Cassava Baseline Report under the Agricultural Transformation in the Nigerian Federal States and Togolese Regions towards achieving Zero Hunger Project

Grant Number: 2000002865

Produced by

Zero Hunger Project Team

Contributors: Oyewale Abioye, Tighankoumi GMAKOUBA, Abraham Shaibu, Adebowale Akande

Contact Persons: Dr. Adebowale Akande (Project lead)

Dr. Francis Nwilene (Co-lead)

Table of contents

Acknowledgments

The International Institute of Tropical (IITA) would like to thank the International Fund for Agriculture Development (IFAD) for providing the fund to conduct the baseline survey. Special appreciation also goes to the Ministry of Agriculture (MAEDR), the Institut de Conseil et d'Appui Technique (ICAT), and the Togolese Agricultural Research Institut (ITRA) for the unreserved support in implementing the project in Togo and support during questionnaire designing, data collection, data analysis, and reporting. The funding of this study demonstrates the commitment of IFAD to supporting cassava value chain actors in Togo.

Acronyms

EA	Extension Agents
ICAT	Institut de Conseil et d'Appui Technique
IFAD	International Fund for Agricultural Development
IITA	International Institute of Tropical Agriculture
ITRA	Institut Togolais de Recherche Agronomique
MAEDR	Ministère de l'Agriculture de l'Elevage et du
M&E	Monitoring and Evaluation
NARS	National Agricultural Research Systems
NZHF	Nigeria Zero Hunger Forum
ZHI	Zero Hunger initiative
P4D	Partnership for Delivery
SDG	Sustainable Development Goal
XLS	Microsoft Excel file format
ZHI	Zero Hunger Initiative

List of tables

List of figures

Executive Summary

The socioeconomic characteristics of cassava farmers in Togo were assessed through a baseline survey conducted across the Maritime, Plateaux-Est, and Plateaux-Ouest regions. The distribution of gender varied, with females constituting 51.87% in Maritime, 50.25% in Plateaux-Est, and 45.45% in Plateaux-Ouest. Education levels differed across regions, with a notable percentage of farmers attending secondary school, ranging from 30.22% in Maritime to 44.76% in Plateaux-Ouest. Membership in associations was significant, ranging from 53.85% to 57.36% across regions, indicating a strong cooperative presence. Access to credit and input formed the major reason farmers join an association followed by, supplies of cassava stems, collective transportation, and bulk sales. Household sizes primarily fell within the range of 1-10.

Regarding income sources, the majority of farmers (94.57%) relied on agricultural production, while a smaller percentage (5.43%) depended on non-agricultural enterprises. Farmer experience varied, with 57% having 16 or more years, 19% having 11-15 years, and 18% having 6-10 years. Farm measurement practices showed that 60.31% of farmers measured their land, with methods including visual estimation, measuring tape, GPS, and phone applications.

Farm sizes varied, with 50% cultivating less than 5 hectares, 48% cultivating 5-10 hectares, and the rest cultivating larger areas. Land acquisition primarily involved inheritance (72.69%), while 16.06% rented land. Most farmers (84.83%) grew local cassava varieties, with only 11.26% adopting improved varieties. The average yield per hectare was 8.9 tons, with 33.18% of farmers exceeding 10,000 kg/ha.

Regarding the cassava seed system, 72.61% of farmers did not purchase cassava stems, and 89.53% did not sell them. Farmers largely had control over their produce prices (72%) or relied

on prevailing market prices (19%). Major constraints for cassava stem and root production included the lack of improved varieties, fertilizers, and market problems.

Awareness of government policies on cassava production was low (61.86%), indicating a potential gap in policy implementation. Institutional capacity, including access to extension services (86.92%) and credit (86%), was relatively high. In digital agriculture, while internet access was prevalent (67.6%), ownership of smartphones (64.14%) and awareness and usage of digital applications were generally low, highlighting opportunities for improvement in technology adoption among cassava farmers in Togo.

In Togo, the surveyed cassava processing landscape reveals following key findings:

Ownership of Processing Centers: A significant majority (92.99%) of cassava processors own their processing centers. This high ownership rate suggests a decentralized processing infrastructure, potentially contributing to increased production and availability of cassava-based products.

Membership in Processors Associations: Despite the importance of collective action and support in the processing industry, only 13.4% of processors are currently members of processors associations. The majority (86.6%) have never been part of such associations, indicating a potential area for improvement in fostering collaboration and shared resources among processors.

Processing Capacity: The study shows a varied processing capacity among centers, with 15.92% processing over 2 tons of cassava daily, while the majority (75.16%) process 1 ton or less. Increasing the capacity of processing centers, especially those processing smaller volumes, could enhance productivity and contribute to meeting market demand more effectively.

Processing Methods: Traditional processing methods are predominant, with 99.36% of processors using them. The low adoption of modern techniques suggests an opportunity for introducing mechanization and technological advancements to improve efficiency and product quality.

Sources of Cassava Tubers: A significant portion (73.25%) of processors rely on external sources for cassava tubers, highlighting potential challenges in ensuring a stable and sufficient supply of raw materials. Encouraging more processors to produce their cassava could mitigate dependency risks and support local agricultural economies.

Cassava Peeling Methods: Manual peeling, performed with knives, is almost universally practiced (98.73%), despite its labor-intensive nature. Encouraging the adoption of mechanical

peeling methods, which are faster and reduce labor requirements, could streamline processing operations and improve overall efficiency.

Survey Key Findings

Below are the key findings from the baseline study:

1. Gender distribution varied across regions, with females forming 51.87% in Maritime, 50.25% in Plateaux-Est, and 45.45% in Plateaux-Ouest.
2. Education levels differed, with around 30.22% of farmers in Maritime having attended secondary school, compared to 37.06% in Plateaux-Est and 44.76% in Plateaux-Ouest.
3. Membership in associations was significant among farmers but not sufficient, with 56.72% in Maritime, 57.36% in Plateaux-Est, and 53.85% in Plateaux-Ouest.
4. Motivations for joining associations included easy access to credit, supplies of cassava stems, collective transportation, bulk sales, and inputs.
5. Household sizes varied across regions, with most falling in the 1-10 range.
6. 94.57% of farmers relied on agricultural production for income, while 5.43% depended on non-agricultural enterprises.
7. 57% of farmers had 16 or more years of experience, with 19% having 11-15 years, and 18% having 6-10 years.
8. 60.31% of farmers measured their farmland, with 39.69% not doing so, which could lead to underutilization.
9. 60% of farmers measured their farmland, with methods including visual estimation, measuring tape, GPS, and phone applications.
10. 50% of farmers cultivated less than 5 hectares, 48% cultivated 5-10 hectares, and the rest cultivated larger areas.
11. 72.69% of farmers inherited land for cassava cultivation, while 16.06% rented it.
12. 84.83% of farmers grew local cassava varieties, while 11.26% adopted improved varieties.
13. 50.55% had a yield less 5tons, 33.18% of farmers had yields exceeding 10,000 kg/ha, with an average yield of 8.9 tons per hectare among the sampled farmers.
14. 72.61% of farmers did not purchase cassava stems, and 89.53% did not sell them.
15. 72% of farmers had control over their produce price, while 19% relied on prevailing market prices.
16. Major constraints included lack of improved varieties, lack of fertilizers, low soil fertility, and market problems.
17. Challenges included availabiity of improved varieties, poor soil, market problems, and labor shortages.
18. 61.86% of farmers were unaware of government policies guiding their production.
19. 86.92% of farmers had access to extension services, and 86% accessed credit.
20. 64.14% of farmers did not own smartphones, and 67.6% had internet access.

21. Awareness and usage of digital applications were generally low even for digital applications developed in Togo

Chapter 1.0 Introduction

1.1. Background of cassava value chain in Togo

Togo is a West African country with a surface area of 56 6000 km^2 and a population of 8 095 498 million (RGPH-5, 2022). Agriculture is a significant driver of Togo's economy, contributing more than 40% of its GDP and employing nearly two-thirds of its workforce. With over 3.6 million hectares of cultivable land, the growth potential in the agriculture industry is virtually limitless. Togo has a very diversified biodiversity and very complex ecosystems with several socio-economic opportunities.

Cassava a species in the family of Euphorbiaceae, and its root provides the raw material for the agricultural processing unit. A starchy rooted plant native to South America (Celis, 1982), it is one of the main starchy rooted plants cultivated in the world (Diallo et al. 2013). It has become one of the most important crops in the tropics and its total production in West Africa accounted for 29% of global production in 2008 (Diallo et al. 2013). Cassava is a perennial shrub cultivated for its roots, stem, and leaves. Its root is very rich in carbohydrates and is gluten-free (Laplace, 2015).

In Togo, farming practices have largely revolved around traditional subsistence agriculture. The farmers usually grow a few main crops (maize, rice, cassava, and beans etc). Because of the irregular climate, there have been slight changes in the planting period for cassava. Cassava was planted after two weeks of sowing the maize (first weeding) and then followed by beans. But given the current amount of rainfall and the delay in the first rains of the year, it is planted at the same time or sometimes well before sowing the maize. In Togo, as in most West African countries, the cassava root is mainly used for human consumption in various artisanal and industrial forms. It is also used for livestock feed (Diallo et al. 2013) and is also consumed raw on the farm. The cassava root can be processed into several products (gari, attiéké, cossettes, starch, tapioca, fufu, raw flour, etc.) which are marketed (Diallo et al. 2013). It is also processed into bread flour, a high-quality flour used in making bread and pastry products (NOVI VA, unpublished data).

Cassava is one of the most grown agricultural product in Togo; the country produced 1,140,200 t in 2023 (BCEAO), which is 20,000 t more than in 2022. Every year, a surplus of about 400,000 t is recorded. Paradoxical with this excessive supply of the tuber, prices of its derived products, gari and tapioca being the main ones, keep rising. For example, in local markets, a bowl of gari currently sells for CFA1,200, up from CFA1,000 recently and CFA600 before that. Regardless, the ministry of agriculture is mustering efforts to further increase cassava production. The Ministry of Agriculture, Livestock, and Rural Development and the Interprofessional Council of the Root and Tuber Crops Sector (CIF RTC) developed the Action Investment Plan for the Root and Tuber Crops (RTC) Sector for the period of 2024-2028. The overall goal of this plan, which was published in 2023, is to increase Togo's roots and tuber output by 15% and achieve a 15% processing rate, by 2028. Diving deeper, the plan aims to improve RTCs' productivity and

quality, boost the value of the products, improve marketing channels, and strengthen the governance and financing mechanism of the sector.

As demand grew in recent years, Togo's cassava output rose as well. For the 2022-2023 agricultural campaign, cassava production rose from 1.20 million tons to 1.22 million tons. Cassava is one of the homegrown food crops used to address food insecurity and alleviate poverty throughout Togo, especially in the Maritime and Plateaux regions. It is seen as readily available raw materials for establishing small and medium-scale industries in the country. Cassava production in Togo is mainly by subsistence farming with low productivity. Therefore, there is a need to increase cassava production for local consumption and export purpose.

To unleash the potential inherent in cassava in Togo, there is a need to promote the transfer of proven technologies and innovations from National and International research Institutions like IITA and AfricaRice, knowledge and build competencies of major cassava value chain actors.

