

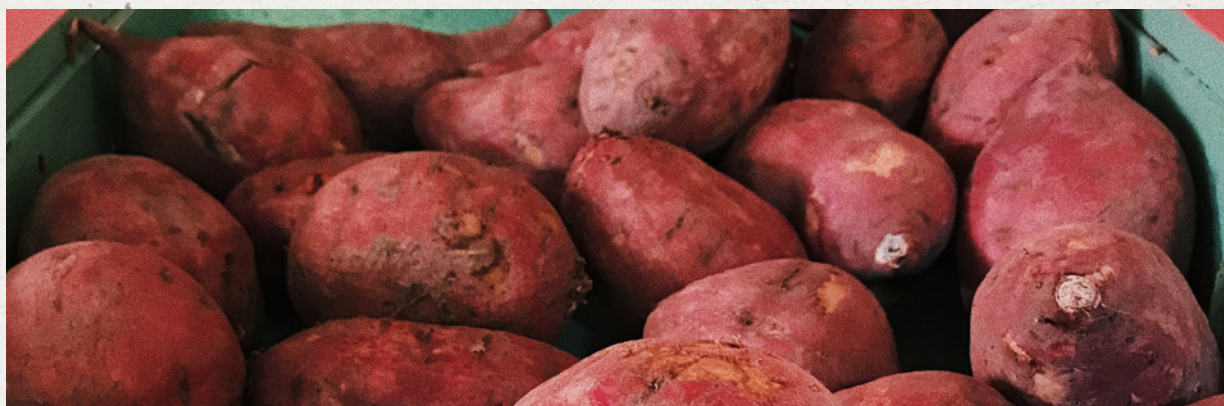
MARKET PROFILE

Market profile

Cassava and other root
and tuber flour



Subject of the study:	Market profile on cassava and other root and tuber flour in Sub-Saharan Africa, in particular cassava flour, for local, regional and European markets
Date :	October 2022



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I. INTRODUCTION

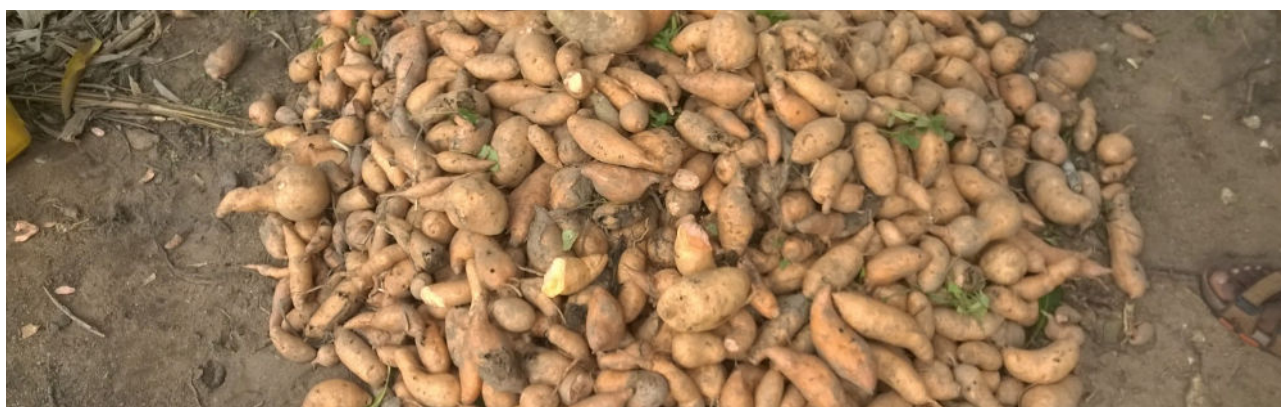
This market profile assesses the potential of West African root and tuber flour, particularly cassava flour. This profile explores local markets and the European market, for which these flours represent a gluten-free alternative to cereal flours.

This profile presents an analysis of the market data (import, export, prices) and uses some companies in the region that are already active in the sector as examples. The Nigerian market is covered in detail and serves as a reference example throughout the profile.

The HS code used to analyse the trade flows is the following:

HS code	Full commodity name	Short name used in the report
HS 110620	Flour, meal and powder of sago or of roots or tubers of manioc, arrowroot, salep, sweet potatoes and similar roots and tubers with a high content of starch or inulin of heading 0714	Cassava and other roots and tubers flour

More details, particularly in terms of data, can be requested from COLEACP.



II. SUPPLY

This section contains a description of root and tuber flour, with a focus on cassava flour, and existing preparation methods. This section also describes the global and local markets for these products.

a. Product preparation

Root and tuber flour is made by crushing or chopping freshly collected roots and tubers, drying the pieces and then grinding them into a fine powder. Root and tuber flour, particularly cassava flour, is used in a wide range of recipes, has become a key ingredient in a variety of bakery and food manufacturing sectors around the world, and is a staple food in many cultures. For example, since ancient times, cassava flour has been a staple of Nigerian cuisine. In Ghana, sweet potato flour is commonly used to make bread.

Cassava flour production process

The cassava flour production process is similar to that of several other root and tuber flours, except for the fermentation process, which is primarily used in cassava flour production. The fermentation stage is essential in the production of cassava flour because it allows moulds that naturally exist on the peeled cassava to grow, which softens the cassava root and helps to eliminate cyanide. Fermentation also improves the physicochemical and pasting properties of the cassava flour, by enhancing the swelling power and solubility and decreasing the pH of the flour. Recent research has suggested that the production of other root and tuber flours, such as sweet potato, could also benefit from the fermentation process used in cassava flour production because of the ability of fermentation to improve the physicochemical

and pasting properties of the flour.

