly increase revenue. They stress the importance of reaching a wider audience and the provision of modern equipment to facilitate faster processing and reduce the labor-intensive aspects of their work. This would help them avoid issues such as rain damage and animal interference.

7.17 Roles of men, women, youth, PWD in each of the market actors

Marginalized groups actively participate in the early stages of the value chain, particularly in the production and processing of fresh okra and tomatoes. Female youth in Ogun State are involved in the entire okra production process, including harvesting, drying, and selling. However, in Lagos, they are only involved in okra processing if they express interest. Women play a significant role in purchasing and processing activities, particularly in ground dried okra and tomatoes. In Anambra and Oyo, women are responsible for cutting, drying, and selling okra, representing approximately 40% of the workforce. Youth, accounting for about 30% of participants, engage in both labor and innovative practices like technology adoption. Persons Living with Disabilities (PLWD) have limited involvement, about 5%, due to physical barriers, lack of access to resources, societal norms, and limited mobility.

In Kaduna, women are primarily responsible for the production, processing, and aggregation of cow milk, storing it in large containers for collection. Milk processing, especially fura-de-nono, is culturally significant and passed down through generations. Women also teach young girls milk processing as an empowerment model, preparing them to start their own businesses when they marry. Female youth assist in processing and selling fura-de-nono under adult supervision in Anambra, Ogun, and Oyo. PLWD are not involved in milk processing in Kaduna, Ogun, Oyo, and Anambra due to the physical demands of the task and societal perceptions of their capabilities.

Women dominate manual processing tasks, representing about 50% in regions with significant fish processing activities. Youth account for approximately 35%, while PLWD have minimal involvement due to accessibility issues. In Kaduna, female youth handle the entire fura-de-nono processing except for those in school, and children sometimes assist. In Lagos, female youth manage pond care, fish feeding, buying inputs, and fish cutting. In Ogun, they are trained to process fura-de-nono and tasked with selling it in the market. Male youth assist with tomato processing by harvesting, transporting, and carrying out processing tasks. In Ogun and Anambra, they play active roles in processing okra, smoked fish, and dried tomatoes, assisting women and managing the cold room for fish.

In Kaduna, women process milk, particularly yoghurt, with male youth contributing significantly. Women in Ogun and Kaduna handle tomato processing, including slicing, boiling, draining, and drying. In Oyo, women additionally cultivate, weed, plant, and apply chemicals and fertilizers. In Ogun, males monitor and secure the drying process. In Anambra, women provide water for fish processing, clean, dry, and sell fish, and manage the cold room, while men occasionally assist. Older adults (aged 36 and above) participate more as consumers and supervisors in Kaduna, while they are fully involved in processing and monitoring in Oyo, Anambra, and Ogun. They use their experience and skills to supervise, teach traditional techniques, and run fish processing businesses. PLWD in Kaduna participate in marketing, folding fish, monitoring smoking, sorting, and packaging based on their abilities. In Anambra, they help with fish folding and random tasks in Ogun but are scarcely involved in Lagos, depending on their disability types.

Women predominantly engage in small-scale marketing and sales, comprising around 60% of marketers. Youth represent about 40%, engaging in
digital marketing and innovative sales strategies. PLWD have limited involvement due to mobility challenges.

Social, Cultural, and Economic Factors Influencing Participation

1. Cultural Norms

Women are primarily involved in manual labor and processing tasks across the states. Like any food security or agriculture-focused intervention, the program should aim to reduce labor-intensive tasks for women. Manual labor limits the scale and efficiency of production, opportunity to lead compared to technology-driven methods, thereby hindering overall productivity.

2. Restrictive Beliefs and Perceptions

Age is a significant factor where older adults are considered experienced and skilled, often given supervisory roles, while youth are viewed as nonchalant and destructive. In Kaduna, older adults are trusted with overseeing tasks, sharing traditional techniques, and teaching younger workers. They often run their own fish processing businesses, making them a target group for behavior change within the value chain.

Quote from a male FGD participant in Anambra affirms that women are believed to be unfit to employ labour and take up leadership of fish production ‘Women will have challenges or workers because the workers cannot obey their instructions the way they obey men. Again, just like the way we were having headmasters in school those days, things were going on well but since we started having only headmsitress in schools there is no discipline again. So, in fish production’

The program should focus on influencing perceptions rather than seeking to change market actors outright for greater inclusivity. Capacity building for youth on viable business practices can address perceptions of them causing damage to crops, like tomatoes.

3. Economic Opportunities and Youth Engagement

Male youth in Ogun and Anambra assist female processors and help transport commodities from farms to processing points or markets. This support for women's participation in distribution activities is an economic opportunity that attracts youth to urban areas, where they are more engaged in market activities. Traditional roles often place men in production and leadership positions, with economic factors like land ownership and access to finance favoring them.

4. Challenges Faced by Persons with Disabilities (PLWDs)

PLWDs face non-recognition, stigmatization, and discrimination, particularly in Oyo, Ogun, and Anambra states, with minimal engagement in Kaduna. They are often considered to lack funds and are seen as an unproductive population. Some respondents in Kaduna noted the absence of PLWDs in their community, perceiving them as lacking strength. PLWDs find it difficult to engage in processing activities. Interventions on the project should gather case studies of effective inclusive strategies and infrastructure that consider their unique challenges in accessing markets, jobs, and resources. Including PLWDs by proxy in interventions targeting farming households and promoting inclusive policies among regulators can ensure better access to markets and resources. Respondents in Kaduna who noted the absence of PLWDs in milk processing illustrate the need for evidence-based partnerships to include PLWDs in businesses.

5. Age-Long Traditions and Their Implications

While apprenticeships in processing and hawking fura-de-nono are age-old traditions, the risks for female youth need to be considered when providing interventions for these groups. The program should focus on growing their businesses in a safe and profitable manner.

6. Community Perceptions of Gender Equality

Data shows a trend where urban communities are more supportive of gender equality, with higher acceptance of women in production and processing roles. Rural communities often hold traditional views, limiting

women's influence. There are varied perceptions, with some communities supporting equal participation. However, traditional norms restrict women's roles to lower-value tasks, with perceptions that women are not physically or financially strong enough and that some tasks are hazardous for them.

7. Economic Constraints

Perceived economic constraints limit women's and youth's ability to invest in agricultural activities due to limited access to financial resources. Addressing these constraints is crucial for enhancing their participation and economic progress within the value chains.

8. Implications of restrictive perceptions on marginalized groups

In Ogun, discomfort during the drying process of tomatoes is a major challenge. Oyo faces financial constraints, while in Anambra, issues include cuts from cutting okra and the absence of modern tech-enabled support. Additionally, smoke from fish smoking affects eyesight in Ogun, Kaduna, and Anambra. Power supply issues also hinder the storage of yoghurt when demand is low.

Barriers to Gender and Inclusion

Adherence to labor-intensive traditional methods
Respondents highlighted that the milking process of cattle is strenuous due to the lack of modern equipment to assist in milking the cows. Women and female youth seem to be very used to strenuous processing procedures compared to the male youth who show more curiosity for newer procedures. female youth respondents in kaduna for fure-de nono said that ‘no challenge because the female youth process the milk the male and female youth understand their different roles so no challenge’ This limited interest on the lack of technological support significantly hampers efficiency and productivity.