According to data from ICAT, 420 extension Officers across the 5 regions of Togo are servicing over 1.5 million farmers. This means an extension to the farmer ratio of 1:3,571, which is insufficient to reach the growing number of farmers in the country. Training and introducing digital tools and proven varieties will be pivotal to putting the current agricultural extension, cassava farmers, seed producers and processors on the path of efficiency. Hence there is a need for the ZHI to establish baseline value indicators of intended outcomes against which future measurements can be made of changes in behavior, systemic capacity, and impact on the conditions of households and individuals in the targeted regions and chart the way forward toward supporting the government to achieve agricultural transformation in Togo.

1.2. Zero Hunger Project: An Overview

Increasing food demand, malnutrition, and insufficient rural livelihoods are key concerns in Togo; thus, the government launched ZHI to meet SDG2. Agricultural research can play a key role in producing high-yielding abiotic-tolerant crop varieties. However, these bio-technologic innovations cannot win the fight against hunger and low rural income in the absence of an enabling policy environment. For this reason, the effort to end hunger and malnutrition must combine agricultural research and technical innovation with policy enhancement. The Zero Hunger Project promotes policy analysis and formulation to drive the uptake of scientific research outputs such as bio-technologic innovations for two staple crops (rice and cassava) as selected by the governments of Nigeria and Togo.

The Zero Hunger Project is embedded within the ZHIs of NZHF and Togo MAEDR. IITA manages it through its P4D directorate in partnership with AfricaRice with a seed grant received from IFAD. The project team is working with its network of NARS to promote the transfer of knowledge and build competencies of the partners. The project involves three states in Nigeria (Benue, Ebonyi, and Ogun) and four regions in Togo (Plateaux, Maritime, Savanne, and Kara). It aims to: (1) engage 200 policymakers at the regional, state, federal, and central levels in both countries in policy review, analysis, and enhancement; (2) improve the productivity of 35 000 smallholders farmers (45 percent women and 20 percent youth); (3) improve the capacity of 100 agricultural extension and advisory service personnel; and (4) strengthen six SMEs in rural and urban areas. The project will indirectly benefit over half a million rural and urban dwellers with

increased access to information, practical knowledge, and high-quality food commodities for consumption. Progressing towards Zero Hunger will additionally lead to income generation.

1.3. Objectives of the baseline survey

The baseline survey aim to establish the true situation at the start of the project to enable tracking of the progress. The overall objective of the baseline Survey was to support the Zero Hunger project team to establish benchmarks against the outputs, outcomes, and impact of the program for assessment during and after implementation, focusing on the core outcome indicators related to productivity, income, and nutrition. It seeks to establish baseline value indicators of intended outcomes against which future measurements can be made of changes in behavior, systemic capacity, and impact on the conditions of households and individuals. It also aims to gather and analyze information that will assist the project's stakeholders in designing or modifying appropriate interventions or generating information to refine the project's logframe and monitoring and evaluation plan.

Chapter 2: Methodology and Resources

This part presents the methodology used, research design, data sources that include the study's location, sampling procedure, data collection, and tools used for data analysis.

2.1. Description of the study areas

The baseline survey was carried out in 12 prefectures, of which 5 belong to the Maritime region and 7 to the Plateaux region (Figures 1 and 2). The cantons and villages were selected based on on their cassava production level, the existence and strength of farmers' and the representativeness of EA using the list received from Institut de Conseil et d'Appui Technique (ICAT). The study area experiences two rainy seasons. All the two regions share farming and trading as major socio-economic activities.

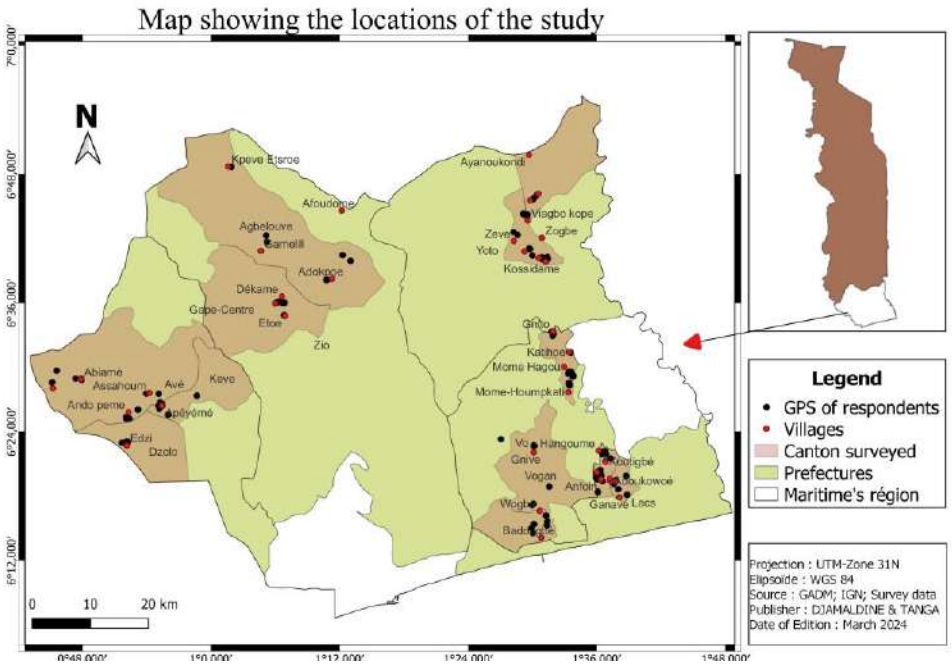

Figure 1. Map showing the baseline survey locations in the Maritime region

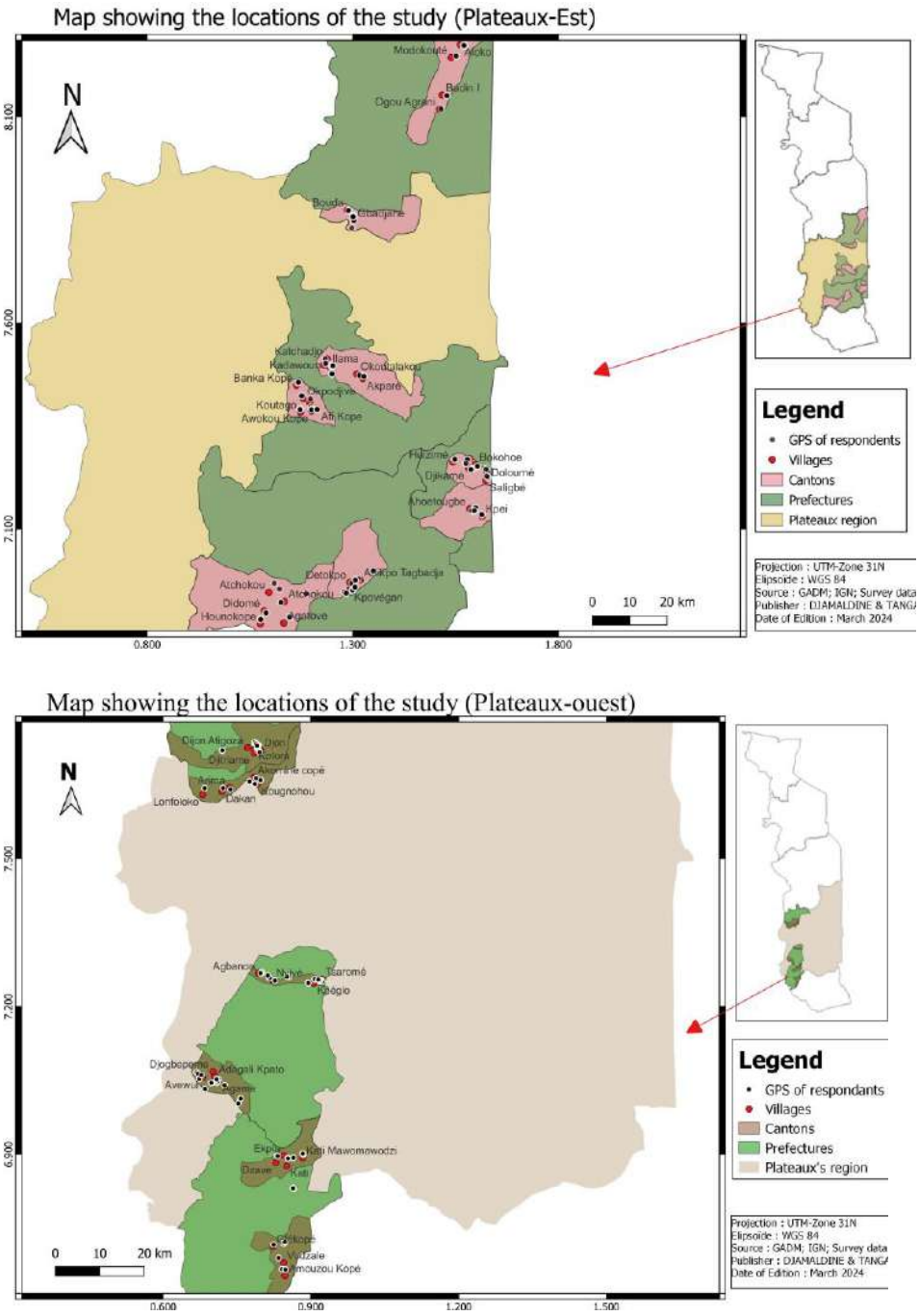

Figure 2.Map showing the baseline survey locations in the Plateaux region

2.2. Sampling procedure

A multistage sampling technique was used in selecting the survey sites to capture maximum variability in regions targeted. In the first stage, two regions representing the major cassava production zones in Togo were purposively selected. At the second stage, five and seven prefectures were randomly sampled in Maritime and Plateaux regions respectively. Cantons were randomly selected per prefecture based on the cassava production level, for a total of 25 cantons in the third stage. In the fourth stage, 117 villages were radomly targeted . In the last stage, six hundred 608 farmers were randomly selected from a list of farmers' organizations across villages (Table 1). The main criteria for selecting farmers and processors involved in the survey were their experience, membership in a cooperative societies, gender (45% women, 30% youth), willingness to stay on the project throughout the project duration and to disseminate new technology acquired from the EAs; willingness of the farmer to conduct small demo plots on his farm for the training of other farmers, willingness to allow other farmers visit their farms for the purpose of mass adoption of new techniques, willingness to become seed entrepreneurs, willingness to attend farmers' meetings/trainings regularly, farmer willingness to share for sharing pictures and project success stories, farmers willingness to participate in project monitoring data collection and surveys, farmers field should be safe and motorable. The sample distribution of farmers and processors surveyed across the two regions is shown in Table 1.