Cassava flour is produced from fresh cassava roots via an eight-step process:

1. **Root washing:** cleaning and washing the fresh roots to remove soil and dirt adhering to the roots before peeling.
2. **Peeling:** the removal of the cassava skin from the flesh of the root.
3. **Washing:** further cleaning of the peeled roots to remove any remaining skin or dirt.
4. **Root size reduction:** achieved by either chipping, slicing or grating the cassava roots. This process reduces the number of particles in the wet mash, leading to achieving easy and uniform drying.
5. **Fermentation:** allowing the wet root mash to ferment in sacks or fermentation vats for 3–5 days.
6. **Dewatering (pressing):** following fermentation, excess water in the wet root and tuber mash is pressed out to create a wet cake, which is usually easier to handle and dry.
7. **Drying:** the wet cake is dried, either by sun drying or through the use of a flash drier, to reduce the moisture content below 12%, while preventing the mash from warming. Flash drying involves placing the wet cake into the dryer for a short period, allowing unbound moisture to be 'flashed' off the wet cassava root. The resultant dry mash is referred to as coarse cassava meal. Flash drying has some benefits over sun drying, including (i) the wet cake is dried quickly; (ii) when required, a buffer hopper or back-mixing system can be included in the drying system; (iii) open circuit or partial gas recycle can be designed; (iv) the drying system can be constructed as a simple system with minimal moving parts to operate in an inert environment. Further, the flash dryer has the potential to produce cassava flour at 10% moisture content, which is below the 13% maximum moisture content recommended for dry cassava products.
8. **Dry milling:** the dry coarse meal is milled to produce the fine flour. Producing high-

quality flour takes up to 24 hours.

Once the flour has been produced, it can be bagged and stored for several months (the storage time and shelf life depend on the production and packaging method).

A similar process to that described above is used to produce most root and tuber flour, although they vary in composition: the crop used, the system of production, etc.

Factors impacting quality of regular flour and high-quality flour

Sometimes, the roots and tubers used in flour production are those that cannot be used fresh due to their poor quality. However, as the various processes involved in flour production, particularly the drying process, can alter the nutritional qualities of the flour, it is important that the flour is made from the good quality plants. The nutritional value of the roots and tubers can be compromised through modification and losses of important nutrients during processing. Heat treatment, including the duration of exposure to heat either by sun-drying or oven drying, has a negative impact on the quality of the flour.



To overcome this problem, the preference is for techniques such as flash drying.

Exposure to thermal heating over a very short period is one benefit of the High-Quality Cassava Flour (HQCF) production process, as it ensures that the organoleptic qualities (flavour, colour, texture) of the fresh root are retained. Another difference between regular flour and high-quality flour lies in the method and duration of processing: regular flour production takes 5–7 days and the product can be stored for up to 30 months, whereas the HQCF production process takes just 24 hours and the product can be stored for 6–12 months, depending on the variety of root and tuber used.

In general, flour is an attractive alternative to fresh root crops as it combines a longer shelf life with the preservation of the nutritional value of the roots.

b. The global supply of root and tuber flour

The flour market is highly segmented, as it is dominated by cassava, sweet potato and yam. However, cassava is the most in-demand root in flour form. The global market for root and tuber flour is becoming more attractive, especially for cassava flour, which is increasingly accepted by the bakery industry as a gluten-free alternative to conventional wheat flour. Some of the major companies that are key players in the global cassava flour market are Otto's Naturals, Healthy Foods, American Key Food Products, Mhogo Foods, Mohan Exports (India) Pvt. Ltd., Dadtco Philafrica B.V., Woodland Foods, Tapioca Vietnam, Vaighai Agro and Pсалtry International Limited. More and more food companies are expressing an interest in using cassava flour in their manufacturing processes, which is expected to further boost demand in the near future.

However, there is limited information on cassava flour production in Europe. All cassava products, both fresh and processed (especially flour), are imported into Europe. According to market data collected on the export of root and tuber flours to Europe

The cassava flour and starch industry in Nigeria

In Nigeria, a few large-scale commercial producers – such as Pсалtry International Company Limited, which specialises in the production of cassava starch, flour, sorbitol and glucose and has a potential maximum output of 100 tonnes of High-Quality Cassava Flour (HQCF) per day – currently dominate HQCF production. These companies use imported equipment to benefit from economies of scale and more efficient processing techniques.

The CEO of Pсалtry International, Olyumemi Iranloye, launched this enterprise in 2005 with the goal of creating and addressing a niche market for cassava produce in rural areas of southwestern Nigeria. Pсалtry International produces the highest quality gluten-free cassava flour that fulfils international standards for both export and multinationals. Pсалtry has about 8,000 hectares of farmland suitable for out-grower programmes, employs over 300 people and has assets worth US\$20 million (₦8.31 billion). Pсалtry produces 18,000–20,000 tonnes of HQCF per year (from about 80,000 tonnes of fresh cassava roots).

There are also some small- or medium-scale cassava flour producers, which use locally fabricated equipment with a capacity of 1–2 tonnes of HQCF per day. Production factories are located in regions where cassava roots are available in sufficient quantities, enabling easy linkage with the factory.

Thai Farm International is also involved in the production of cassava flour in Nigeria. The company was founded in 2006 by Asian and Nigerian shareholders and was acquired by Flour Mills of Nigeria in 2012. Thai Farms is Nigeria's largest processor of locally cultivated cassava tubers and is known for consistently producing HQCF. Thai Farms supports over 2,000 cassava farmers through the purchase of their cassava crops.

Green Tech Industries Limited, another player in the region, was founded as a commercial company to cultivate and process cassava, potatoes and corn into import substitutes for industrial flour and starch for domestic and export markets, as well as to bring rural communities into the mainstream of modern economic activity.