Challenges
Youth face numerous challenges, including hunger, thirst, theft, and rainfall during cattle rearing. In extreme cases, some even lose their lives while

trying to secure cattle during adverse weather conditions. Youth in Kaduna are often unable to participate in milk processing due to school commitments, while in Ogun and Kaduna, female youth face insecurity and the stress of hawking. Male youth also face hunger, theft, and the burden of securing cows, alongside conflicts between farmers due to climate change.

1. Limited Focus and Financial Constraints

Youth in Ogun are perceived as unfocused and nonchalant, requiring constant monitoring to prevent damage and loss during tomato processing. The overall lack of focus among youth also leads to damages in tomato processing due to the limited financial gain. Challenges in accessing capital and equipment for both women and youth further exacerbate these issues.

2. Technology and Management Practices

Women often have less access to training and modern technologies, limiting their productivity. Limited access to markets and information, coupled with insecurity, is a common problem among marginalized groups (MGs) in all states. Women face additional challenges in accessing larger markets due to mobility constraints and societal norms.

3. Adaptability and Barriers

While youth are more adaptable to new technologies, they face significant financial constraints. Persons Living with Disabilities (PLWD) encounter substantial barriers in accessing marketing opportunities, further hindering their participation in the value chain.

Opportunities and Entry Points for Gender and Inclusion

1. Women in Cooperatives and Market Associations

Women are often clustered in cooperatives and market associations, especially in Ogun and Oyo. Within these clusters, women actively participate in processing and marketing activities. With the right training and support, women and youth have significant opportunities for entrepreneurship and leadership roles.

2. Youth Engagement in Urban Areas

Male youth participation is notably higher in urban areas such as Lagos and Kaduna, where they are actively engaged in both consumption and purchase activities. Youth are particularly enthusiastic about quick yields and returns, making tech-enabled innovations an attractive and viable option for them.

3. Integrating PLWDs into Clusters

Currently, clusters for Persons Living with Disabilities (PLWDs) are not specifically mentioned, indicating a need for targeted interventions. Integrating PLWDs into existing clusters, strengthening current clusters, or forming new ones can help ensure their inclusion in the value chains.

4. Supporting Women in Small-Scale Processing

Data from the assessment shows a trend where women can successfully lead small-scale processing businesses with proper support. Existing or budding training programs on processing and marketing dried okra and tomatoes can further enhance women's roles in the value chain.

5. Youth-Focused Interventions

Establishing youth-focused interventions to enhance their involvement in the value chain is crucial with a strong gender lens for female empowerment initiatives. Such interventions can provide the necessary skills and opportunities for youth to become active participants in the agricultural market.

7.18 Challenges faced by market actors and consumers in accessing commodities

The key challenges identified across the value chain commodities are:

1. Limited opportunities for business financing
2. Limited opportunities to upgrade and upskill traditional technologies to modern once
3. Weak supply chain of value chain commodities
4. Limited access to opportunities for capacity building on standardization and certification of value chain commodities
5. Product and market relativity in the 5 states (not all value chain commodities are commercially viable per state)
6. Seasonality impact on productivity
7. Cross cutting challenge: gender and youth social norms

Limited opportunities for business financing

Most market actors interviewed (approx. 85%) reported getting capital for their business through self-financing and expressed challenges accessing credits from financial institutions. The root causes are not unconnected to their inability to access needed information and training to acquire required documents and financial literacy skills that can prepare them to access credit. Also, because of the disconnect of existing associations such as Agricultural Fresh Produce Growers and Exporters Association of Nigeria (AFGEAN) and All Farmers Association Nigeria (AFAN) to these last mile market actors and lack of business development services; the processors continue to cope through bulk sales to wholesalers and retailers so they can recoup profit through such sales. The income generated is what will be used to get material for the next processing cycle. This has been what has characterized coping strategies for micro and SME processors.

Limited opportunities to upgrade and upskill traditional technologies to modern once

The lack of energy for powering technologies that can improve production of commodities and unavailability of improved technologies to increase production in volume, nutritional quality and hygiene are major barriers to improved productivity among the market actors. For instance, there is a significant loss of extracted milk due to lack of cold storage system that

can extend the shelf-life of milk for further value addition in the next phase of the processing value chain. The technique used for milk processing is still the traditional approach that involves boiling and collection into the 5 litre paint buckets. Since there are no cold storage systems from the point of production, most of the milk is either quickly processed to other products like wara to avoid further losses. Similarly, the lack of mobile cold storage facilities and high cost of transport logistics further weakens the supply chain.

In similar vein, dried okra and dried tomatoes processed are mainly through traditional sun drying in open ground that is exposed to dirt, rodents and other contamination. Also, more than 50% of the nutrients are lost due to uncontrolled temperature and poor handling. This also affects the taste and quality. Further, the volume of tomatoes that can be processed are limited because the use of traditional technique implies that processing the commodities are subject to climate and weather which are more likely unpredictable due to erratic weather patterns. In addition, processors are unable to access the required skill for upgrading to new technologies because there are no incentives by investors in these technologies to provide these services to the market actors for at least a user fee. For instance, there is an existing technology for using solar energy for drying tomatoes in a manner that preserves taste, nutritional content and color . Also, opportunities for capacity building are not available to last mile market actors due to non-existence of linkages to these opportunities. The pattern is also similar for fish particularly capacity to process at larger scale because of lack of access to large fish kiln processing equipment and heat energy

Weak supply chain of value chain commodities

Findings from the assessment identify cost of transport logistics and lack of access to cold storage system as a key cause of weak supply chain for the commodities. This was particularly reported for dairy products and fish. Due to lack of cold storage facilities and high cost of transportation, the shelf-life and volume of commodities are in relatively small quantity thereby reducing income and productivity of commodities

Limited access to opportunities for capacity building on standardization and certification of value chain commodities

Due to lack of access to improved technologies and technique, disincentives for investors to produce standard equipment and processing and lack of strategy from line MDAs such as SON and NAFDAC to support standardization and certification of value chain commodities; the processed commodities from these processors often will not be put in shelf of standard supermarkets as packaged products. Also, these processors are often disconnected from SON and NAFDAC responsible for regulation and certification of products.

Product and market relativity in the 5 states (not all value chain commodities are commercially viable per state)

Based on the findings from the assessments, not all value chain market actors were actively engaged in commercial activities in locations where market actors were interviewed and across the 5 states. Fish processing was common across the 5 states while commercial activities for dried tomato processing were only found in Kaduna, Ogun, Oyo and Anambra. Similarly, dried okra processing and marketing was found in Kaduna, Lagos, Ogun, Oyo and Anambra. However, the demand for dried tomatoes by consumers was relatively low in Anambra and Lagos while it was found to be in high demand in Kaduna and Oyo. Similarly, though dairy product businesses were found in Anambra, Lagos, Oyo and Ogun; the consumer preference and production dynamics were different. In Kaduna, dairy products were consumed as a traditional food. And price was not the driver for consuming it. In Anambra, households do not consume fura-de-nono and yoghurt like Kaduna households. Hence, the availability of these products does not guarantee a consumer market because consumer behavior varies from state.