Table 1. Sample distribution by gender and value chain

Maritime						
			Gender		Value chain	
Préfecture	**Canton**	**Total**	**Male**	**Female**	**Producer**	**Processor**
Avé	Assahoun	24	13	11	17	7
	Edzi	24	14	10	21	3
Lacs	Anfoin	24	14	10	19	5
	Ganave	24	17	7	20	4
Vo	Mome	24	13	11	16	8
	Togoville	27	13	14	19	8
	Vogan	24	4	20	5	19
Yoto	Gboto	24	12	12	17	7
	Tometikondji	25	9	16	13	12
Zio	Agbelouve	24	10	14	20	4
	Gape_Centre	24	10	14	24	-
Subtotal		**268**	**129**	**139**	**191**	**77**
Plateaux-Est						
Préfecture	**Canton**	**Total**	**Male**	**Female**	**Producer**	**Processor**
Est Mono	Badin	25	14	11	24	1
	Gbadjahe	27	12	15	7	20
Haho	Djemegni	24	12	12	16	8
	Notsè	25	13	12	17	8
Moyen Mono	Saligbe	24	13	11	16	8

	Tado	24	10	14	13	11
Ogou	Akpare	24	13	11	21	3
	Datcha	24	11	13	15	9
Subtotal		**197**	**98**	**99**	**129**	**68**
Plateaux-Ouest						
Préfecture	**Canton**	**Total**	**Male**	**Female**	**Producer**	**Processor**
Agou	Amoussoucope	20	4	16	18	2
	Kati	24	13	11	20	4
Akébou	Djon	26	14	12	26	-
	Kougnohou	25	17	8	25	-
Kpélé	Akata	24	16	8	22	2
	Dutoe	24	14	10	20	4
Subtotal		**143**	**78**	**65**	**131**	**12**
Total		**608**	**305**	**303**	**451**	**157**

2.3. Baseline data collection

The survey was conducted by 50 EAs using Open Data Kits. A semi-structured questionnaire was designed and pre-tested across the two regions to validate the importance of the variables and the possible responses in addressing the survey objectives. It was later revised to incorporate emerging issues from the pre-testing before its administration to farmers and processors. The questionnaire was comprised of the following key parts: socioeconomics characteristic of the respondents (gender, education, years of experience, membership of group, household size), informations about cassava farming, production of cassava and costs of production, cassava seed system and varieties grown, cassava processing and commercialization and digital Agriculture (ownership of mobile phones, access to the internet, awareness of digital tools like herbicide calculator, Akilimo,NURU, FertiTogo and E agriConseil).

2.4. Baseline data Analysis and Reporting

Data analysis began by exporting the data from ODK to Excel format. The data were analyzed using EXCEL. Descriptive statistics, specifically; frequencies, cross-tabulations, and charts, were used for the analysis. The results of the study are presented below.

Chapter 3: Baseline survey findings and implications

3.1. Socioeconomics characteristics of the farmer

In Togo, the baseline survey for cassava farmers was conducted amongst farmers from Maritime, Plateaux-Est, and Plateaux-Ouest which are the two regions targeted in the country under the project. The characteristics such as gender, education, and other characteristics are shown in Table 2.

For Maritime, Females formed 51.87% of the sampled cassava farmers compared to males with 48.13%. The level of education determines the opportunities available to improve livelihood strategies and enhance food security; this study revealed that a sizeable number of the farmers (about 30.22%) had attended at least secondary school. 44.78% completed primary school, 20.52% had no formal education, and 4.48% had post-secondary school education which is very low. 71.27% of the sampled farmers are producers while 28.73% are processors. Membership in an association drives the fast adoption of technology. 56.72% of the sampled farmers were in an association; the rest are either no longer a member or have never joined an association.

Farmers' associations play a significant role in helping members increase access to necessary information, capital, and technology as this will benefit members and promote productivity and increase income. The sampled farmers in this region were asked about their motivation for joining an association. It was revealed that 38.82% of the sampled farmers joined an association to get easy access to credit. About 11.84% of the farmers believed that an association would serve as a source where they could get supplies of cassava stems for planting. Collective freight transportation of cassava serves as a drive for joining an association for 3.29% of the sampled cassava farmers who believed that transporting their produce in bulk would lead to a reduction in the cost of transporting their goods from the farm to either the processing center or market.

11.18% of the farmers declared that they joined an association to take advantage of bulk sales. Easy access to inputs served as a source of motivation for 30.26%% of the sampled cassava farmers to join an association. Only 4.61% of these farmers joined an association for other reasons that would make their enterprise profitable.

Table 2.Socioeconomics characteristic of respondents from Maritime Region

	Frequency	Percentage
Gender		
Male	129	48.13
Female	139	51.87
Education		
no formal education	55	20.52
Primary	120	44.78
Secondary	81	30.22
Superior	12	4.48
Value Chain Class		
Producer	191	71.27
Processor	77	28.73
Membership of Association		
Yes	152	56.72
No	116	43.28
Motivation for Joining Association		
Easy access to credit	59	38.82
The association supplies cassava	18	11.84
Collective transport of cassava tubers	5	3.29
Group selling of cassava	17	11.18
Easy access to inputs	46	30.26
Other	7	4.61
Household Size		
1-5	114	45.06
6-10	120	47.43
11-15	16	6.32
Above 15	3	1.19

With regards to Plateaux-Est Region, Females formed 50.25% of the sampled cassava farmers compared to males with 49.75% (Table 3). About 37.06% of the farmers had attended at least secondary school. 30.96% completed primary school, 29.44% had no formal education, and 2.54% had post-secondary school education. 65.48% of the sampled farmers are producers while 34.52% are processors. 57.36% of the sampled farmers were in an association; the rest were not a member of any association (Table 3).

The sampled farmers in this region were also asked about their motivation for joining an association. It was revealed that 25.66% of the sampled farmers joined an association to get easy access to credit. About 2.65% of the farmers believed that an association would serve as a source where they could get supplies of cassava stems for planting. Collective freight transportation of cassava serves as a drive for joining an association for 2.65% of the sampled cassava farmers

who believed that transporting their produce in bulk would lead to a reduction in the cost of transporting their goods from the farm to either the processing center or market.

36.28% of the farmers declared that they joined an association to take advantage of bulk sales. Easy access to inputs served as a source of motivation for 30.09%% of the sampled cassava farmers to join an association. Only 2.65% of these farmers joined an association for other reasons that would make their enterprise profitable.

Table 3.Socioeconomics characteristic of respondents from Plateau Est Region

	Frequency	Percentage
Gender		
Male	98	49.75
Female	99	50.25
Education		
No formal education	58	29.44
Primary	61	30.96
Secondary	73	37.06
Superior	5	2.54
Value Chain Class		
Producer	129	65.48
Processor	68	34.52
Membership of Association		
Yes	113	57.36
No	84	42.64
Motivation for Joining Association		
Easy access to credit	29	25.66
The association supplies cassava	3	2.65
Collective transport of cassava tubers	3	2.65
Group selling of cassava	41	36.28
Easy access to inputs	34	30.09
Other	3	2.65
Household Size		
1-5	68	34.52
	101	51.27
11-15	22	11.17
Above 15	6	3.05

For Plateaux-Ouest, males formed 54.55% of the sampled cassava farmers compared to females with 45.45%. About 44.76% of the farmers had attended at least secondary school. 47.55% completed primary school, 3.50% had no formal education, and 4.20% had post-secondary school education. 91.61% of the sampled farmers are producers while 8.39% are processors.

53.85% of the sampled farmers were in an association; the rest were not a member of any association.

The sampled farmers in this region were asked about their motivation for joining an association. It was revealed that 53.25% of the sampled farmers joined an association to get easy access to credit. About 1.30% of the farmers believed that an association would serve as a source where they could get supplies of cassava stems for planting. Collective freight transportation of cassava serves as a drive for joining an association for 2.60% of the sampled cassava farmers who believed that transporting their produce in bulk would lead to a reduction in the cost of transporting their goods from the farm to either the processing center or market.

33.77% of the farmers declared that they joined an association to take advantage of bulk sales. Easy access to inputs served as a source of motivation for 6.49%% of the sampled cassava farmers to join an association. Only 2.60% of these farmers joined an association for other reasons that would make their enterprise profitable.

Table 4.Socioeconomics characteristic of respondents from Plateau Ouest Region

	Frequency	Percentage
Gender		
Male	78	54.55
Female	65	45.45
Education		
no formal education	5	3.50
Primary	68	47.55
Secondary	64	44.76
Superior	6	4.20
Value Chain Class		
Producer	131	91.61
Processor	12	8.39
Membership of Association		
Yes	77	53.85
No	66	46.15
Motivation for Joining Association		
Easy access to credit	41	53.25
The association supplies cassava	1	1.30
Collective transport of cassava tubers	2	2.60
Group selling of cassava	26	33.77
Easy access to inputs	5	6.49
Other	2	2.60
Household Size		
1-5	52	42.62
6-10	62	50.82
11-15	8	6.56

3.2. Sources of income of the farmers

The majority (94.57%) of the farmers in this survey earn their income from Agricultural production, which implies that the region is mainly agrarian and depends on growing crops such as cassava, rice, and so on. In comparison, 5.43% of the respondents relied on the non-agricultural enterprise as their source of income (Figure 3.

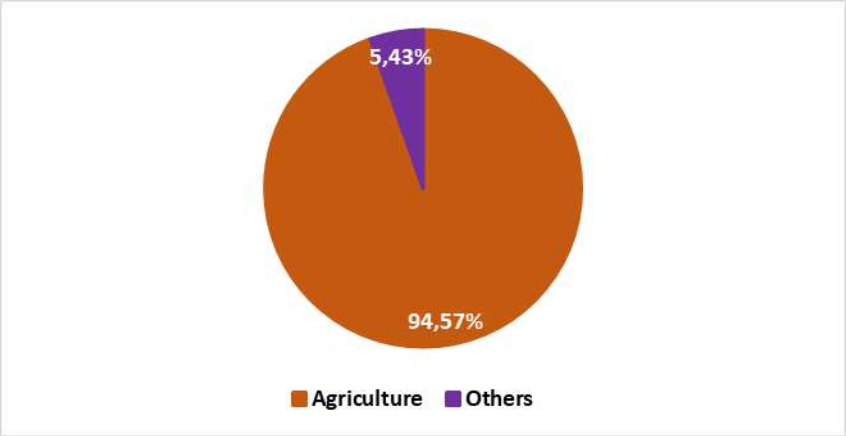

Figure 3.Distribution of respondents source of income across the survey area

3.3. Distribution of farmer years of experience

Overall, a higher percentage (57%) of the farmers had 16 years of experience and above, 19% had 11 – 15 years of experience, 18% had 6 – 10 years of experience while the others had 1 – 5 years of experience as a farmer (Figure 4).

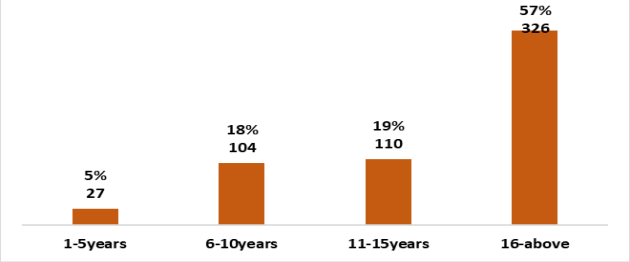

Figure 4.Distribution of famers years of experience across the survey area

3.4. Farm Measurement

About 60.31% of the farmers sampled in the project area reported that they measured their farmland, which may be because they know how to measure farmland and the benefits associated with it. On the other hand, 39.69% of the respondents reported that they had not measured their farmland, and this can result in the misuse or underutilization of land, which could reduce their profit (Figure 5).