Promise Point Limited is a medium-sized agriculture company located in southwestern Nigeria's Ekiti state. Promise Point specialises in the cassava value chain and aims to provide smallholder farmers with a guaranteed market by focusing on two market channels: one for food-grade starch and high-quality flour, which will be supplied to secondary processors such as multinationals within and outside the country, and the other for vitamin A bio-fortified gari, a traditional West-African cassava product, which will be distributed to 20,000 bottom-of-the-pyramid consumers.

from 2002–2019, the main flour producing countries in sub-Saharan Africa are Ghana, Côte d'Ivoire, Cameroon and Nigeria.

c. Key producers and exporters

Ghana, Côte d'Ivoire, Cameroon and Nigeria are the leading exporters on the international market for root and tuber flour, where they account for 57%, 16%, 11% and 6% of European import volumes, respectively. The modest market for fresh tropical roots and tubers in Europe has continued to steadily develop over the past decade. The most popular root and tuber crops are yams, cassava and sweet potato. These roots were first in high demand in ethnic stores and restaurants, but they are now becoming more generally available. Consumer interest in unusual flavours is growing and consumers are becoming more aware of nutritional values, which is helping to build market channels for the roots and tubers. Small and medium enterprises are now breaking into the market by partnering with importers who specialise in the distribution of these crops.

In the cassava flour market, the Ghana Exports Promotion Authority (a government agency tasked with developing, facilitating and promoting Ghanaian exports) has made cassava one of their priority crops over the last few decades. This has led to more

Ghanaian agripreneurs focussing on cassava production for the export market. Thus, Ghana can afford to be highly competitive in price and outperform other major cassava producing African countries, as well as other key competitors from South America, including Brazil, Paraguay, Colombia and Peru.

The global sweet potato flour market is also rapidly gaining momentum, benefiting from an increase in fresh sweet potato production, which reached a peak of about 92 million metric tonnes in 2020. In the period 2022–2027, the sweet potato flour industry is expected to increase at a compound annual growth rate (CAGR) of 4.7%.

As one of the top sweet potato producers in sub-Saharan Africa, Nigeria is well positioned to access the global sweet potato flour market. Nigeria produces 3.46 million tonnes of sweet potato annually, almost as much as Tanzania (3.47 million tonnes), which is the leading producer in Africa, and more than Uganda (2.59 million tonnes), Kenya (1.15 million tonnes), Madagascar (1.13 million tonnes), Rwanda (1.08 million tonnes) and Côte d'Ivoire (47,914 tonnes).

The United Kingdom is a particularly important market for root and tuber flour, being both the main importer and re-exporter. Indeed, from 2002–2019, 43% of the flour on the European market passed through the United Kingdom.



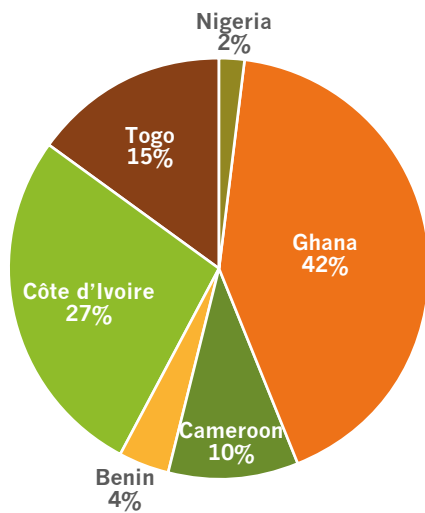


Figure 1: Volumes shares of West African exporting countries to EU28 of cassava and other roots and tubers flour, in 2019. (Source: COLEACP based on CEPII BACI.)

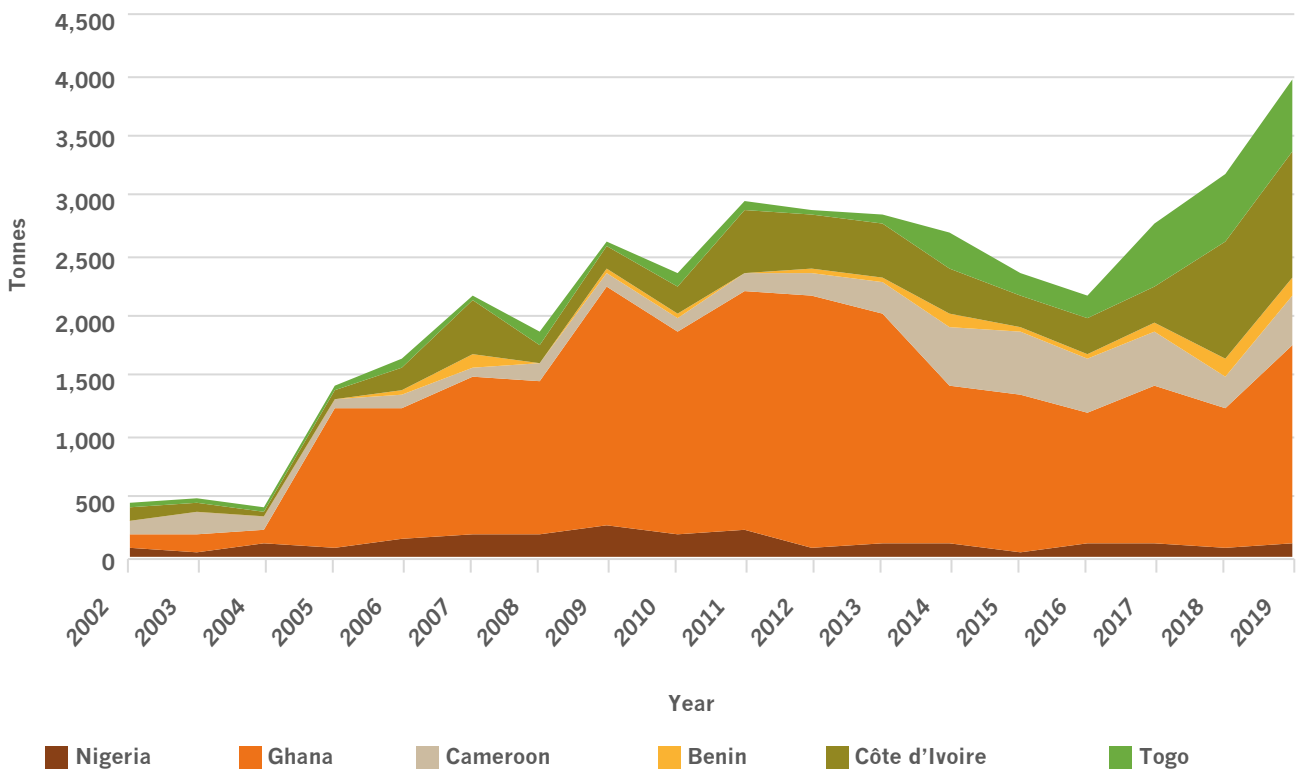


Figure 2: West African exports to the EU28 of cassava and other roots and tubers flour, in volumes (2002–2019). (Source: COLEACP based on CEPII BACI).