Seasonality impact on productivity

Since processors depend largely on sun-drying and seasons, they are only able to get major raw materials for processing during the harvest season for the commodities. For instance, tomatoes are only available for processing in August/September in the south and November/December in the north. The availability of sunshine will determine the quality of drying.

Erratic or high volume of rainfall means that processing of the commodities will be adversely affected. Similarly, cattle are unable to produce enough milk during lean season because of less access to fodder which affects the volume of milk produced per day. Due to reliance mainly on traditional technologies, seasonality has a major impact on demand and supply of the commodities.

Cross cutting challenge: gender and youth social norms

ANAMBRA STATE

The challenges for women are mostly the work is stressful and requires physical strength and traveling using the bad roads to other locations to buy and sell which is quite strenuous for women mostly around the tomato and yoghurt. Because of the health hazards for the fish cold room and yoghurt which causes pneumonia and the drying which causes waist pain and women are often susceptible to such health issues. Lastly there are inadequate cows in the location which affects the raw material of milk for buying and selling which women are mostly involved

Youths are not involved because of the health hazards of pneumonia, back and waist pain, youths are not patient because they want a business with fast returns and high incentives

While the PWD are not involved because it requires movement from one location to another and requires physical strength and oftentimes, they are being discriminated against because of their ability and also the technical know-how and ability on how to operate the cold room.

KADUNA STATE

The business requires physical strength and products can be demanded at any time of the day for delivery and there are unstable prices of inputs and transportation leading to the high-cost production which affects women's involvement. Because of religion and cultural belief, women are not allowed to go out

Quote from a Fish producer in Kaduna “You know anything that they will tell you say the Islam religion is involved, so it is one of the reason why women are not mostly into these kind of associations and also because of the environment that we are in because most of the women, we have the women but they are not much because they are mostly married women at their homes, some are at different place, so you see that is some of the reasons we face challenges with having women, but there are some that we do business with “
The youths lack knowledge of the business and see it as a business for the elderly and are also not patient.
For PWD, it is stressful and requires physical strength, which often affects their involvement.

LAGOS

Women don’t have the right knowledge on the technicalities around hygiene and sanitation of the business and also the timing in order to ensure quality of the product for Fish and tomatoes, and it also requires the physical strength of offloading and uploading of goods and pushing of the carts for the retail of the products.
The youths lack the knowledge to perceive the business as a business for the elderly, and it also has low returns.

OGUN

Security concerns which involve the risk of movement in the transportation of the products from one location to another by women for dried tomato and okra due to that they don’t have time for their family which is also needs their attention, they also believe women engaged in the production get older than their age

The youth are not interested, they believe in going to school and towns to make money and they don’t have access to loan. It is stressful and requires physical strength and a perceived assumption that PWD cannot perform the roles

Quote from a Dried tomato Wholesaler “Hmmmmm I think it depend on the type of challenge the person is going through, but it is a bit stressful even for us that are able”

OYO.

Because of the security concerns on the road during the movement of products, women are scared of going into it because of fear of the Fulani attack and the health concerns due to the smoke and ice for fish and yoghurt and they do not have the strength and capacity to handle the cows.

The youths lack the knowledge and are not committed to the business, while the PWD is that it involves movement from one location to another, which is stressful.

7.19 Role of Regulatory Bodies in the Involvement of Women, Youth and PWD

The associations and regulatory bodies play a vital role in ensuring the involvement and participation of the marginalized groups through awareness creation, capacity building, and support with modern technologies for ease of production while the associations also support the women and youth with farm inputs and some money to reduce the cost of production
“We encourage youth to belong to an association because if there is any benefit coming from the government, only those that belong to an association will be benefitted. We involve youth in our association because they understand how to talk to their peers, and for the women, they understand the marketplace well. We give them inputs and simple farm implements to carry out their farm operation. Stipends were given to them to reduce the cost of production. Steps, to encourage them to go into agriculture, to make sure that what they produce is off-taken by off-stakers.”

Recommendations

- There is need to create special projects for youth that focuses on technology and businesses development services that will make the value chains attractive for them it could also be through contract arrangements of engagement to spur their interest
- Women should be trained on the technical know-how, modern techniques of production and management skills for them to be employers of labor for effective supervision of the daily running's
- SBCC awareness on the roles PWD can play and function effectively at each point of the value chain for ease of engagement.

7.20 Market Member Association, Relationship, Collaboration or Engagements and Challenges

Key Achievement of the Regulatory Bodies to Market Actors in the Landscape Assessment Across the various Commodities

The organization focuses on developing best agricultural practices for farmers through extension services, promoting nutrition-sensitive activities, biofortified food, and processing fertilizers. They offer training, regulation, market access, and support in the production and processing of valuable commodities such as dairy products and vegetables. Various government agencies like NAFDAC, FIIRO, and SON play essential roles in ensuring quality, safety, and compliance with standards in the agricultural sector. They provide training, support, and regulatory oversight to farmers and businesses in various value chains, such as dairy, vegetables, and fruits. The organizations also work toward sustainable food security and economic development in Nigeria.

NAFDAC In Kaduna State, the organizations organize training programs and workshops aimed at enhancing the skills and knowledge of fish producers and processors. Provides technical assistance, capacity building and best practices in fish processing and preservation to reduce

post-harvest losses and improve product quality.
Improved access to modern processing techniques, funding, and training programs that enhance productivity and product quality.
Better equipment, infrastructure support, and compliance assistance with health and safety standards, ensure high-quality dried fish products.
We ensure that the consumers have higher quality and value on the said commodities.

LAGOS

FIIRO is also helping SMEs adapt to the standard by fabricating some of the equipment for them. Some of them do not have the funds to cater for equipment, and FIIRO is helping them to fabricate some equipment.

All Farmer Association

ANAMBRA

It has helped them greatly because they have learned the best agricultural practices in producing, processing, and storing these crops in order to reduce pest harvest losses.

MILCOPAL Producer Association

KADUNA

Recently, in the course of the activity of ECOWAS and SWISS Cooperation, they have advanced some grants for setting up boreholes in a community as well as empowerment of youth in dairy production and feed & fodder enterprises. We have a relationship with KARGIS and KASUPDA and their MD is a very friendly man assisting us to give us 5 hectares of land where we want to train the youth in terms of Acca cultivation and fodder enterprise. We have built our relationship with these state organizations: the Ministry of Agriculture Kaduna State, KARGIS, and then KASUPDA. Furthermore, for the Ministry of Agriculture, we deal with animal husbandry; we stay very closely with the director of veterinary services; we know their activities; and we have their contacts in case of any outbreak of

diseases. Early reporting is key in managing some of these diseases. Outbreaks like Foot and Mouth disease, CBPP, Black Cutter and the rest of them. Once they are informed, they are quickly mobilized to come and vaccinate or give treatment, as the case may be. So, we have a relationship with this department.