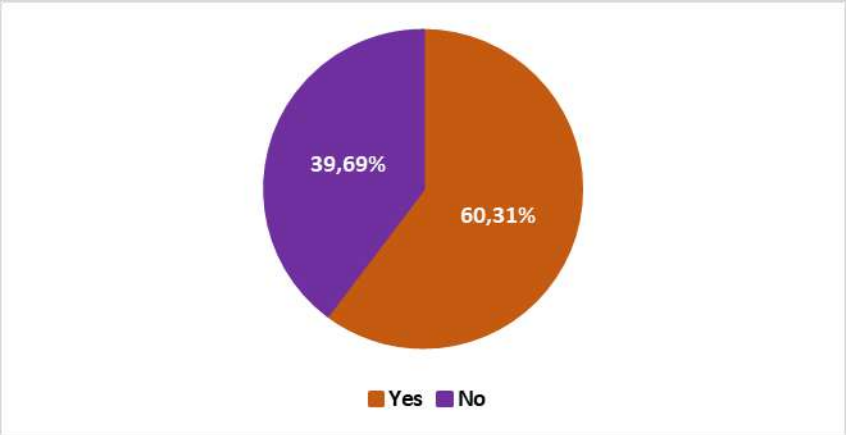

Figure 5.Distribution of Farm Measurement across the survey area

3.5. Methods of measuring farm

In this survey, 60% of the farmers reported that they measured their farmland; it is, therefore, important to have a clear picture of how they measured their farmland to ensure the accuracy and precision of the method used for land measurement. According to the results, it is revealed that 19% gauged the farmland using their eyes while 33% made use of the measuring tape to measure their farmland. 22.43% used a Global Positioning System while 8% used a phone application for measurement which shows the farmers in this region are quite open to advanced technologies (Figure 6).

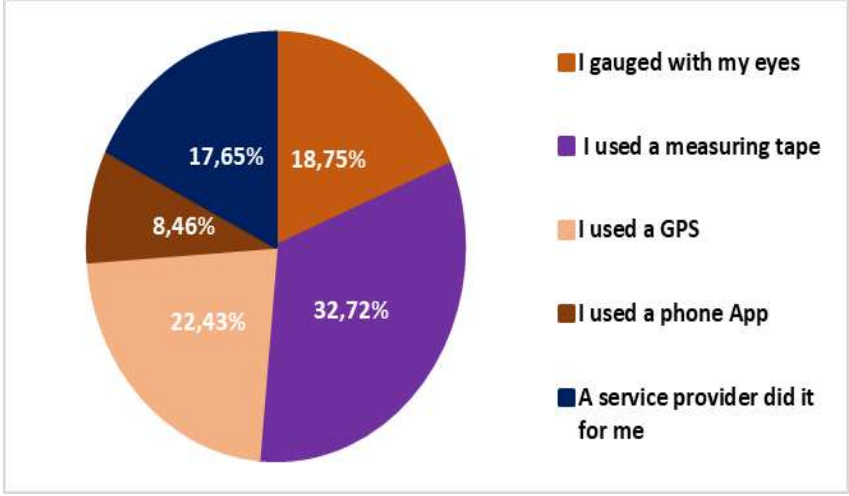

Figure 6.Distribution of farm measurement methods across the survey area

3.6. Farmers farm size

Farmland is an essential agricultural resource and primary productive asset for agricultural production. Therefore, this study revealed the variation in the farm size of a sample of 451 cassava farmers in the two regions of the ZH project in Togo. Out of the sample production farmers, 50% of the farmers cultivates less than 5 hectares of land, 48% cultivates between 5-10 hectares, while 1% cultivates over between 6-10 and 10 hectares each (Table 5).

Table 5.Farm size and area under cultivation across the survey area

	Frequency	Percentage
Farm Size		
< 1 hectare	68	15
1-5 hectares	312	69
6-10 hectares	42	9
> 10 hectares	29	6
	451	**100**
Area undercultivation		
< 1 hectare	225	50
1-5 hectares	214	48
6-10 hectares	5	1
> 10 hectares	5	1
	449	**100**

3.7. Land acquisition

Guaranteed land rights are a critical but underrated factor in achieving household food security and improved nutritional status. In this survey, 72.69% of the farmers land used for cassava cultivation was mostly inherited. About 16.06% of the farms were rented, and the price can vary from community to community. 5.42% were leased, while others were either purchased or donated. The fact that most of the farmers lands are inherited guarantees continuous production and might make the farmers increase their local production (Figure 7).

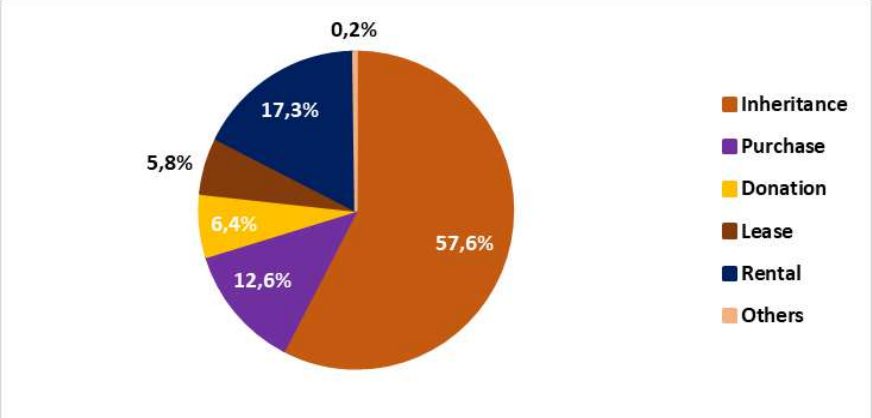

Figure 7.Distribution of land acquisition across the survey area

3.7. Type of variety grown

Adopting improved varieties is key to improving agricultural productivity and farmers' livelihood. This study's result revealed that majority of the farmers (84.83%) still cultivate local varieties. The limited use of improved varieties in this state may be due to several factors such as lack of information on improved cassava varieties, unavailability of improved varieties planting materials, unwillingness to adopt new planting materials, etc. On the other hand, 11.26% of the farmers adopted the use of improved cassava varieties, 2.07% cultivated both the improved and local varieties while 1.84% of them don't have an idea of the variety that they are cultivating (Table 6).

A follow up interview with farmers revealed that the most grown cassava varieties were are Gbawékouté, Lagos kouté, Kataoli,Kognevo, Ahassomé, Ahossou and Adanka.

Table 6.Distribution of cassava variety grown across the survey area

Variety Grown	Frequency	Percentage
Local	369	84.83
Improved	49	11.26
Both	9	2.07
Don't know	8	1.84
Total	**435**	**100**

3.8. Average yield of sampled farmers

About 50.55% of sampled farmers recorded an average yield of less than 5000kg/ha. Also, 20.30% of the cassava farmers had an average yield of between 5001-10000kg/ha. The rest of the farmers (29%) had more than 10000 kg/ha yield. From this survey, the average yield of all the farmers is 8.89 tons per hectare (Table 7). This suggest a need for strengthning the seed systems as further interrogation of the data and discussions with farmers revealed that most of the farmers are using local varieties which has no capacity to give good yield.

Table 7.Distribution of average yield of the sampled farmers across the survey area

Yield	Frequency	Percentage
Less than 5000 kg/ha	227	50.55
5001-10000 kg/ha	92	20.30
10000 kg/ha and above	130	29.00
Total	**449**	**100**
Average Yield (kg/ha)	**8898**	

3.9. Cassava Seed system

3.9.1. Purchase and sales of cassava stems

According to the result obtained from this study, it can be deduced that 72.61% of the sampled cassava farmers do not purchase the planting material (cassava stem). Consequently, they use the stem from their own farm for the establishment of their field in the next growing cycle. The sale of cassava stem is not common among the sampled farmers, such that 89.53% do not sell their cassava stem. However, few cassava farmers recognized the importance of the profit that could be harnessed from the sale of the stems and they constitute 10.47% (Tableau 8).

Table 8.Sources of cassava planting material across the survey area

Variable	Frequency	Percentage
Purchase of Cassava Stem		
Yes	123	27.39%
No	326	72.61%
Sale of Cassava Stem		
Yes	47	10.47%
No	402	89.53%

3.9.2. Price determination

There is a high variation in the cost of production with respect to the input. This study revealed that 72% of cassava farmers possess maximum control over their produce or product price. On the other hand, the basic mission of farmers' associations is to represent farmers to ensure their participation in formulating and implementing policies and agricultural development actions. Consequently, from this study, only 2% of cassava farmers depend on the farmers association's decision to determine the price for their produce. 7% of the cassava farmers depend on prices negotiated by the buyers, while 19% of the farmers depend on the prevailing market price (Figure 8). Therefore, the government should seek to assist farmers by setting price floors in agricultural markets.

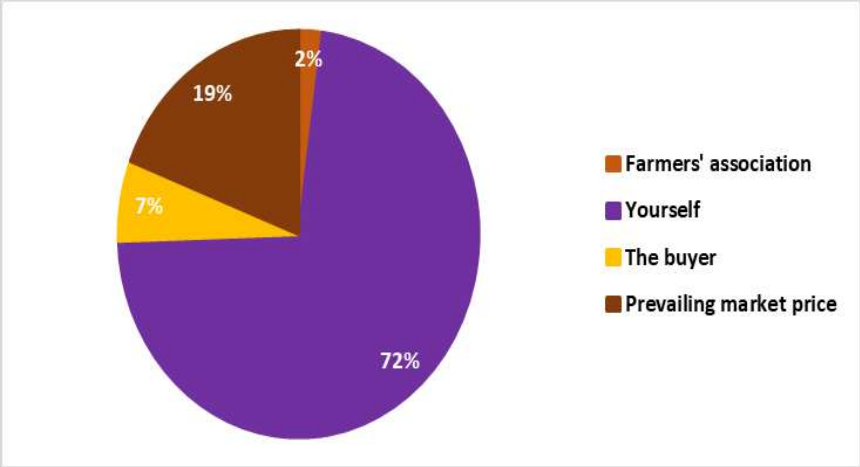

Figure 8.Distribution of price determination across the survey area

3.10. Constraints for cassava stem production

For sustainable cassava production, it is important to plant healthy cassava stem, the major planting material. However, the production of cassava stem is faced with few challenges, and this study was able to identify the causes of this problem. Sampled cassava farmers in the three regions in Togo have identified various challenges militating against the production of cassava stem in the region. 18.85% of the farmers attributed the constraint of cassava stem production to lack of improved varieties; because healthy plants will equally produce healthy stem, the farmers believed that cultivating improved varieties will yield good quality stems. 0.44% identified lack of specialized fertilizers as a constraint, 0.67% identified low soil fertility as a constraint. Majority of the cassava farmers (71.18%) attributed the challenges of cassava stem production to multiple constraints which includes lack of improved varieties, lack of specific fertilizers, low soil fertility, market problem, low price for cassava, labor not available, and other constraints (Table 9).