Figures 1 and 2 provide an overview of cassava flour and other tropical root and tuber flour exports to the EU from West Africa. Historically, Ghana has been the largest exporter, although the country has experienced a decrease in the exported volume between 2011 and 2016.

Côte d'Ivoire and Togo are the other important players in this market. Overall, the trend is very positive, representing a significant increase in exports from West Africa to the EU28. The last year shown in the graphs (2019) was particularly successful.



Nigeria is the world's largest cassava grower, with an annual estimated cassava production of 59.47 million tonnes of root, of which a large percentage is processed. However, the volume of cassava products exported from Nigeria is insignificant due to the very high domestic demand from both individual consumers and businesses.

Ghana produced 22.45 million tonnes of cassava in 2019, an increase of 1.6 million tonnes over the previous year. Since 2009, the country's cassava production has increased. Cassava is a vital root crop in Ghana, as it serves as a foundation for many staple dishes and is a key contributor to the country's agricultural GDP. The Netherlands and the United Kingdom are Ghana's largest export partners for cassava.

According to the Ghana Export Promotion Authority's competition research, there are new prospective markets for Ghana's cassava processing business. Nigeria, as well as European markets such as Italy, Poland and Portugal, offers significant opportunities for market diversification and penetration for Ghanaian businesses and trade promotion organisations. Ghana's cassava exports totalled US\$508,000 in 2017 but fell by 9%, to US\$437,000, in 2018.¹ Fresh cassava exports from Ghana produced about US\$1 million in income in 2018. The decline in exports from

Ghana could be attributed to a lack of access to reliable suppliers of high-quality cassava and to transportation, and a lack of power for processing equipment.

Côte d'Ivoire is estimated to produce 4.2 million tonnes of cassava annually. In Côte d'Ivoire, cassava is used to produce up to 20 food-based products, including attiéké, placali, foutou, atoukpou, cassava flour, cake and bread. The most extensively consumed of these products is attiéké, agglomerated steaming cassava semolina produced from fresh cassava roots. Cassava has become a symbol of Côte d'Ivoire's identity, with significant quantities transported to neighbouring countries (including Burkina Faso, Guinea and Mali) and Europe (including Belgium, France and Germany). According to the Chambre de Commerce et d'Industrie de Côte d'Ivoire, fresh cassava exports increased from 1,741 tonnes in 2009 to 363,548 tonnes in 2013, and from 2017–2019, cassava exports grew to about 742,256 tonnes. However, despite the potential of this sector in Côte d'Ivoire, there is little trade in flour outside the country.

Cassava production in **Cameroon** is estimated at over 5 million tonnes per year. Cassava flour exports from Cameroon from 2013–2017 totalled around 3,000 tonnes but increased to 15,030 tonnes in 2019 alone, with a value of US\$2.14 million. Belgium, France, Portugal, the Netherlands and Canada are Cameroon's top cassava export markets.

¹ Ghana Export Promotion Authority (2019). Potential Market – Cassava (url: <https://www.gepaghana.org/market-report/cassava-potential-market-report-2019/>)

III. DEMAND

High Quality Cassava Flour (HQCF), which is generally unfermented, white in colour, smooth and odourless, is mostly used in the bakery and confectionary industries as a wheat flour alternative. Cassava flour has also been utilised in the manufacturing of paperboard and plywood. In recent years, demand for cassava flour has increased in Nigeria, largely due to the federal government's policy on cassava flour inclusion in wheat flour for cassava wheat composite flour manufacture, particularly for bread and confectionary baking.

The demand for root and tuber flour in Europe is steadily growing, with cassava and yam flour the most popular varieties. The demand for these products began in ethnic restaurants and convenience shops, but they are gradually becoming more widely available. Increasing interest in and awareness of the culinary possibilities is helping to build the market channels for root and tuber flour.

To assess the potential market destinations in the European market, it is worth considering the destinations for fresh roots and tubers. The United Kingdom is the largest importer of yams, which are almost entirely imported from Ghana and sold only in the United Kingdom. France, Belgium and the Netherlands also import large quantities of yams. Belgium, in particular, is growing in importance as a commercial hub, particularly for yams and cassava and has experienced rapid import growth over the last