Specific Interventions for Each Value Chain

MDAs/Associations	Anambra	Kaduna	Lagos	Ogun	Oyo
State Agricultural Development Program (ADP)—Vegetables/Fisheries	They support the out-growers by giving them inputs and fertilizers used in production, and after production, we find the off-takers who buy all that they produce. B. It has highly contributed because farmers are sure that when they produce, they have already existing market	The availability of support or relationships within this organization toward linking producers to processors and to MSMEs in collaboration with catfish, donor agencies, together with fish millers. The organization has negotiated with millers and those that produce feed so as to cut down the cost of feeds. The organization has also made sure that there are adequate supplies of feeds to help the fish farmers grow their products effectively. This has contributed toward improving productivity and income for the farmers in the state because more people got involved in fish farming and there is a high supply of fish which has made more youths go into the fish business.	The availability of support or relationships within this organization toward linking producers to processors and to MSMEs in collaboration with catfish, donor agencies, and fish millers. The organization has negotiated with millers and those that produce feed so as to cut down the cost of feeds. The organization has also made sure that there are adequate supplies of feeds to help the fish farmers grow their products effectively. This has contributed toward improving productivity and income for the farmers in the state because more people got involved in fish farming and there is a high supply of fish which has made more youths go into the fish	**OGADEP** have guaranteed market They link the farmers with the off-takers.	They have associations with almost all agriculture organizations. They organize training for them, and they seek our help whenever there is a sudden disease outbreak. Once they are able to assist the farmers. They expect processors to benefit from increased productivity of farmers.
Research Institutes - FIIRO, NSPRI, etc.	Providing good quality seeds and distributing to		We are into industry-based research and for most of those value chain productions that		

	farmers. And training on the GAP of the seeds		you mentioned some of our research officers have worked on it like the fura-de-nono I think they are working on starter culture for yoghurt production we have gotten to the pilot scale on that level whereby we have been able to establish a starter culture for yoghurt production. We also have research officers who have worked on fura-de-nono we also have food technologists who have worked on the smoked fish and how it can be preserved to the best method of preservation and how they can establish their own market. We build the smoking kiln for processing do the research and transfer it to the industry that is interested in the application of the technology		
NAFDAC - (Product/Industry) - Food/MSMEs	Sensitizing consumers in the market on how to get agriculture products. Thereby bringing producers and buyers together	. The availability of support or relationship within this organization toward linking producers to processors, and to MSMEs in collaboration with catfish, donor agencies, together with fish millers. The organization has negotiated with millers and those that produce feed so as to cut down the cost of feed.	We partner with other agencies Govt and the like to help the category of producers we have worked with FIIRO and SON to devise standards not too high for them to meet. The Ministry of Trade in Abuja is not left out to make sure businesses are done without stress to create an enabling environment for businesses to thrive.	ATWAP, the Association of Table Water Producers, and the Association of Food Producers train them from time to time. And if there is a wave we let them know. Education is power, training them, and organizing workshops make things better. Recently most of our registrations have been online, unlike before which requires physical and more paperwork. Now the Paperwork has been reduced we have a platform you can visit to do registration.	NAFDAC collaborates with various departments, associations, and organizations to support producers, processors, and MSMEs involved in the production of tomatoes, okra, fish, and dairy in Ogun State. These collaborations take several forms and provide multiple benefits, enhancing productivity, compliance, and market access. Here are some key collaborators and the nature of these relationships: Departments and Government Agencies 1. Federal Ministry of Agriculture and Rural Development (FMARD) - Collaboration Forms: Joint initiatives, policy development, training

					programs, and agricultural extension services. - Benefits: Provides technical support, improves agricultural practices, and enhances food safety and quality standards. 2. Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) - Collaboration Forms: Capacity building,
Standard Organization of Nigeria (SON)	They partner with IFAD to assist the farmers to register their products and train them in various ways. It has helped their business to have a name and helped them to reduce the cost and stress of going from one office to another for registration.	we ensure standards at every point. We have a relationship with the Federal Ministry of Agriculture, the North West Ministry of Agriculture Tilapia value chain, and Feed the Future (USAID) Food and Agriculture organizations. The relationship between producers and processors of smoked/dried fish and some organizations typically involves several forms of collaboration: Food and Agricultural Organization (FAO): Provides technical assistance, capacity building, and best practices in fish processing and preservation to reduce post-harvest losses and improve product quality.		business development services, and access to finance initiatives. - Benefits: Supports MSMEs in business planning, accessing loans, and improving operational efficiency 3. Nigerian Agricultural Quarantine Service (NAQS) - Collaboration Forms: Inspection, certification for exports, and phytosanitary measures. - Benefits: Helps producers meet international export standards, reducing barriers to international markets. NAFDAC's collaborations with various departments, associations, and organizations provide comprehensive support to	We have a relationship with other government agencies that have overlapping duties with us, such as NAFDAC. We also have a relationship with MAN (manufacturer Association of Nigeria) and many others.

				producers, processors, and MSMEs in Ogun State. These partnerships enhance training, regulatory compliance, market access, and innovation, ultimately boosting productivity and profitability in the agricultural sector.	
Agricultural Fresh Produce Growers and Exporters Association of Nigeria (AFGEAN)	They have a relationship with the All Farmers Association(AFA), All the Commodity Association. They also link AFA members to where to get credit facility and to their market. They reported that it has helped the farmers link to customers				
Small and Medium Enterprises Development Agency of Nigeria (SMEDAN)	They partner with FCMB and Moniepoint. Cooperative farmers, rice farmers and cassava farmers. The collaboration has helped the farmers to get free POS from the FCMB and it enables them to open accounts for other farmers and also make profit from it. They also collaborate with NAIC(National Agricultural Insurance Cooperation). They advise the farmers to insure their crops. NAIC helps the farmers whose farm products were destroyed by flood to absorb the shock by indemnifying them. They sign an MOU (Memorandum of Understanding) to buy at the prevailing market price. The processors support the farmers with an input and after the production they collect their money back.		we have a specialized linkage program that links processors to raw material sellers and even fabricators of equipment for them to process their produce. So part of our initiative about that is a local Govt program that we have in SMEDAN and corporative groups from each local Government in the state with the specialized product and linking them up with fabricators that can fabricate equipment for them to do their product seamlessly and we also link them up with raw materials source from their locality.		
Farmers' Association (Tomato/Okra/etc.)	Training of farmers on how to produce the vegetables like tomatoes and pepper. They train them on how to build simple grain houses where they monitor the		We deal with NGOs like COWAN, a coalition of Women, and WCCI. We deal with most of these people to encourage our women to go into food		We give our information whenever there are large requests or demands for tomatoes. Some people do come from outside the state to buy tomatoes in

	rain and control the pests so they can produce all seasons so that the tomatoes will yield to the required capacity. The Association partners with Anambra state government and NIRSAL which gives them credit facility. The programmes are fully under implementation.		processing. The collaborations have helped a great deal and we heard there are some farm inputs up North but we are expecting them because it is a women's NGO They are making funds available to the women only. We have access to loans that are easy to pay we do conferences and seminars together.		large quantities, we will have to connect with our people to gather what they have to meet the demand. We have an association with the Oyo State Ministry of Agriculture, especially the Department of Rural Extension. They help members to get little support from the Government. Support like farm input.
Fish Farmers' Association	The Association partners with organic agriculture and NANO. The Organic agriculture produces organic fertilizer and pesticide, they provide environmental safety to the producer and consumers. NANO organizes workshops and collaborates with the ministry of agriculture to enlighten farmers on the best way to produce, process and market. It gives farmers longer time to sell their products. Organic products has more life shelf than inorganic processed products			Ogun State fishery and aquaculture farmers association (O.G.S.F.A.F.A) -Aller squa Nigeria --It's to provide fushi feeds to 50 members across the 20 local governments in Ogun State. -Ogun State department of fisheries. They organize fisheries /aquaculture fairs. IITA--YAS--International Institute of Tropical Agriculture -- Youths in Agric business: Empowerment programme for 100 youths within Abeokuta only. -To know how to use methods and mindset that maximize productivity, competitiveness, climate resilience, and revenues.	The association doesn't support such, members are the ones that look out for their market channel. But if there is a large demand from someone who contacts our organization office, we share such demand between members to supply. And such things come occasionally.
Dairy Farmers' Association	We are opportune to work with the Anambra state government. We link the				