Table 9.Distribution of contraints for cassava stem production among sampled farmers

Constraints	Yes (%)
lack of improved varieties	18.85
lack of specific fertilizers	0.44
low soil fertility	0.67
market problem	1.77
labor not available	1.33
Other	5.76
Multiple constraints	71.18

3.11. Constraints for cassava root production

8.87% of the farmers attributed the constraint of cassava root production to lack of improved varieties; because healthy plants will equally produce healthy root, the farmers believed that cultivating improved varieties will yield good quality roots. 1.33% identified poor soil as a constraint, 0.67% identified market problem and unavailability of labor as constraints. Majority of the cassava farmers (88.03%) attributed the challenges of cassava root production to multiple constraints which includes lack of improved varieties, lack of specific fertilizers, poor soil, market problem, labor not available, low price of cassava, security and other constraints (Table 10).

Table 10.Distribution of constraints for cassava root production among sampled farmers

Constraints	Yes (%)
lack of improved varieties	8.87
poor soil	1.33
market problem	0.67
labor not available	0.67
other	0.44
Multiple Constraints	88.03

3.12. Awareness of policy on cassava production

Majority (61.86%) of farmers are unaware of any government policy that guides their production. The awareness and implementation of these policies by cassava farmers and the government, respectively, would help boost cassava production and increase cassava export in the international market (Figure 9).

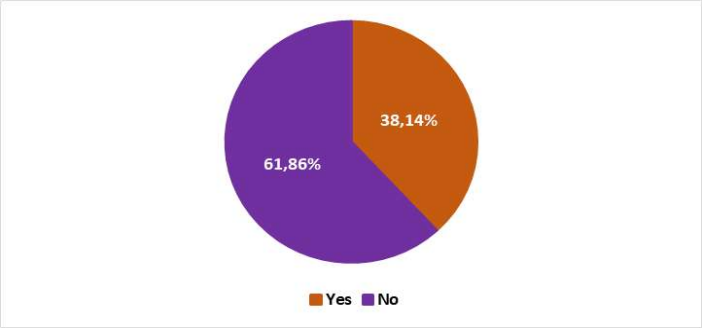

Figure 9.Distribution of Awareness of Government Policy on cassava production among sampled famers

3.13. Institutional capacity: Access to extension, access to credit, membership of an association

3.13.1. Farmers access to extension services

Extension programmes have been the main conduit for disseminating information on farm technologies, assisting farmers in developing their farm technical and managerial skills, and ultimately extending research outcomes and improved agricultural practices to farmers. Extension programmes are expected to help increase farm productivity and revenue, reduce poverty and minimize food insecurity. Majority (86.92%) of the sampled cassava farmers reported that they have access to the services of extension agents. Only a few had no access to the services of the extension agents (Figure 10).

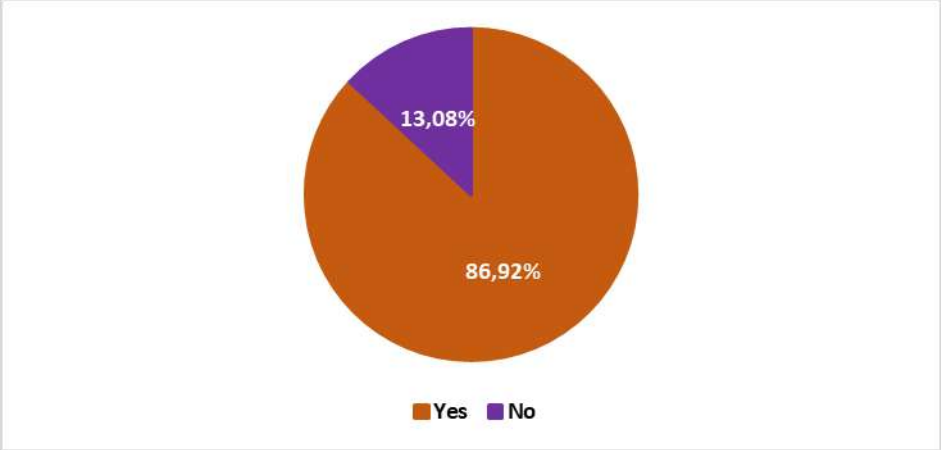

Figure 10.Distribution of the access to extension services among sampled farmers

3.13.2. Farmers access to credit

Capital is an important factor of production, and the important role of credit in agricultural enterprise development and sustainability cannot be overemphasized. In 2021/2022 seasons, 18% of the farmers sampled requested for credit, majority of them (86%) got, while during 2022/2023 season, 20% of the farmers requested for credit and majority of them (86%) got it (Figure 11).

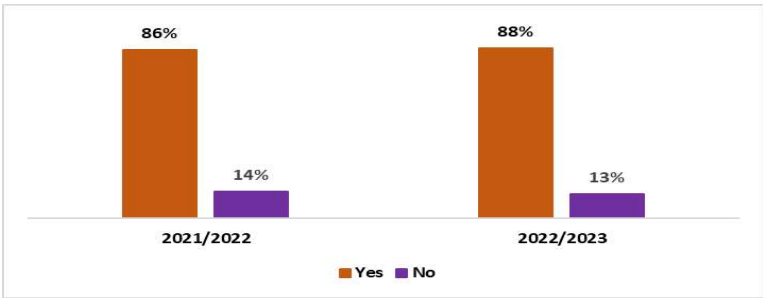

Figure 11.Distribution of the access to credit among sampled farmers

3.14. Digital Agriculture

3.14.1. Ownership of smartphone

This survey revealed that 64.14% of the farmers do not own a smartphone (Figure 12) which implies that the larger proportion of these farmers are yet to fully exploit the benefits of a smartphone because of social and economic inequalities and even illiteracy among the smallholder farmers. Mobile phones (smartphones) has become one of the fastest-growing Information Communication Technology that has found usefulness in extension service delivery for improving agricultural productivity and accelerating development programmes in rural areas. With their high reachability, smartphone use enables smallholder farmers to achieve higher incomes, with lower input supplies and high distribution costs from output sales. It can also be used to reach a large audience of farmers without necessarily embarking on the costly visits to their farms, and it can serve as a complementary tool for maintaining extension agent-farmer contact.

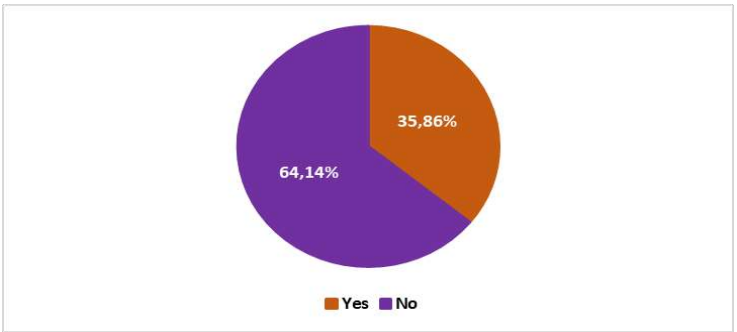

Figure 12.Distribution of the Ownership of Smartphone among sampled farmers

3.14.2. Access to Internet service

From this survey, it could be deduced that majority of the farmers (67.6%) reported having access to the internet in their community (Figure 13) which means that even some of the farmers without a smartphone have access to the internet in their community and can use the internet to source for agricultural information to improve their productivity once they have access to smartphones. On the other hand, 32.4% of farmers reported not having access to the internet.

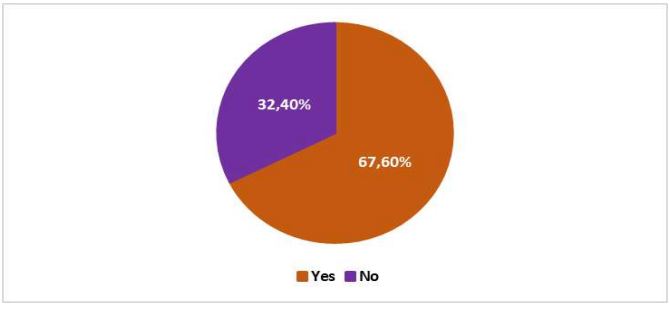

Figure 13.Distribution of access to Internet Service among sampled farmers

3.14.3. Awareness and usage of Digital Applications

This study revealed the farmers' awareness and utilization of some digital agricultural skills. Out of sampled farmers, 85.59% reported that they are not aware of the calibration of knapsack sprayer before spraying, which shows that majority of the cassava farmers do not ensure proper and appropriate application of herbicides on their field, and this is causing over or under dosing of the fields with chemicals. Good Agronomic Practices with information and communication technology are essential for improved productivity in cassava production. However, 14.41% were aware of calibration before spraying. Further analysis revealed that 38.46% of the farmers who are aware of calibration practice it by themselves and 61.54% of them employ the services of service providers.

The majority (91.35%) of cassava farmers engaged in this study are unaware of the IITA Herbicide calculator (Figure 14), which helps farmers estimate the correct amount of herbicides to be added to knapsack sprayers, helping farmers to avoid under dosing or overdosing. However, few farmers (8.65%), probably elite farmers, are aware of this technology, and 5.13% of cassava farmers put it into practical use.

AKILIMO has also been developed to provide site-specific recommendations for fertilizer application, intercropping, scheduled planting to produce high starch content, and weed control using the best agronomic practices. Majority (95.79%) of sampled cassava farmers in the two regions in Togo are unaware of the Akilimo mobile application, while 4.21% are fully aware of this application (Figure 14). The utilization of improved technology is essential to ensure the positive impact of such technology in crop production.

FertiTogo has been developed in Togo and promoted across the country to provide site specific recommendations for fertilizer for major staple crops. The baseline study revealed low level of awareness (9.7%) and utilization (4.55%) of FertiTogo (Figure 14). There is a need for awareness creation and training of farmers for FertiTogo application.

NURU is an application developed and deployed in Togo under the West Africa Virus Epidemiology (WAVE) Project to diagnos major cassava disease in West Africa. The survey revealed that minority (13.30 %) of farmers sampled are aware and 13.33 % of farmers utilized NURU (Figure 14). There is still a need for awareness creation and training of cassava farmers and more EAs as the survey of EAs has similar result.

E-agriConseil+ is developed by ICAT and provide recommendation for many staple crops from planting to harvest. The baseline study has revealed that only 23.06% are aware, of which 13.46% utilized E-agriConseil+ (Figure 14). This result also suggest a need for awareness creation and training of farmers and EAs on this application across the country.

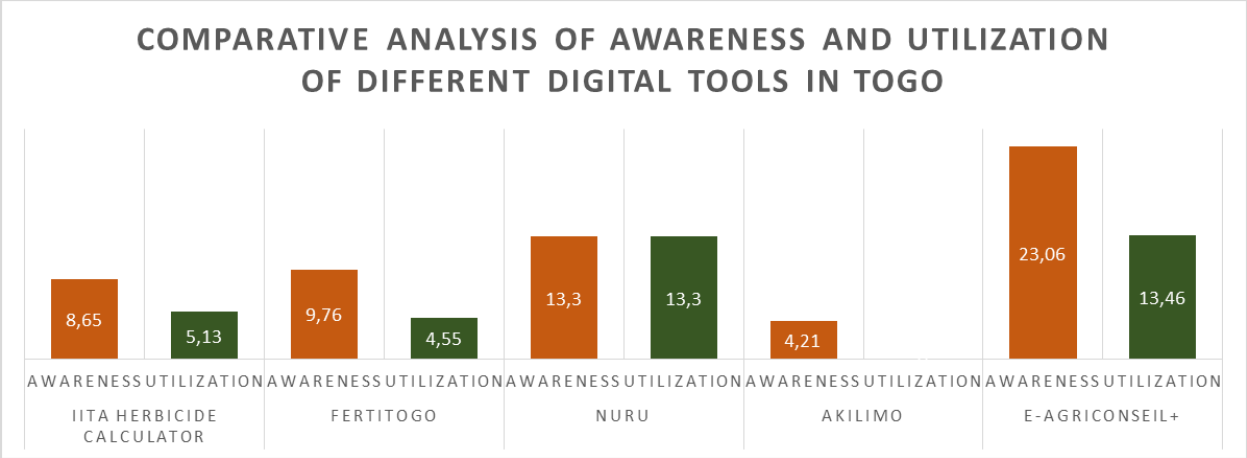

Figure 14.Distribution of awareness and usage of Digital Applications among sampled farmers

4. Result of the survey on sampled processors in Togo

4.1. Ownership of processing center

Majority (92.99%) of the sampled cassava processors in the survey area reported that they own a processing center while only 7.01% of the farmers do not own a cassava processing center (Figure 15). Ownership of cassava processing centers by majority of farmers in a community will increase the production and availability of cassava processed commodities. Mechanization of cassava processing operations will enhance human capacity, leading to intensification and increased production.