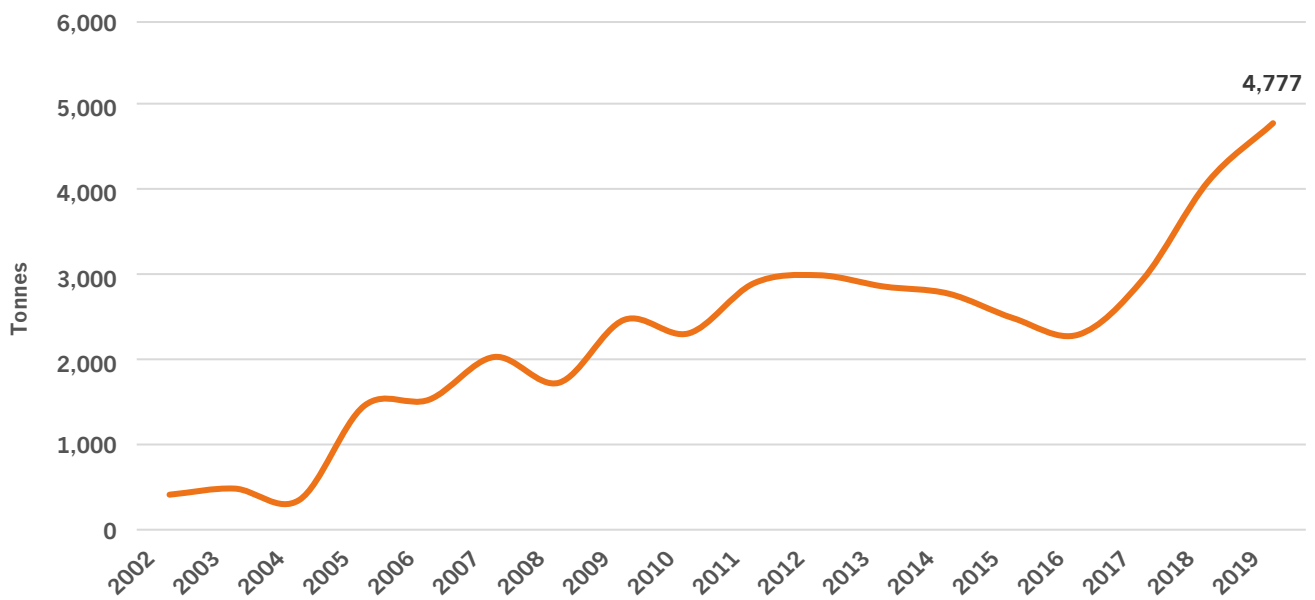
3 years. Yams are becoming more popular in Belgium, although Belgian importers, like those in the Netherlands, also play a key role in yam dissemination across Europe and re-export a large proportion of exotic roots and tubers.

Cassava is the most popular imported root or tuber in Spain. The Netherlands imports a similar volume of cassava, but most is further distributed throughout Europe. Cassava is also sold in significant amounts in France and the United Kingdom. Costa Rica remains one of the largest competitors for the European market, accounting for 72% of imports; with Nigeria and other countries in sub-Saharan African, the three regions account for about 80% of cassava imported into Europe.

For fresh cassava, the arrival price at the port in Europe is between €1.50 and €2.00/kg, according to several suppliers of raw materials for the agri-food industry (Greenyard Fresh France (France), Nature's Pride (Netherlands), Wealmoor (UK), OGL Food Trade (Germany)).

The global market for cassava (processed or unprocessed) has considerable room for expansion. In the period 2020–2027, the cassava product market is projected to expand. According to Data Bridge Market Research, the market is predicted to develop at a CAGR of 6.1% from 2020 to 2027, reaching US\$118.81 million by the end of 2027. This expansion can be ascribed to a number of factors, including increased cassava crop yield due to improved varieties resistant to drought,





pest and disease, as well as industrialisation.

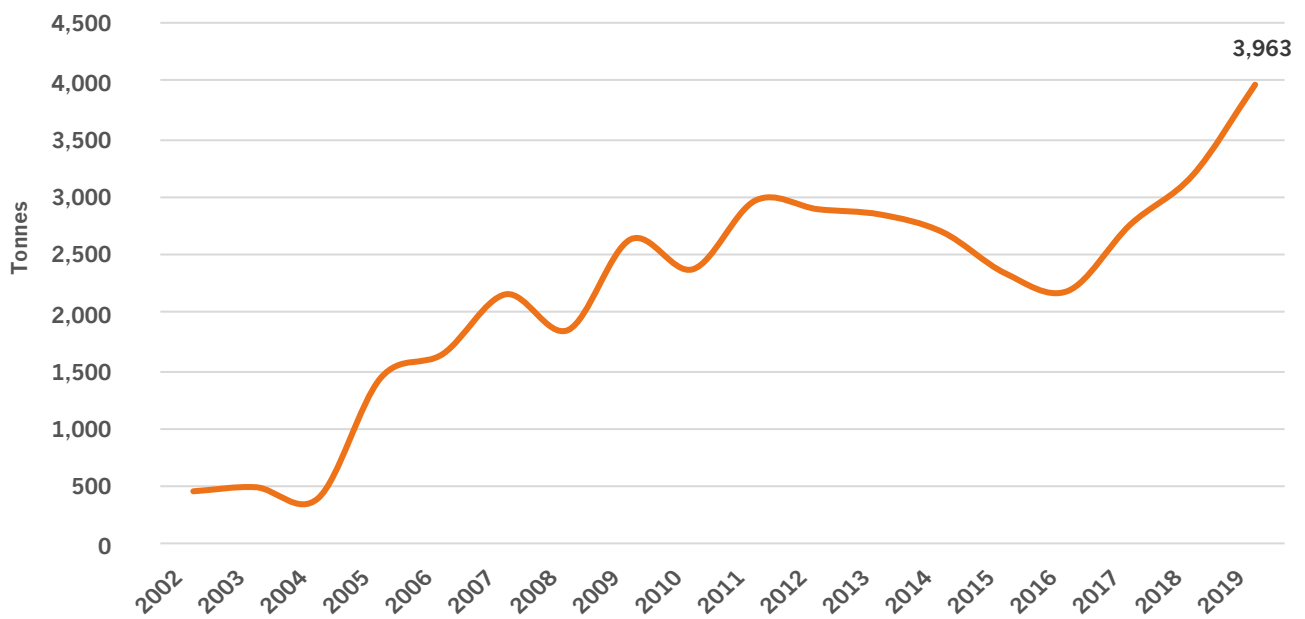


Figure 3: EU28 imports from sub-Saharan Africa of cassava and other roots and tubers flour, in volumes (2002-2019). (Source: COLEACP based on Eurostat.)