	producers to the ministry, we buy from the farmers and supply to the ministry for exports like vegetables. The farmers are happy because they are able to sell what they cultivate, they already have a market they produce for which encourages more production.				
Lady Ranchers			We are not ready for that yet because we are still building our own business and this is a corporative. Our funding comes from within. We have an investment template for members that is how we raise money for the business and when it gets raised to some certain level we might be thinking about collaboration. We have some programs that we are running (one woman and five goats) what we are trying to do is improve their livelihood to give them a source of income and livelihood. It allows them to make a lot of money like three or four times a year. Goat gives good quality. The wara that is made from goat milk is far sweeter than the wara from cow milk so we are trying to localize these initiatives. We are looking at making youth see the reasons why they can't be dependent. The elderly ones are the members of these female ranchers. When we settle our objectives within then we can start looking for partners and collaborations.		
			we are still looking within to strengthen what we have internally first. Animal waste can be used to generate electricity which is one of the messages that we		

			have. We have lots of experts who are our members in Animal science many of them in Agriculture and corporate processing and industry so they are there to provide that support to see what else can we do with milk. We provide our members with market access what that means is we buy off the excess cash in their hands they can do other things and buy other needs they do not produce. We train on how to grow edible grass for our cows. Women are the face and symbol of poverty and it is very sad. We are not a philanthropy organization per se but we have philanthropic intentions. It is a lot of work investment and money we spent almost a 40million naira within six months the satisfaction we have is from the things that we see and they are unquantifiable.		
APPEALS Project Worldbank Fish farmers Production, Processing and Marketing					

8. Identified Interventions Based on Constraint Diagnosis

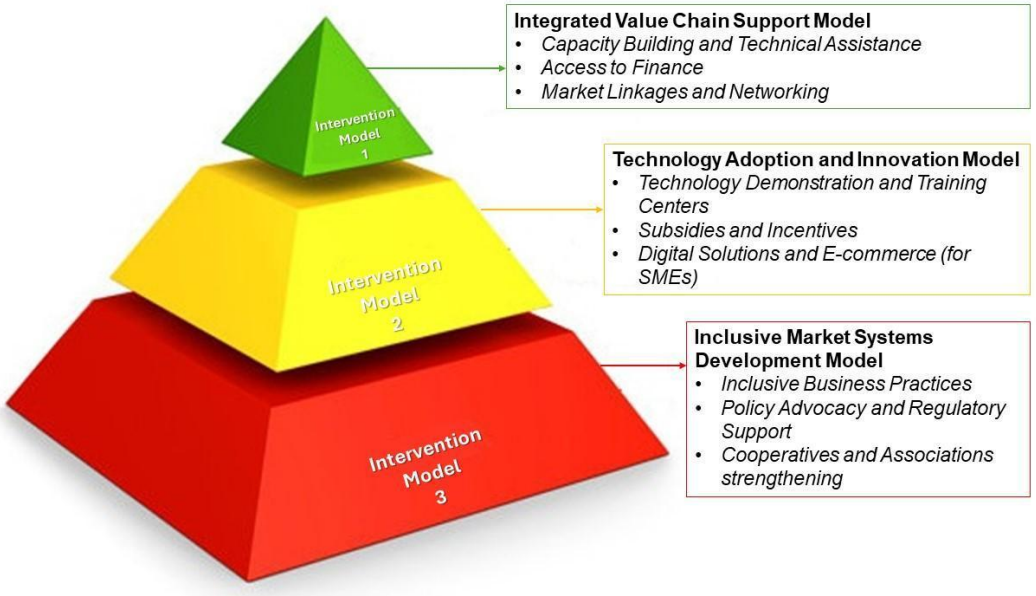
Findings from the market system assessment have identified key constraints, including:

1. Use of basic traditional technology that limits volume and quality of production,
2. Lack of technical capacity for quality processing
3. Limited opportunities for business financing
4. Seasonality impact on production
5. Weak supply chain of commodities
6. Cross-cutting challenges: lack of power, gender perception and norms that limit opportunity for women and crude tech nologies that make business unattractive to young people.

To address the diagnosed constraints among other challenges, there are 3 intervention strategies identified to address key constraints, these include:

1. Integrated value chain support model
2. Technology adoption and innovation model
3. Inclusive market systems development model

These intervention strategies are tailored to the findings aimed at addressing constraints and leverage opportunities to improve income earning for microprocessors, SMEs, and other market actors by enhancing their capacity and efficiency while increasing nutritional products available for low-income consumer households in Nigeria.



8.1 Intervention Model 1: Integrated Value Chain Support Model

This model is aimed at improving income opportunities for microprocessors, SMEs, and other market actors by enhancing their capacity and efficiency throughout the value chain. This can be achieved through the effective implementation of the following sub-intervention components.

1. **Partner with agribusiness technology firms to introduce improved technology equipment and build capacity of market actors:** there are existing technologies that can be introduced using arrangements such as “cooperative, community, and private sector” driven models for procurement and management of equipment. The table below lists value chain commodities, proposed technologies, and possible business model arrangements. The feasibility of a business model that would be acceptable to the market actors should be based on what is acceptable and workable for the market actors.

Value chain commodity	Available technologies to improve productivity	Possible business model arrangement	Photo of equipment and any existing partner or initiative that have supported technology
Dried tomatoes	A fabricated simple solar dryer for tomato fruit drying, a solar dryer, and open solar drying were used to dry tomato slices, and a study of drying time influences on moisture content losses and weight of tomato slices. Also, to study various parameters such as relative humidity, temperature and velocity of air on tomatoes drying and compared to solar dryer and open solar dried during tomatoes fruits drying. Tomatoes are sliced to a thickness of about 10, 15 and 25 mm. The sliced crops are arranged in single, twice and third layers on surface of mats and left to dry naturally in the open solar and in solar dryer	cooperative, community, and private sector owned equipment where the dried tomato processors organize themselves into groups with a constitution for engagement and are supported by private sector partners fabricating the technology. In addition, need to collaborate with SON and NAFDAC for certification, packaging, and proper marketing of products.	This form of initiative was reported to have been implemented by PYXERA Global and Technoserve, the YieldWise Innovation Partner. 
Dried okra	Research has confirmed that the best approach for drying okra is shade drying (placed under a shade or shaded	cooperative, community and private sector owned equipment where the dried okra processors organize themselves	There are no identified projects supporting the value chain. However, with the proven research and affordable resources to set up the shade drying process, this can be an opportunity to improve okra productivity.