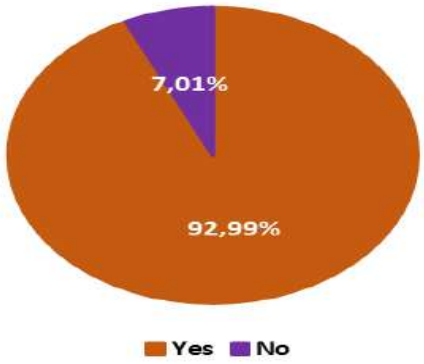

Figure 15. Distribution of ownership of processing center among sampled processors

4.2. Membership of a Processors Association

Membership in the cassava processors association is vital to promote good relationships and correct processing of cassava products. The chart below illustrates the response of cassava processors to membership in the cassava processors association. 86.6% of the processors have never belonged to the processor association, while only 13.4% still have their membership intact (Figure 16).

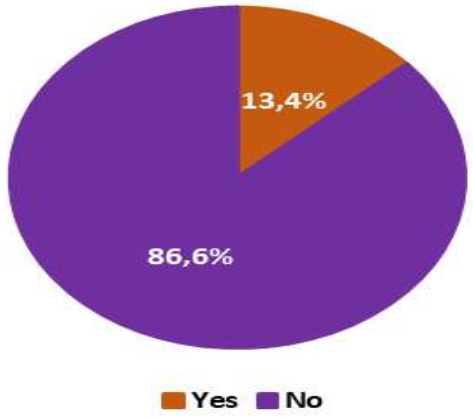

Figure 16.Distribution of Membership of a Processors Association among processors

4.3. Processing capacity

The study revealed that 15.92% of processing centers process more than 2 tons of cassava daily processing capacity.8.92% process approximately 1.1-2.0 tons per day, while 75.16% had a daily capacity of 1 ton and below per day (Table 11). The limited processing capacity means that the income of processors will be low, and the country's role in international trade is similarly limited. To this end, the production capacity of each processing center must be expanded such that more cassava needs to be processed to meet the local market demand. Information about the quantity of cassava processed per day can help to provide basic information for any initiative to support the cassava processing industry. This also shows the need for provoding mechanization equipments of processing cassava.

Table 11.Distribution of processing capacity among sampled processors

Processing Per Day	Frequency	Percentage
0 - 1 tonnes	118	75.16
1.1 – 2.0 tonnes	14	8.92
Above 2 tonnes	25	15.92
Total	157	100.00

4.4. Processing methods

Most (99.36) of the sampled processors use the traditional method of processing while 0.64% use other methods (Table 12). This result shows the need for mechanization intervention in the cassava processing. The processing method can influence the quantity and quality of cassava products produced. Utilizing these modern cassava processing techniques will reduce food contamination, postharvest losses, access to an enhanced market, and increased income levels for the farmers and other stakeholders.

Table 12.Distribution of processing method among sampled processors

Processing Methods	Frequency	Percentage
Traditionally	156	99.36
Others	1	0.64
Total	157	100

4.5. Sources of cassava tubers for processing

The results revealed that few of the processors sampled (26.75%) produced cassava on their farm and processed it after harvesting. In contrast, 73.25% sampled cassava processors depend on other farmers and the markets for the cassava processing (Table 13). This result suggest the need to produced more cassava to support the raw material demand in Togo since majority of the processors sampled depends on others farmers for their processing.

Table 13.Distribution of sources of cassava tubers for processing

	Frequency	Percentage
	Own production	
Yes	42	26.75
No	115	73.25
Total	157	100

4.6. Cassava Peeling Methods

Majority (98.73%) of the cassava processors in the study area use the manual peeling method (peeling with knives). The manual peeling method is labor intensive and takes a more extended period to peel cassava roots. However, 1.27% of the processors use the mechanical peeling method (Figure 17). The mechanical peeling method is faster and reduces the labor required for cassava peeling.

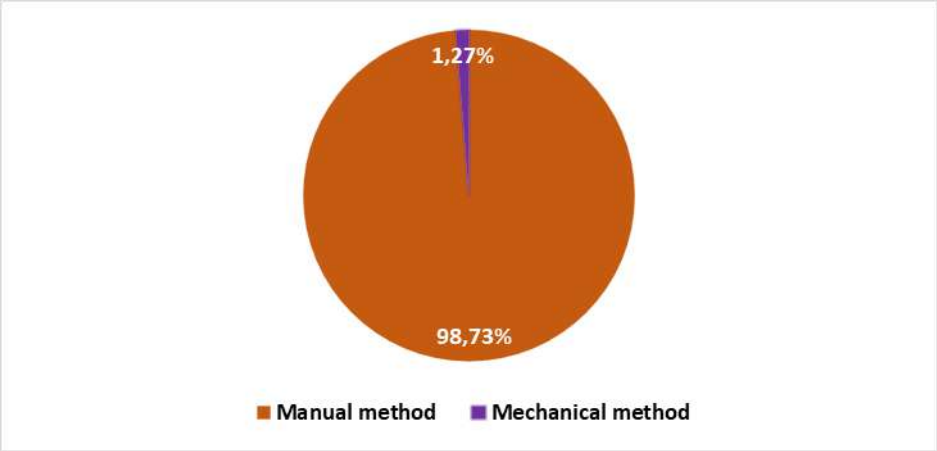

Figure 17.Distribution of cassava peeling methods among sampled processors

5. Recommendations and conclusion

Based on the findings of the survey in Togo, the following recommendations can be made in relation to cassava production:

Enhance access to education: Given the varying levels of education across regions, efforts should be made to improve access to education, especially secondary education, to equip farmers with the necessary knowledge and skills to enhance agricultural practices and productivity.

Promote cooperative associations: Since membership in associations was significant and served various needs such as access to credit and inputs, there should be continued support and encouragement for farmers to join and actively participate in cooperative associations. Additionally, training programs within these associations can be organized to build the capacity of members in modern agricultural practices.

Support mechanization and Digital Technology adoption: Addressing the challenges faced by farmers, such as limited farm measurement practices and low awareness and usage of digital applications, requires interventions to promote mechanization and technology adoption. This can be achieved through government support in providing access to modern farming equipment and training programs on the use of digital tools for farm management.

Improve access to improved varieties and inputs: To address constraints in cassava stem and root production, efforts should be made to increase access to improved varieties, fertilizers, and other agricultural inputs. This could involve partnerships with agricultural research institutions and private sector entities to ensure the availability and affordability of quality inputs for farmers.

Strengthen policy implementation and awareness: There is a need to bridge the gap in awareness of government policies on cassava production. Government agencies should implement strategies to disseminate information about relevant policies and programs to farmers effectively. Additionally, there should be mechanisms in place to monitor and evaluate the implementation of these policies to ensure they effectively address the needs of cassava farmers.

Facilitate access to finance: Given the importance of access to credit for agricultural activities, efforts should be made to facilitate access to finance for cassava farmers. This could involve the provision of financial literacy training and the establishment of special loan schemes tailored to the needs of agricultural producers.

By implementing these recommendations, stakeholders can contribute to the sustainable development of cassava farming in Togo, improving livelihoods and food security for farmers and communities alike.

With regard to cassava processing sector in Togo, the following recommendations are suggested:

- **Promote collaboration**: encourage more processors to join associations to foster collaboration, knowledge sharing, and resource pooling within the industry,

- **Capacity building**: Invest in upgrading processing centers, especially smaller ones, to increase their processing capacity and efficiency through mechanization and modernization initiatives,
- **Technological adoption**: Facilitate the adoption of modern processing technologies and methods to improve productivity, product quality, and competitiveness in the market.
- **Support local production**: Provide incentives and support programs to encourage more processors to produce their cassava, thereby ensuring a stable and sustainable supply chain.
- **Mechanization:** Promote the adoption of mechanical peeling methods to reduce labor requirements, improve processing efficiency, and enhance overall productivity in the sector.

In conclusion, the production and processing surveys conducted in Togo shed light on various aspects of the cassava farming and processing landscape. The production survey revealed significant insights into the socioeconomic characteristics of cassava farmers, highlighting gender distribution, education levels, membership in associations, sources of income, farm sizes, and constraints faced by farmers. Meanwhile, the processing survey provided valuable information on ownership of processing centers, membership in processors associations, processing capacity, methods, sources of cassava tubers, and peeling techniques.

Based on these findings, it is evident that there are opportunities for improvement and intervention to enhance the cassava value chain in Togo. Recommendations include enhancing access to education, promoting cooperative associations, supporting mechanization and technology adoption, improving access to improved varieties and inputs, strengthening policy implementation and awareness, and facilitating access to finance.

By implementing these recommendations, stakeholders can contribute to the sustainable development of the cassava sector in Togo, leading to improved livelihoods, increased food security, and enhanced economic opportunities for farmers and processors alike. Overall, addressing the identified challenges and leveraging the opportunities presented can lead to a more robust and resilient cassava industry, benefiting both rural communities and the broader economy.