Figure 4: EU28 imports from West Africa Africa of cassava and other roots and tubers flour, in volumes (2002-2019). (Source: COLEACP based on Eurostat)

Local market in Nigeria

Nigerian Breweries, NB Plc, is one of the largest buyers of cassava by-products such as cassava flour and starch, followed by Nestle Nigeria Plc and Yale Foods, Ibadan. These multinational industries use cassava flour as fillers and binders, as well as to make sugar or maltose. Cassava flour is used as replacement for conventional flour, which is usually of wheat origin. For milling, wheat produced locally in Nigeria (approximately 55,000 tonnes) is usually supplemented by imported wheat. By using locally produced cassava flour, Nigeria saves up to US\$4 million dollars every year from import substitution in foreign exchange.

The demand for cassava flour in Nigeria is estimated to be 750,000 tonnes per year, with an estimated supply of about 50,000 tonnes. The huge gap between the demand for cassava flour in Nigeria² and the available supply can largely be attributed to the federal government's policy on cassava flour inclusion in wheat flour for cassava wheat composite flour manufacture, particularly for bread and confectionery

baking. In times of extreme scarcity, flour millers reportedly source cassava from neighbouring countries such as Ghana and Cameroon.

How local policies can impact domestic demand: The bakery sector in Nigeria

The bakery sector in Nigeria has experienced numerous regulatory changes over recent decades. Some of the local agricultural policies have been highly beneficial to the bakery sector and the national economy as a whole. For example, wheat flour has conventionally been used in the bakery sector. The continuous expansion of the sector has led to increasing demand for wheat flour, which is milled from imported wheat; this had an impact on the pricing of bakery products.

In response, the Government of Nigeria placed a restriction on wheat importation and developed a policy requiring up to 30% cassava flour inclusion in all bakery foods. Nigeria has a rich supply of cassava flour raw material, as cassava production has increased and import restrictions on cassava flour have been implemented. The increased availability of cassava at a reduced price is increasing consumption in Nigeria, as well as export to other nations, resulting in total market growth. Cassava flour has other potentially valuable

² Data Bridge Market Research, 2019

uses. For example, HQCF is an excellent complete replacement for starch (SBA) in starch-based paperboard adhesives and is preferred over low-grade cassava flour. In Nigeria, HQCF costs US\$530/tonne, whereas imported maize starch (usually used in SBA) costs US\$933/tonne, resulting in a significant profit margin. The bulk of Nigerian paperboard factories use imported ready-mixed glue powders at US\$973 per tonne. While a single batch of ready-to-use glue can cost US\$292, an HQCF-based SBA costs US\$128 per batch, a 44% saving (although the actual saving may be slightly lower as formulations need to be tailored to the requirements of individual factories).

However, the largest potential market for HQCF is in bakery items as a partial replacement for wheat flour. The Government of Nigeria's Cassava Transformation Agenda Project aims to induce millers and bakers to use 20% HQCF in bread and other bakery products in this market. In general, Nigeria does not have a favourable climate for wheat cultivation and only produces 8,000 tonnes of the crop per year. As a result, Nigeria imports 4 million tonnes of wheat per year (about 3% of the global wheat supply) to be milled in the country. The substitution of wheat flour therefore represents a substantial potential market.

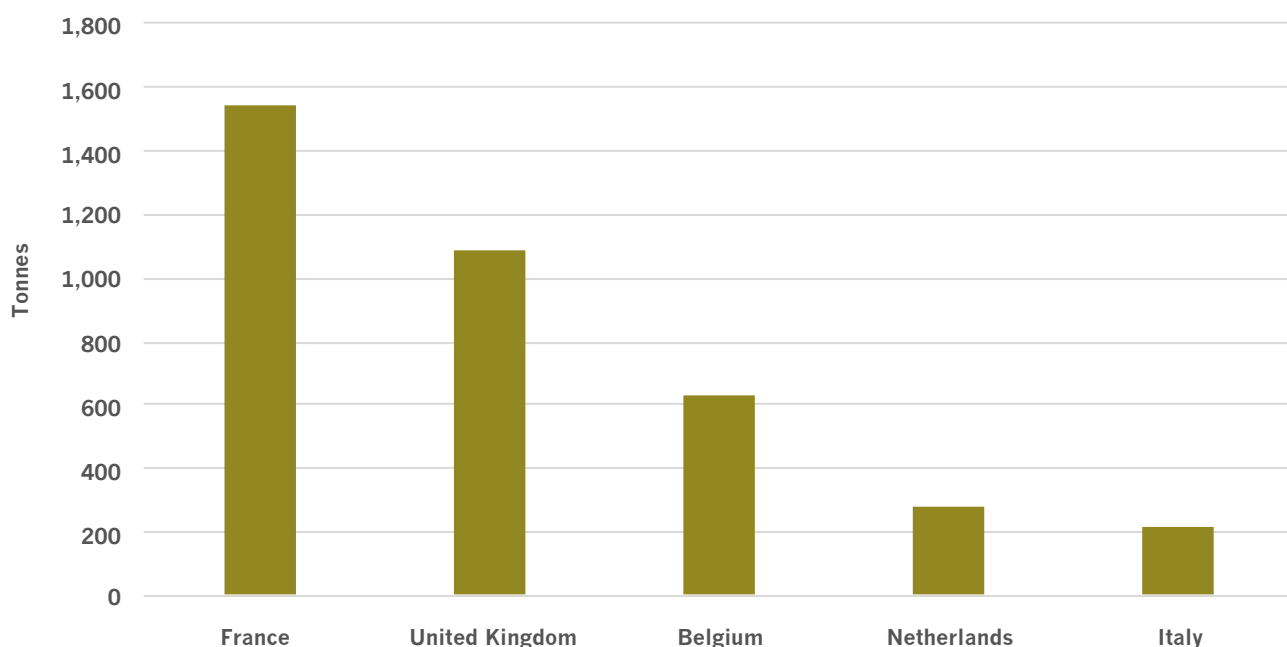


Figure 5: EU28 destination markets for cassava and other roots and tubers flour from West African countries, in volumes (2019). Source: (COLEACP based on Eurostat)

IV. MARKETS

a. Organisation of the sector

The organisation of the value chain for cassava flour sold in Nigeria, which is representative for the other countries in the region, is shown in Figure 6.