	room with good ventilation). Interestingly, the shade dried sample gave the best result in terms of colour and taste which may be low temperature processing that retained its taste (sensory qualities). The result of the study suggests that drying improved the concentration of nutrients and preservation of okra all year round.	into groups with constitutions for engagement and are supported by private sector partners fabricating the technology. In addition, need to collaborate with SON and NAFDAC for certification, packaging and proper marketing of products	
Dried/smoked fish	Supporting fish processors with fish drying/smoking facilities that can process fish at a large scale e.g. government model kiln, brick kiln, and red clay kiln that can be co-owned by the fish cooperatives and also maintained. This will increase production capacity.	Co-owning of fish kiln	World Bank Agro-Processing, Productivity Enhancement and Livelihood Improvement Support (APPEALS) Project which implements fishery project, FCDO funded ENGINE and WB projects have supported fishery.
fura-de-nono and yoghurt	Solar-powered cold storage system	**Shared Community-owned Model**. In a shared community model, members of the community form a group or association and purchase a cold storage system because of its benefits. The mini-grid developer works with the community, providing technical support such as recommendations on equipment compatibility based on energy needs. The community owns the	Benefits of cold storage systems adopted in several countries have been observed to preserve income-generating farm-produce, increase revenue, and create jobs. 

		cold storage system in this model but requires funding through grants, loans, and community contributions/savings. Capacity building on good hygiene practices (GHP), good manufacturing practices (GMP), and hazards analysis and critical control points (HACCP) in the dairy sectors to lower the degree of microbial contamination because food safety is a growing global public health concern. Promotion of cross breeding (to produce high milk yielding offspring). Promotion of improved feed fodder and feeding regime to increase feed conversion ratio and milk production.	 *Specialized milk cooling containers powered by the sun*

Facilitate collaboration with NAFDAC, SON, ADP and private sector partners for training on best practices in production, processing, and marketing for microprocessors and SMEs. This includes Good Manufacturing Practices (GMP), post-harvest handling, and value addition techniques. A good number of the respondents expressed willingness and desire for capacity-building training to enable improved product quality, increase quantity, and reduce the cost of production. OPTINUP can provide technical support through the engagement of a business development services provider or facilitate private enterprises interested in aggregating the various commodities and willing to offer the training.

Facilitate access to Finance: Collaborate with financial institutions to develop and promote financial products suited to the needs of microprocessors and SMEs, such as low-interest loans, grants, and microcredit schemes. This can also include working with business development service providers to offer financial literacy training to enhance the ability of market actors to manage finances, plan investments, and access available financial resources. OPTINUP can implement this by working with existing banks within the targeted states. The project can also explore working with microfinance and Fin-tech as these categories tends to work better with community level and have less stringent policies. For a direct approach, OPTINUP can offer grants or conditional cash to participants, this will serve as a quick win but will lack long term sustainability if not well implemented.

Market Linkages and Networking: Facilitate linkages between producers, processors, and buyers through trade fairs, networking events, and digital platforms, this is aimed at promoting these processed commodities as a preferred alternative in a struggling economy for Lic. An effective market linkage will also help microprocessors and SMEs find new buyers and suppliers to increase their market scale. As a value addition, OPTINUP can disseminate market information regarding demand, prices, and best practices through digital channels (SMS) and local networks (radio/TV) producers and processors.

Expected Outcomes for the Intervention Model

- Increased efficiency and productivity in the value chain.
- Enhanced financial management and investment capacity of microprocessors and SMEs.
- Improved market access and sales opportunities.

8.2 Intervention Model 2: Technology Adoption and Innovation Model

The technology adoption and innovation model is aimed at increasing the income of microprocessors, SMEs, and other market actors by promoting the adoption of modern technologies and innovative practices. This can be achieved through the effective implementation of the following sub-intervention components.

1. **Technology Demonstration and Training Centers:** The MSA finding shows a low use of technology and lack of knowledge on available technology to improve commodity processing. Establish technology

demonstration sites where microprocessors and SMEs can see the practical application of modern processing and preservation technologies, such as solar dryers, smoking kilns, and cold storage units can improve quality. This can be established through partnerships with public agencies such as SMEDAN and the National Directorate of Employment. These agencies have presences across the 36 states of Nigeria and manage incubation centers or training centers.

i. **Subsidies and Incentives:** Alternatively, OPTINUP can offer subsidies or low-cost financing options to help microprocessors and SMEs acquire modern processing and preservation equipment. OPTINUP can further facilitate partnerships with the private sector enterprise supplying such machines to roll out training on the use and link project participants to such organizations for future maintenance.

ii. **Incentives for Innovation:** A more systemic approach will be to drive private enterprise investment by offering incentives such as de-risking grants or co-investment. Such incentives will enable innovative business models that offer an output market for microprocessors, improve production quality, and nutritional benefits for LIC.

iii. **Digital Marketing Platforms:** Technology can also be explored to support microprocessors and SMEs in reaching a broader audience and selling their products through digital marketing platforms. Providing capacity building in this regard can increase the revenue for processors.

Expected Outcomes

- Increased adoption of modern technologies leads to higher productivity and reduced post-harvest losses.
- Enhanced capacity to reach new markets and consumers through digital platforms.
- Higher incomes due to improved efficiency and market access

8.2 Intervention Model 3: Inclusive Market Systems Development Model

Intervention Model 3: Inclusive Market Systems Development Model

The selected commodities have a large number of women participating in the value chain; it is therefore crucial for OPTINUP to ensure deliberate consideration for inclusivity in deciding the intervention approach the project might consider. The assessment also shows poor participation of youths and persons with disabilities in the various value chains owing to one reason to another. Prioritizing the inclusion of these traditionally excluded groups is key towards improving economic opportunity for marginalized households. It is therefore key to foster inclusive growth and improve income opportunities for marginalized groups, including women, youth, and persons with disabilities, within the value chains.

1. **Team Preparedness and Accountability Systems for GESI Integration:**
   Ensuring accountability for Gender Equality and Social Inclusion (GESI) in the program starts with designating specific individuals responsible for GESI integration. For a program of this scale, it is essential to go beyond having just a GESI Officer, Coordinator, or Advisor. While these roles are crucial, it is equally important to ensure that the entire team is well-oriented on the program's GESI focus. To achieve this, co-developing a GESI roadmap for each value chain and intervention area is vital and helps the team make the most judicious use of its resources for inclusion. This collaborative approach will help embed GESI principles throughout the program and set a baseline for reflection as implementation progresses. Additionally, incorporating GESI considerations into all forms and templates—whether for reporting, work planning, research, event planning, or presentations—will build accountability into every aspect of the program. This comprehensive integration will help the team recognize GESI as both a cross-cutting and special purpose theme, ensuring it is treated with the importance it deserves across all program activities.