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Annex: Baseline study questionnaire

1. GENERAL INFORMATION

Part I: General Information

11.1. Country
11.2) State
11.3) Ward/Village_____
_____
11.4) District/LGA _____

	Degree	Minute	Second
11.4	11.5	11.6	11.7
1) GPS latitude			
2) GPS longitude			

2. GENERAL INFORMATION

1.1 Farmer's name (surname last): _____
1.2 Are you the household head (1= Yes; 0=No)
1.3 If no, what is your relationship to the household head (1=Wife; 2=Son; 3=Daughter; 4=Brother
1.4 Phone number of the farmer (preferably WhatsApp number): _____
1.5 Farmer's Gender: 1= Male 0= Female
1.6 Number of people residing in farmer's household eaten from the same pot: _____
1.7 How many are male? How many are female?_____
1.8 Is any of your children practicing farming
1.9 Is any of your children interested in farming?
1.10 Level of education of the household head: 1= None, 2= Primary, 3= Secondary, 4= Tertiary Institution, 5= Non-Formal, 6=Other_____
1.11 How many years of experience do you have as a farmer?
1.12 Major sources of income of the household head: 1= Agriculture 2= non-Agriculture
1.13 If you select Agriculture above, please pick the source of income from agriculture 1= Production 2= Processing 3= Marketing 4=Agro-input supply 5=others (specify)
1.14 What is the estimated household monthly income: 1= Less than or equal to CFA30,000 2= CFA31,000 - CFA50,000 3= CFA51,0000 - CFA100,000 4=CFA101,000 - CFA150,000 5= CFA151,000 and above
1.15 What percentage of your monthly income do you spend on your farm? what percentage on the family, what percentage do you save? What percentage do you spend on other things?
1.16 Have you borrowed money during this planting season 2022/2023? 0=No 1=Yes
1.17 If yes, what your most common source? (1) Relative and friends (2) Informal savings and credit group (3) Money lender (4) Government credit schemes (5) NGO/Church/Mosque (6) Bank

1.18 If yes, what was the purpose? (1) purchase improved seed, 2=purchase fertilizers, (3) purchase other agri. input, 4=purchase food, 5= medical costs, 6=Other (specify)

1.19 Did you get the loan? 1= Yes 0=No

1.20 Have you borrowed money during the past planting season 2021/2022? 0=No 1=Yes

1.21 If yes, what your most common source? (1) Relative and friends (2) Informal savings and credit group (3) Money lender (4) Government credit schemes (5) NGO/Church/Mosque (6) Bank

1.22 If yes, what was the purpose? (1) purchase improved seed, 2=purchase fertilizers, (3) purchase other agri. input, 4=purchase food, 5= medical costs, 6=Other (specify)

1.23 Did you get the loan? 1= Yes 0=No

1.24 Are you a member of an association/cooperative?
0=No 1=Yes 2= No longer

A. If yes, which type of association/grouping? 1= Farmer organisation; 2= Platform; 3= Cultural association; 4= Political association; 5= Religious association; 6= NGO; 7= Other (specify)

1.25 What was your main motivation to join the association? 1= Easy access to credit, 2= The association supplies cassava/rice, 3= Collective freight transportation of rice/cassava, 4= Group selling of rice/cassava, 5= Easy access to inputs, 6=Other (please specify)

1.26 How long have you been a member (years)? _____

1.27 Status of membership: 1=Member 2=Leader

1.28 Is the association still functioning? 1=Yes 0=No

1.29 Registration status (Is it registered with the government?): 1=Yes 0=No

1.30 Do you have access to the internet in your community? Yes=1 No=0

1.31 Do you have a smartphone? Yes=1 No=0

1.32 If you have a smartphone, what do you use it for? Phone call=1, WhatsApp=2, Facebook=3, Twitter=4 Instagram=5, Send email=6, Use other applications=7

Part II: INFORMATION ON FARMS

1.1 <u>How did you acquire your land</u> 1= inherited, 2= purchase, 3= donation (definitive transfer), 4= Lease (Fee paid for at least 5 years), 5= rent (Annual fee), 6= other (specify and describe this type of tenure)

1.2 Have you measured your farm size before? Yes=1 No=0

1.3 If you have measured your farm before, how did you measure it? I gauged with my eyes=1, I use a measuring tape=2, I use a GPS=3 I use a phone App=4, A service provider did it for me=5

1.4 Total area of farmer's farm (ha)

1.5 What was the size of the land planted with Cassava/rice last season?

1.6 Do you have facility for irrigation farming? Yes=1 No=0

1.7 If yes, what is your water source? River bank = 1 Borehole=2, Well=3

1.8 What other crop do you plant? 1= Rice 2= Maize 3= Sweet potatoes 4= Vegetables 5= Plantain 6= Palm tree 7= Others (specify)

1.9 Do you have access to extension services? 1= Yes 0= No

1.10 How frequent do you have access to extension services? 1= Monthly, 2= Quarterly, 3= Biannually, 4= Annually

1.11 What is your frequent sources of extension messages? 1= Agric extension staff, 2= Extension bulletins 3= Media (Radio/TV/Newspaper), 4= fellow farmers 5= Mobile phone (e-extension): 6= Other (specify): _____

1.12 How often do you interact with agricultural extension workers on cassava/rice production?

1= Very often, 2= Often, 3= Scarcely, 4= Never

1. CASSAVA PRODUCTION

1.1. What are the main sources of labour for the various field operations on your cassava/rice fields?

Operation	Family	Hired	Communal	Shared crop labor
Land preparation				
Planting				
Weeding				
Fertilizer application				
Harvesting				

1.2. Varieties grown and other information

Plot No	Dominant cassava/rice variety	Type of variety **(Code 1)**	Name of cassava/rice variety (Common name)	Area (ha)	Yield (kg/ha)	Years cultivating cassava/rice variety	Source of cassava/rice variety **(Code 2)**	Associated crops to cassava/rice **(Code 3)**	Drought tolerance of the variety **(Code 4)**	Pest and disease tolerance of the variety **(Code 4)**
1										
2										
3										
4										
5										

Code1= cassava varieties: 1= local, 2= improved, 3= Don't know
Code2= Sources of cassava varieties: 1= Research/extension, 2= Friends, 3= market 4= NGO/projects, 5=others
Code3= Associated crops: 1=cowpea, 2= maize, 3= millet, 4= sorghum, 5= soybean, 6= ground nut, 7= yam, 8= onion, 9= tomato, 10= sweet potato, 11= sesame, 12= potatoes, 13= cotton, 14= eggplant, 15= pepper, 16= okra, 17= banana, 18= mango, 19= orange, 20= cashew nut, 21= others (specify) :.....
Code4= Resistance perceptions: 1= High, 2= Moderate, 3= low 4= don't know

1.2.1. What is your primary source of information about the improved variety you grow?

1= Local cassava/rice producers 2= Cutting/seed dealers (retailers, private seed company)
3= Extension agent 4= Fellow farmer 5= Media (Radio/TV/Newspaper)
6= Others (specify) _____

1.2.2. Have you heard about biofortified cassava(Yellow cassava)?
1= Yes 2=No

1.2.3. If yes, do you grow it(Yellow cassava)?
1= Yes 2=No

1.2.4. If yes, will you to continue planting it(Yellow cassava)?
1= Yes 2=No

1.2.5. If no to 4.2.3, why are you not planting it(Yellow cassava)?

1= the stems are not available, 2=Yield is poor 3=It spoils faster 4=We don't eat it 5= No market for it

1.2.6. If don't use improved cassava/rice varieties give reasons

1=Cuttings/seeds not available 2=Not heard of any improved varieties 3=No money to buy the cuttings/seeds

4= Satisfied with the local varieties 5= Not interested in experimenting with new varieties

6= Not seen any demonstration to show superiority of improved varieties 7= Other (specify):_____

1.2.7. Do you buy cassava stems?

1= Yes 2=No

1.2.8. Do you sell Cassava stem?

1=Yes 2=No

1.2.9. Who do you sell it to?

1=``````````````````````````````````

1.2.10. Indicate the main criteria that drive the cultivation of 3 main cassava/rice varieties you grow (Check all Yes/No that applies)

Characteristics	Variety 1		Variety 2		Variety 3	
	Yes	No	Yes	No	Yes	No
Cutting/seed price						
Consumer's needs						
Insects/diseases tolerant						
Weeds tolerant						
Drought tolerant						
Early maturing/drought escape						
High yield						
Labour saving						
Inputs saving						
Availability of cuttings/seeds						
Affordable cutting/seed price						
High price premium in the market (High demand)						
Easy storage/conservation						
Good performance under low soil fertility						
Performance under low soil moisture						
Taste						
Policy						

1.2.11. If cassava cuttings/rice seeds are purchased, who are your major suppliers?

1=Local cutting/seed producers; 2= Cutting/seed dealers 3= Extension/research; 4= Other_____

1.2.12. Give the quantities of main cassava/rice varieties you purchased?

Year	Name of cassava/rice variety	Type of variety (1 = Local, 2 = Imp.)	Cutting/seed quantity purchased	Amount paid	Name of seller **(use code below)**	Quantity of cuttings/seed (bundles/kg)

			(bundle/kg)			planted
20	1=----------					
	2=----------					
	3=----------					
	4=----------					
2020	1=----------					
	2=----------					
	3=----------					
	4=----------					
2021	1=----------					
	2=----------					
	3=----------					
	4=----------					

Var. seller code: 1= Research; 2= Extension; 3= NGO; 4= Other farmers 5= Private company; 6= others_____

1.2.13. Do you rely on the same supplier when purchasing cassava cuttings/rice seeds?1= Yes 2= No

1.2.14. What quantities of the following inputs did you apply in average to the cassava/rice?

Cassava/rice variety	NPK (basal)(kg)	Urea (top-dress) (kg)	SSP (Phosphate) (Kg)	manure	Insecticides (litre)
Local					
Improved					

1.2.15. Have you heard about contracts with an input dealer, trader or processor in exchange for crop?

1= Yes, 2= No

1.2.16. Do such contracts exist in your village? 1= Yes, 2= No

1.2.17. Have you ever made such contracts for any of your crop? 1= Yes, 2= No

2. SEED SYSTEMS AND VARIETY DESCRIPTION

2.1. Cassava/Rice **(**Please tell us more about the Cassava/Rice varieties you have planted lately)

List cassava/rice varieties planted	What you don't like in this variety?	Do you plant This variety every year even under different Rainy conditions? 1=Yes; 2=No	Who decided about the choice of this variety? **(Code 1)**	Have you always been able to get the cuttings/seeds of this variety when you wanted it? 1=Yes; 2=No	In the years you've planted this variety, have you renewed it or replaced it from sources other than your own harvest? 1=Yes; 2=No	What is the main reason for deciding to replace the cutting/seed for this variety? **(Code 2)**	What was the Primary source you used to renew or replace the variety?**(Code 3)**
Variety 1							
Variety 2							
Variety 3							
Variety 4							
Variety 5							

Code 1: 1= Spouse; 2=Fellow farmer; 3=Seed producers; 4= Private extension agent; 5= Processors 6= Govt extension agent(NGO)
Code 2:1=poor cutting quality; 2=reduced yield; 3=lost stored seed; 4=increased susceptibility to pest; 5=no rain/did not germinate; 6=other (specify)
Code 3:1= Research/extension, 2= Friends, 3= market 4= NGO/projects, 5=others_____

3. PESTS AND DISEASES CONTROL METHODS USED

3.1.1. What are the major pests usually encountered in your cassava/rice fields?

	1= Yes; 2= No	Part affected 1= leaf, 2= stem, 3=tuber	Methods of controls 1= Chemical, 2= biological, 3=cultural, 4=integrated, 5= biopecticide, 6 = None 7=others
Pests			
Grasshopper			
Termites			
Rodents			
Birds			
Others 1_____			
Others 2_____			
Others3_____			
Human infestation			
Diseases (Cassava)			
Cassava mosaic			
Anthracnose			
CBB (cassava blight, bacterial)			
Root rot			
Others 1_____			
Others 2_____			
Diseases (Rice)			
Rhizoctonia oryzae			
Alternaria padwickii			
Others 1_____			
Others 2_____			

3.1.2. For the method you rely on, please indicate

Pests and diseases control methods	Name of the method	Source of information		Effectiveness of the method	Constraints associated with the method

Chemical /pesticide					
1					
2					
3					
Biological(*)					
1					
2					
3					
Other (**)					
1					
2					
3					

(*) Plant/animal extracts (leaves or insects); biopesticides;

(**) May include crop rotation, fallow, intercropping, staggering planting time etc.