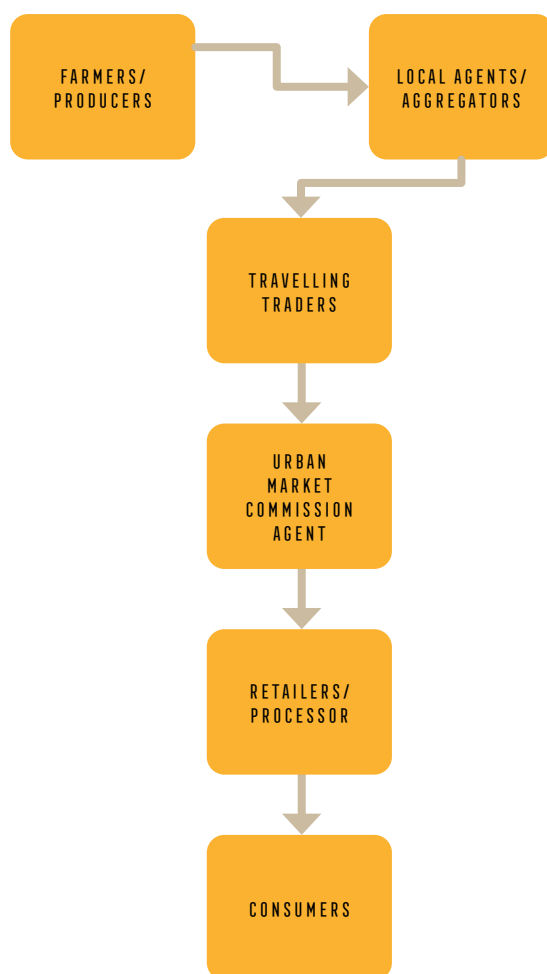


Figure 6: Value chain for cassava flour in Nigeria

The organisation of the value chain for cassava flour export in Nigeria, which is representative for the other countries in the region, is shown in Figure 7.

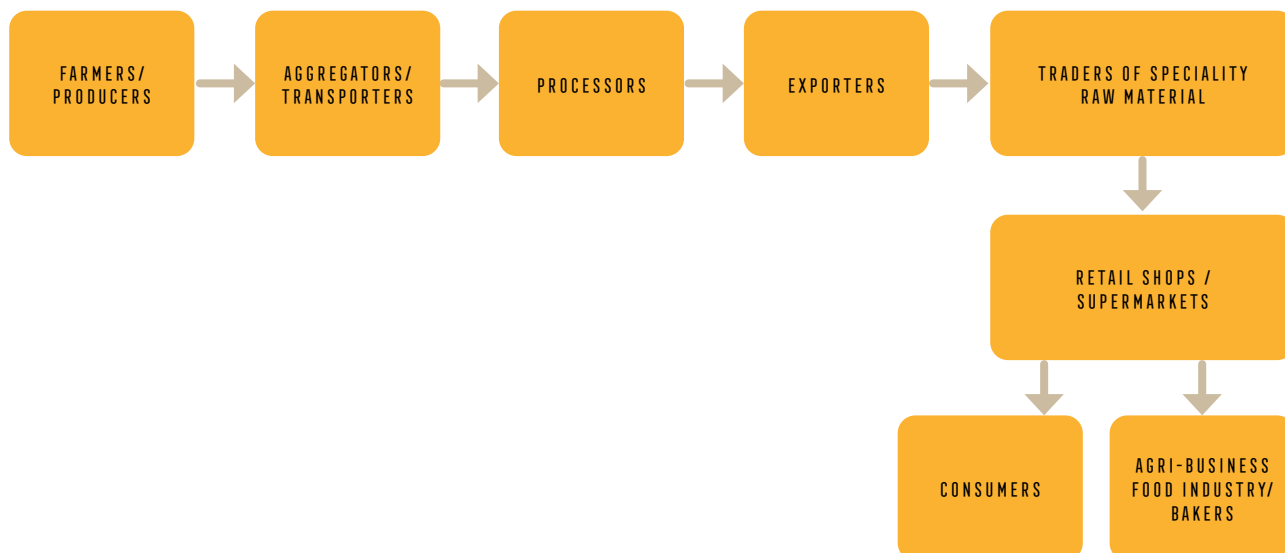


Figure 7: Value chain for cassava flour export from Nigeria

b. Market access (price, product, promotion)

Cassava flour offers a diverse market beyond the agri-food industry, including in pet food manufacture, textile applications, and more. The price of root and tuber flour on the international market varies according to several factors:

- The type of root and tuber (e.g. cassava, yam, sweet potato, etc.)
- The variety of root and tuber (e.g. for cassava: white-flesh cassava, such as the TMS 30572 and TME 419 varieties, commands a different market price to yellow-flesh cassava, such as TMS 01/1368 and TMS 01/1371 varieties)
- The country or region of origin: some origin countries have a better reputation on the international market.

Packaging

Packaging is critical in the food system because it helps to decrease waste, provide value, extend shelf life, maintain product quality and wholesomeness, raise market standards, and ensure food safety. Root and tuber flours are processed and packaged to be stored at room temperature. Cassava flour is hygroscopic in nature, meaning it may absorb moisture and gases when exposed to the environment, which promotes the growth of bacteria. Cassava flour is packaged differently depending on the end consumer: it is sold in 1 kg bags to supermarkets and malls when it is purchased directly for the intended consumers, or it is packaged in large sacks of 25 kg for industrial use. A variety of materials, such as paper, plastic and sack bags, as well as a mix of these materials, can be used as packaging. Aluminium can be coated or laminated on paper and may be preferable to other materials as it can be recycled at a minimal cost. Plastic films, such as low-density polyethylene, high-density polyethylene, laminated aluminium foil, polyethylene, polypropylene and plastic containers have all been used to package cassava flour.