2. **Inclusive Business Practices:** Implement gender-transformative approaches to ensure that women and youth are actively included in all aspects of the value chain. This includes at least a 50% enrollment

of women, youth and PWDs who are market actors across the value chain and intervention areas, thereby creating an entry point for access to the opportunities presented by the program. Also, leadership training, mentorship programs, and targeted tailored support will be meaningful

3. **Develop and deploy Key GESI Messages for Market Actors:** Crafting precise and impactful Gender Equality and Social Inclusion (GESI) messages that align with the needs of market actors is essential for creating opportunities for women, youth, and people with disabilities (PWD) within the target value chains. Addressing the restrictive norms, beliefs, and perceptions identified through this assessment is critical, as these can hinder GESI efforts if not effectively influenced. To overcome these barriers, it is crucial to gather and disseminate empirical evidence that can truly motivate market actors toward inclusivity. This evidence should be presented in a way that highlights the benefits of GESI integration, such as enhanced productivity, broader consumer bases, and improved community relations. Key strategies include tailored messages to resonate with the specific needs and priorities of different market actors and use language and examples that reflect their unique contexts and challenges and give an exposure into the negative impact of restrictive norms, beliefs, and perceptions on their business.
4. **Accessibility Programs:** Develop programs to make the value chain more accessible to persons with disabilities, such as adapting equipment and facilities and providing specialized training. Where possible, ensuring PWD access income generation opportunities within the value chains as producers, processors or input dealers. One great starting point would be to recruit PWD as enumerators, mobilisers or community agents to identify others considering that some communities had mentioned that they were non-existent.
5. **Policy Advocacy and Regulatory Support:** Engage with policymakers to advocate for supportive policies and regulations that promote inclusivity and fair practices within the value chains. The program can aim to join coalitions facing Women, Youth and PWD- facing policy reviews, advocacy and campaigns is an opportunity to deploy data for concrete outputs that can create an enabling environment for the marginalized groups.

6. **Community-Based Interventions**
   a. Cooperatives and Associations: Support the formation and strengthening of cooperatives and associations that allow marginalized groups to pool resources, share knowledge, and access markets more effectively. Targeting these groups with tailored financial inclusion interventions would be effective for catalytic results in their businesses and wellbeing.
   b. Stakeholders' Engagement: Involving key market actors in discussions and workshops to foster collaboration and buy-in, while highlighting success stories and best practices from similar contexts to inspire action. Continuous communication is crucial, using platforms such as local media, online platforms via whatsapp groups, and workshops to reinforce GESI messages and disseminate information and updates consistently.

Expected Outcomes

- Greater participation of women, youth, and persons with disabilities in value chain activities.
- Improved policy environment supporting inclusive and fair practices.
- Enhanced community support and collaboration, leading to stronger and more resilient value chains.

State	Product supply & demand	Dried tomatoes	Dried Okra	Smoked/dried fish	Fura de nono	Yogurt
Anambra	Volume of production (supply)	There is production at commercially viable scale	There is production at commercially viable scale	There is production at commercially viable scale	There is production but not at low scale	There is production but not at low scale
	Demand in the state	Moderate	Moderate	Very high	Low	Moderate
Kaduna	Volume of production (supply)	There is production at commercially viable scale	There is production at commercially viable scale	There is production at commercially viable scale	There is production at commercially viable scale	There is production at commerciall y viable scale
	Demand in the state	Very high	High	High	High	High
Lagos	Volume of production (supply)	There is production but not at low scale	There is production at commercially viable scale	There is production at commercially viable scale	There is production but not at low scale	There is production but not at low scale
	Demand in the state	Very low	Very low	Very High	Very low	Very low
Oyo	Volume of production (supply)	There is production at commercial	There is production at commerci	There is production at commercially viable scale	There is production at commercially	There is production at commerciall y viable scale

State	Product supply & demand	Dried tomatoes	Dried Okra	Smoked/dried fish	Fura de nono	Yogurt
		ly viable scale	ally viable scale		viable scale	
	Demand in the state	Low	Moderate	Very high	Very low	Very high
Ogun	Volume of production (supply)	There is production at commercially viable scale	There is production at commercially viable scale	There is production at commercially viable scale	There is production at commercially viable scale	There is production at commerciall y viable scale[20]
	Demand in the state	Moderate	High	Very high	Moderate	Very high

Specific Interventions for Each Value Chain

SN	Commodity	Specific Interventions	Intervention Approach
1	**Dried Tomato Processing**	**Improved Drying Techniques**	• Partner with private sector enterprises willing to do business in any of the target regions to introduce solar drying technology and provide training on its use to ensure a consistent drying process, which enhances product quality and shelf life.
		Packaging and Branding	• Assist processors in developing attractive packaging and branding to differentiate their products in the market.
		Access to Equipment	• Facilitate access to modern slicing and drying equipment to reduce labor intensity and increase production efficiency.
2	**Dried Okra Processing**	**Modern Grinding and Drying Equipment**	• Provide modern grinding and drying machines to replace traditional methods, ensuring higher quality and efficiency.
		Marketing Strategy Training	• Conduct training sessions on effective marketing strategies to reach a broader audience and increase sales.
		Financial Support	• Offer financial assistance to enable processors to purchase modern equipment and scale their operations.
3	**Dried/Smoked Fish Processing**	**Introduction of Smoking Kilns**	• Promote the use of efficient smoking kilns that reduce health hazards and improve the quality of smoked fish.
		Improved Packaging	• Develop better packaging solutions to maintain the quality and freshness of smoked fish during transport and storage.
		Access to Markets	• Establish direct market linkages between fish processors and retailers or

			consumers to eliminate middlemen and increase profit margins
4	**Yoghurt Processing**	**Cold Storage Facilities**	• Invest in cold storage and refrigerated transportation to maintain product quality from production to market
		Technical Training	• Provide training on yoghurt production techniques, quality control, and hygiene practices.
		Financial Assistance	• Offer financial support for the purchase of modern refrigeration and processing equipment.
5	fura-de-nono **Processing**	**Financial and Technical Support**	• Provide financial aid and technical training to processors, focusing on modernizing production methods and improving hygiene standards.
		Market Expansion	• Develop strategies to expand market reach, including packaging improvements to attract more consumers.

9. Conclusion

In conclusion, the approaches of processing tomato and okra into dried tomato and dried okra have great opportunities in providing sustainable solutions to the over 40% post-harvest losses to fruit and vegetables. Similarly, processing of fish through drying or smoking with appropriate good processing practices and linkage to the output market and consumers can unlock decent jobs with increased revenue for women and young people. Use of a modern portable, eco-friendly cold storage system will extend the shelf-life of diary processing. If the cooperative, community, and private sector model is employed, there would be an opportunity to create more jobs, increase volume of production, and strengthen the supply chain to support increased availability of quality dairy products all year round. Overall, facilitating partnerships that introduce improved technologies, training micro and SME processors on good manufacturing practices, certification, and standardization will increase the quality, quantity, and profitability of the selected value chains. The model to pilot can be “cooperative, community, and private sector” driven models where the market actors for respective value chain commodities will organize themselves into groups with a constitution for engagement and are supported by private sector partners fabricating the technology. In addition, FHSA needs to collaborate with SON and NAFDAC for certification, packaging, and proper marketing of products.

10. Limitation

The Market System Analysis for the selected commodities: animal source foods (fura de nono, yogurt and smoked/dried fish) and fruits and vegetables (dried tomatoes and dried okra) was conducted to understand the market landscape, including dynamics, constraints, and opportunities in the five states. However, the approach of the study and data collection method were not void of limitations. A key factor to the limitations is not uncommon to most assessments requiring significant data-backed evidence but yet needs to be conducted within the allowance of funding, time, and scope of the assessment objectives and purpose. The MSA for OPTINUP was planned when some of the initial implementation activities were yet to be rolled out. The project has an ambitious purpose to assess the market landscape, including market behaviour, supply and demand chains within the system, using limited resources and time. Hence this implied using statistical methods that would provide evidence and insights while considering the array of data points that would be collected, analyses and cost. Below are key limitations of the study.