COST OF PRODUCTION

3.2. Breakdown of costs and return of cassava/rice during the last season

4.4.1 How many times did you harvest your fresh cassava for sale during the last Season?
4.4.2 What proportion of harvest of your fresh cassava do you consume?
4.4.3 What is the value of fresh cassava sold in the last production season(in Naira)?
4.4.4 Total land cultivated (ha)
4.4.5 Cost of land clearing for land cultivated
4.4.6 cost of ridging the cultivated land
4.4.7 cost of heap making on the cultivated land
4.4.8 Cost of planting for the land cultivated
4.4.9 cost of Harrowing the cultivated land if applicable
4.4.10 Cost of tractor hiring for plowing the land cultivated (first ploughing)
4.4.11 Cost of tractor hiring for plowing the land cultivated (second ploughing)-in Naira
4.4.12 Quantity of fertilizer used on the cultivated land
4.4.13 Cost of the fertilizer used on the cultivated land
4.4.14 Quantity of Herbicides used on the cultivated land for the dominant variety (unit in litres)
4.4.15 Cost of herbicides used on the cultivated land for the dominant variety
4.4.16 Quantity of pesticides used on the cultivated land (unit in litres)
4.4.17 Cost of pesticides used on the cultivated land
4.4.18 Cost of first weeding for the land cultivated
4.4.19 Cost of second weeding for the land cultivated
4.4.20 Cost of third weeding for the land cultivated
4.4.21 Cost of first herbicide for the land cultivated
4.4.22 Cost of second herbicide for the land cultivated
4.4.23 Cost of third herbicide for the land cultivated
4.4.24 Cost of pesticide application for the land cultivated
4.4.25 Cost of first harvesting of cassava for the land cultivated
4.4.26 Cost of second harvesting of cassava for the land cultivated
4.4.27 Yield /Ha in tons
4.4.28 Total number of tons harvested from the cultivated land
4.4.29 Price of fresh cassava sold in tons from the cultivated land
4.4.30 Price of stems per bundle sold from the cultivated land
4.4.31 Number of bundles of stems sold from the cultivated land
4.4.32 Cost of Transportation of the harvested roots per tons(in Naira) from the cultivated land
4.4.33 Number of trips made to transport the cassava harvested from the land cultivated.
4.4.34 Do you practice ratooning? Yes=1, No=1
4.4.35 If yes, how many times do ratoon before harvest?
4.4.36 How do you determine the quantity of herbicide or pesticide to use on your farm? follow the instruction on the herbicide label=1, I guage as i deem fit=2, I leave it to the service provider to determine it=3, Extension Agent's advise=4 I follow guidance from fellow farmers=5, Other=5
4.4.37 Have you heard of calibration before spraying? Yes=1, No=2
4.4.38 If yes, do you do it or do your service provider do it before spraying? Yes=1, No=2
4.4.39 Have you heard about IITA Herbicide Calculator Application before? Yes=1 No=2
4.4.40 If yes, have you used it before? Yes=1, No=1
4.4.41 Have you heard about Akilimo Application before? Yes=1 No=2
4.4.42 If yes, have you used it before? Yes=1, No=1
4.4.43

4. AGRICULTURAL MARKETING DECISIONS

4.1. Do you sell your cuttings/seeds? 1. Yes 2. No.

4.2. Do you give it out for free? 1. Yes 2. No.

4.3. When do you sell your cuttings/seeds?

	Average selling price (kg/local currency)	Reasons for selling	Place of sale	Buyer
Soon after harvest				
First quarter after harvest				
Second quarter after harvest				
Just before planting				

4.4. Who determines the prices of cuttings/seeds you sold?

1= Farmers Association 2= Yourself 3= The buyer 4= Government 5= other (specify):_____

4.5. If prices were fixed by you, say how you determined them

1= N/A 2= I used prices in neighboring markets;
3= I used published prices in the newspapers 4= I used prices announced on the media
5= used cost of production 6=other (specify):…….

4.6. How do you market the cassava(stems)/rice produced?

1= On-farm 2=. At local market 3= Transported to other parts of Country
4= Exported to other countries 5= Consumed

4.7. How do you market the cassava(root)/rice produced?

1= On-farm 2=. At local market 3= Transported to other parts of Country
4= Exported to other countries 5= Consumed

4.8. What are your constraints for cassava(seed)/rice production

1= lack of improved varieties 2= lack of specific fertilizers 3= poor soil
4=problem of markets 5=low price for cassava 6= labour is not available
7=other:……..

4.9. What are your constraints for cassava(root)/rice production

1= lack of improved varieties 2= lack of specific fertilizers 3= poor soil
4=problem of markets 5=low price for cassava 6= labour is not available
7=other:……..

8.10 Are you aware of any government policy on casssava? Yes(1) 2(No)

8.11 If yes, what do you know about it? 1) Inclusion of cassava flour in making of bread 2) Diversification into other usage 2) import substitution

5. Nutrition

9.1 Which of these biofortified crops do you grow?

Crop	Cassava	Rice
Yes (1)		
No (2)		

Thank you for your co-operation

Zero Hunger Questionnaires for processors

1.1. Is this processing Centre your own? Yes=1, No=2

1.2. Do you process cassava? *1= Yes, 0= No*

1.3. If yes, why do you process cassava aside for profit?*?*

1= Add value before sale ____ 2= Improve cassava quality_____ 3= Reduce cassava losses _____
4= For better and longer storage_____ 5=Other (specify)_____

1.4. If no, why?

1= High cost of setup_____ 2=. There is one in our community owned by the cooperative_____
3= I use a private processing centre in our community_____ 4= High maintenance costs _____
5= high cost of processing
6=non Availability of spear parts 7= Other

1.5 What is your processing centre capacity/the capacity of the processing centre you use? less than 1 metric ton=1, 1 metric ton=2, 2 metric tons=3, 3 metric tons=4, 4 metric tons=5,, 5 metric tons= 5 metric tons, 6 metric tons and above=7

1.6 How many tons of fresh cassava root do you process in a day?
1.7. How many tons of fresh cassava root is being processed at the processing centre where you processed per day?
1.8. How many people process cassava from your processing centre on the average everyday?

1.1. Have you ever been a member of processors' organizations*?* 1= Yes____ 2= No longer ____ 3=Never____
1.2. If yes, what is the name of the organization? _____

1.3. Since when have you been member of this organization? _____Year(s)

1.4. What are the first three purposes of this organization?

a……
b……
c……

1.5. What are the three main advantages of being member of this organization?

a……
b……
c……

1.6. Do you have contract arrangement(s) with any actor along the cassava/rice value chain?

1= Yes _____ 0=No _____

1.7. If yes, what type of contract do you have? 1=Formal (written) _____ 2= informal (verbal) _____

What are the terms of this contract? 1 = Formal contract; 0 = Informal contract

1.8. What processing method do you use?

1=*Traditional (specify_____)* 2= *Modern (specify Stainless grater, fryer/chimney, stainless sifter)_____)* 3= *Other (specify_____)*

1.9. Do you process cassava for home consumption, sale or both? *1= home consumption, __ 2= sale, __ 3= both_*
1.10. How do you get cassava? *1= own production__ 2= from other farmers___ 3= from market __ 5= Others specify__*
1.11. How reliable are the sources? *1= Very reliable, _____2= Fairly reliable_____, 3= Not reliable.* _____
1.12. Do you process any of the products below and what is the market sale price of processed products in local currency?

Processed products	Yes (1)	No(2)	Unit cost	Precision of Unit (local)	Equivalent in Kg

Garri					
Fufu					
Cassava flour					
Lafun					
Animal feed (using cassava peel)					
Combo bits					
Abacha					
Custard					
Moimoi					
Others (specify)					

1.13. What shelling method do you use before processing? 1= manual peeling ____ 2= mechanical____

1.14. What is your source of water for processing?

1= pipe borne, _____ 2= dugout well, _____ 3= local river, _____
4= local pond, _____ 5= others (Specify)_____

1.15. How reliable is your supply of water? 1= very reliable, __ 2= fairly reliable, ____ 3= not reliable____

1.16. Are there any problems associated with processing in particular? 1= Yes, ____ 0= No_____

1.17. If *Yes*, list problems

1_____
2_____

1.18. What grinding methods do you use? 1= manual_____ *2*= mechanical_____

1.19. If mechanical what is the source? 1= hiring _____ 2= own_____

1.20. Frying /grilling method used 1-manual_____*2*= mechanical_____

1.21. Quantity of cassava/rice processed, duration of processing and processing cost

1.22. Cost of labor

Processing stage/50kg bag	No. of workers			No of days	Nber of hours/day	Rate paid/person	
	Men	women	Youth			Hired labour	Family labour
Peeling/washing							
Grinding/Gratin g							
Pressing							
Frying							
Packaging							
water							

Processing constraints

1.23. What are the main constraints you face in your cassava/rice processing activity? Classify them from the most important to the least important.

Constraint	Importance **(Code1)**
Lack of good quality cassava/rice	
Weak knowledge of processing operations and techniques	
Lack of equipment for processing	
Low storage capacity	
Storage warehouse too far from the Unit	
High labour cost	
Non availability of labor for processing	
Problem of markets	
Low price for processed products	
Lack of funds	
Lack of water	
Other (Please specify) _____ _____	

Code1*: 1= very important, 2= important, 3= moderately important, 4= somewhat important, 5= minor importance*

1.24. Did you take any credit for your processing activity?

1=Yes _____ 0= Yes_____

1.25. If yes, from where?

1=Friends_____2=Cooperatives _____ 3= Moneylenders 4=Family_____5 Others (specify) _____

1.26. How much did you borrow from them? _____
1.27. How much did you pay as interest (in local currency)? _____
1.28. How many months or years were you given to repay the loan? _____

HIGH QUALITY CASSAVA PEEL

How many people work at your processing centre per day?

Are you aware of High Quality Cassava Peel (HQCP)? Yes=1, No=2

How many adult women participate in the peeling of cassava per day?

How many youth female participate in the peeling of cassava per day?

How many wheelbarrow/basket/tons/bags of cassava peel do you generate per day?

What do you do with the Peels? Dump fresh peels somewhere=1, Users pick fresh peels freely=2, Dump fresh peels somewhere for livestock to feed freely=3, Sell fresh peels=4, Sun dry and sell at the centre=5, Sundry and pack in woven plastic bag to sell at market near location (<10km)=6, Sundry and pack in woven plastic bag to sell at market outside location (>10 km)=7

If you dump fresh peels somewhere, what portion between 1-10?

If users pick fresh peels freely, what portion between 1-10?

If you dump fresh peels somewhere for livestock to feed freely, what portion between 1-10?

If you sell fresh peels, what portion between 1-10?

If you sun dry and sell at the centre, what portion between 1-10?

If you sun dry and pack in woven plastic bag to sell at market near location (<10km), what portion between 1-10?

If you sun dry and pack in woven plastic bag to sell at market outside location (>10 km), what portion between 1-10?

What do you do with the rest of the peel if you do not take it to a farther market?