1. **The study was largely a qualitative assessment.** It was only the household consumption survey that was quantitative. The implication of using a qualitative instrument is that the findings can only provide insights into locations that have been pur posefully selected. It would be non-affirmative to try to establish relationships between variables beyond explaining the “how” in the location.

2. **Note:** The project did not conduct a separate market actor pro filing for targeted market actors. This ideally should be a first task order to serve as a sample frame for the MSA. Also, con ducting this is resource-consuming and lasts an average of 1 month before MSA. As a result, the consulting firm involved the scoping study and snowballing approach. These have their lim itations. Including, but not limited to:
    a. The likelihood that information provided by a single individual for the clusters may not be exactly true when they are ground truth. The team encountered that the data on the number of persons per cluster is just a fluid estimate as the

group does not have proper record-keeping. If the team will spend the limited resources to do actual profiling, the MSA would be impossible.

b. Not having an initial sample frame means purposeful selection of market actors. This is acceptable often for qualitative assessment.

3. Due to the non-standardized measurement scale in the sector and poor record-keeping, it is difficult to get information on a standard scale such as Kg or grams. In fact, within local governments and across value chains, different market actors use different measurement scales. Also, the fact that qualitative instruments were used for collecting the data means that it factors in the exact nuances per location. This makes conversation difficult. However, a form of normalization analysis was done in some instances for fair comparison.

4. Quite a couple of the value chains are “neglected” VC with potential opportunities, but relatively less assessment or implementation has been done on them. For instance, the dried tomatoes and dried okra are not areas that have enjoyed significant support from donors. The implication is that most market actors do not do the business at a competitive scale compared to staple value chains such as maize, rice, and cassava. Hence, the definition of SMEs or microenterprise needs to be put in an appropriate context. For instance, though the standard definition of SME in the ideal sense should mean having an annual turnover of 10 million naira, in this light, the turnover is significantly less for SMEs (500,000 to 2 million).

5. The findings from the locations can best be used in understanding the dynamics, constraints, and demand-supply chain but may not be generalized for the whole population.

11. ANNEXES (Excel attachment)

11.1 Value Chain Prioritization Matrix

Key for level of demand from consumers
60%> very =high
45%-60%=high
21-45%=moderate
20%< =low

State	Product supply & demand	Dried tomatoes	Dried Okra	Smoked/dried fish	Fura de nono	Yogurt	Value chain to prioritize with remarks
Anambra	Volume of production (supply)	There are a number of microprocessors and SMEs in Anambra East producing at commercial scale.	There are a number of microprocessors and SMEs in Anambra East producing at commercial scale.	There are a number of microprocessors and SMEs in Anambra East producing at commercial scale.	Low number of micro and SME processors in Onitsha North	Low number of micro and SME processors in Awka South	The topmost VC commodities that are commercially viable with a ready market are: 1. smoked/dried fish (1st) 2. next to dried okra (2nd) 3. and dried tomatoes (3rd) Fura de nono and yogurt will require extra interventions to increase production and product penetration, which may not bring value for money to FHSA. However, where there are available and generous resources, there can be training on hygiene at critical control points for processing and handling.
	Demand in the state	Moderate: 31% consumption	Moderate: 42% consumption	Very high: 70% consumption	Low: less than 20% consumption	Moderate: 37% consumption	
Kaduna	Volume of production (supply)	There are a number of microprocessors and SMEs in Kubau. producing at commercial scale	There are a number of microprocessors and SMEs in Kubau. producing at commercial scale	There are a number of microprocessors and SMEs in Kaduna North producing at commercial scale.	There are a number of microprocessors. and SMEs in Zaria producing at commercial scale.	There are a number of microprocessors and SMEs in Zaria producing at commercial scale.	Since there is processing of the 5 commodities on a commercial scale, Kaduna State should be supported with interventions across the 5 VC commodities. Also, there are WB projects like APPEAL.

State	Product supply & demand	Dried tomatoes	Dried Okra	Smoked/dried fish	Fura de nono	Yogurt	Value chain to prioritize with remarks
	Demand in the state	Very high: 67%	High: 48%	High: 50%	High: 50%	High: 49%	
Lagos	Volume of production (supply)	There are no processors (SME & micro) identified in Lagos at commercial scale.	There are a number of microprocessors and SMEs in Kosofe at commercial scale.	There are a number of microprocessors and SMEs in Ikorodu on a commercial scale.	There are no processors (SME & micro) identified in Agege at commercial scale.	None	The top most VC commodities that are commercially viable with a ready market are: 1. smoked/dried fish 2. dried okra (because people reported that they consume it since it is cheap) Investing in dried tomato processing would involve significant backward integration due to the trace numbers of consumers that consume it in household. Also it is mainly transported from other states to Lagos.
	Demand in the state	Very low: less than 20%	Very Low: 16%	Very high: 70% consumption	Very low: less than 20%	Very low: less than 20%	
Oyo	Volume of production (supply)	There are a number of microprocessors and SMEs in Ibadan, NW, at commercial scale.	There are a number of microprocessors and SMEs in LGAs at commercial scale.	There are a number of microprocessors and SMEs in Ibadan, NW, at commercial scale.	There are a number of microprocessors and SMEs in Itesiwaju at commercial scale.	There are a number of microprocessors and SMEs in Ibadan, NW, at commercial scale.	The topmost VC commodities that are commercially viable with a ready market are: 1. smoked/dried fish (1st) 2. yogurt (market actors even reported they transport processed yogurt from Oyo to Ogun because it reduces their cost of production) (2nd) 3. Dried okra (if the quality is improved and it becomes more affordable, there will be an increase in market scale) (3rd) 4. Dried tomatoes (4th)
	Demand in the state	Low: less than 20% (they consume less because they find it expensive).	Moderate: 41%	Very high: 91%	Very low:9% (They are likely consuming it more in the form of wara than fura de nono)	Very high: 70%	
Ogun	Volume of production (supply)	There are a number of microprocessors and SMEs in ABK a North at commercial scale	There are a number of microprocessors and SMEs in ABK. North at commercial scale	There are a number of microprocessors and SMEs in Odeda at commercial scale.	There are a number of microprocessors. and SMEs in Odeda at commercial scale	The SMEs from ABK North (no microprocessors) mostly get it as a finished product from Oyo because of the cost production advantage. They now transport to Ogun.	The top most VC commodities that are commercially viable with a ready market are: 1. smoked/dried fish (1st) 2. There is also supply at the commercial scale and demand for yogurt. This can be equally prioritized as fish (1st) 3. Dried okra (2nd) 4. Dried tomatoes (3rd) 5. Fura de nono (4th)
	Demand in the state	Moderate: 32%	High: 54%	Very high: 97%	Moderate: 25%	Very high: 73%	

1. Contacts for Producers, processors and regulators
2. Contacts for SMEs for the 5 value chain commodities
3. Contacts for Aggregator
4. Contacts for Transporters
5. Contacts for Cold chain
6. Contacts for Wholesalers
7. Contacts for Retailers
8. List of microprocessors and whether they belong to associations

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