For root and tuber flour, resealable and non-resealable plastic bags are the most frequent packaging alternatives in both specialty and mainstream retail. However, in the European Union market – particularly the UK but also Estonia, France, Greece and Sweden – the relationship with plastic is in transition. As consumer awareness of the environmental impact of single-use plastics grows, the UK Government is considering imposing a plastic packaging tax.

The packaging recommendations for products such as cassava flour are almost entirely target-market dependent. Most food product distributors and retail outlets in the UK are focussed on products supplied in compostable packaging, in line with current trends in plastic reduction. Depending on the commodity (fresh cassava, yam or sweet potato), wholesale packaging is frequently cardboard boxes weighing 4–20 kg. Customers have different packaging requirements and buyers favour smaller packaging for more specialised products.

Certain materials may work better as alternative packaging material; for example, glass jars or cardboard boxes are viewed as more favourable for packaging of flour compared with plastic packages. Cassava flour is more convenient because the packaging process does not usually involve additional heating, which may negatively impact the nutritional and organoleptic properties of the product, and it does not require maintenance in a cold chain.

The United Kingdom is a reference market in Europe and is generally considered to be a 'trendsetter' for the region in terms of market changes. The following is a list of examples of various cassava and other root and tuber flours and their packaging that are available in the UK.



LIFEWAYS CASSAVA FLOUR

Produced by Lifeways UK and distributed across supermarkets and African shops in the UK. This is a 100% handmade, additive-free cassava flour from Nigeria.

3 kg bag for £9.90 (US\$12.97).

Ready-to-use flour is transported and stored at room temperature. The flour can be prepared directly as a meal or used for baking. Can be stored for 12 months from the date of manufacture when stored in a cool and dry place.



OLU OLU POUND'OL IYAN

Produced by Jumbo UK and distributed to supermarkets and African shops across UK. Can also be purchased online.

4 kg bag for £11.00 (US\$14.41).

Ready-to-use flour is transported and stored at room temperature. The flour can be prepared directly as a meal or used for baking. Can be stored for 12 months from the date of manufacture when stored in a cool and dry place.



LAGOS POUNDO IYAN

Produced in Nigeria and sold in the UK by supermarkets and African shops.

4 kg tin for £9.90 (US\$12.97).

Ready-to-use flour is transported and stored at room temperature. The flour can be prepared directly as a meal or used for baking. Can be stored for 24 months from the date of manufacture when stored in a cool and dry place.



ENIOLA'S CASSAVA FLOUR

Produced by Eniola Foods in Nigeria and sold in the UK by supermarkets and African shops.

9 kg bag for £19.19 (US\$25.23).

Ready-to-use flour is transported and stored at room temperature. The flour can be prepared directly as a meal or used for baking. Can be stored for 12 months from the date of manufacture when stored in a cool and dry place.



NIGERIA TASTE CASSAVA FLOUR

Produced in Nigeria and sold in the UK by supermarkets and African shops.

3 kg bag for £12.99 (US\$15.25).

Ready-to-use flour is transported and stored at room temperature. The flour can be prepared directly as a meal or used for baking of confectioneries. Can be stored for 12 months from the date of manufacture when stored in a cool and dry place.



TROPICAL SUN CASSAVA FLOUR

Produced by Tropical sun and sold in supermarkets and African shops across the UK.

1 kg bag for £3.49 (US\$4.59).

Ready-to-use flour is transported and stored at room temperature. The flour can be prepared directly as a meal or used for baking of confectioneries. Can be stored for 12 months from the date of manufacture when stored in a cool and dry place.



OLA-OLA CASSAVA FLOUR

Produced is produced by Yusol International Foods and distributed across UK to supermarkets and Africa shops.

4 kg bag for £16.79 (US\$22.08).

Ready-to-use flour is transported and stored at room temperature. The flour can be prepared directly as a meal or used for baking of confectioneries. Can be stored for 12 months from the date of manufacture when stored in a cool and dry place.



OTTO'S NATURALS CASSAVA FLOUR

Produced by Otto's Naturals (USA) and sold in supermarkets and African shops across UK and Europe.

4 kg bag for £13.89 (US\$18.39).

Ready-to-use flour is transported and stored at room temperature. The flour can be prepared directly as a meal or used for baking of confectioneries. Can be stored for 12 months from the date of manufacture when stored in a cool and dry place.

c. Specific requirements of the EU market

If root and tuber flour are intended for the production of bakery products in the European market, they must comply with the provisions of Council and European Parliament Regulation No 396/2005 of 23 February 2005 relating to maximum residue levels of pesticides in or on food and feed of plant and animal origin intended for human consumption. In addition to compliance with the regulations, it may be necessary to obtain certificates, such as a food safety certificate (the most common of which are IFS, FSSC22000 and BRC).

Product quality and sustainability standards are increasingly important in the EU market. Many agri-food products and world food distributors are looking for ways to expand their ranges, as are established retail stores and supermarkets. Product traceability is key. Quality labelling must include the product

name (e.g. cassava flour), batch code, name and address of exporter/country of origin, best-before date, net weight and recommended storage conditions. Corporate responsibility and sustainable sourcing certifications such as Fairtrade, Rainforest Alliance and others are also included. For food safety certification, in addition to HAACP certificates such as IFS or BRC might be required by some export markets.

GLOBALG.A.P., a pre-farm-gate standard that covers the entire agricultural production process from before the plant is planted in the ground to the unprocessed product, is also available (processing is not covered). This certification, however, is contingent on the target country, market conditions and distribution route. It has been widely adopted as a standard requirement for cassava and yam products, particularly in Northern Europe, where it is a requirement for almost all retailers.

The Global Food Safety Initiative (GFSI) recognises a number of certification programmes that meet the GFSI Benchmarking Requirements (GFSI does not itself provide food safety certification). GFSI-recognised accreditation is recognised by retailers and other purchasers all over the world as a signal of the highest standards in food safety, providing food enterprises who hold these certificates access to all corners of the global market. Therefore, it is worthwhile, if not essential, for manufacturers who process cassava flour to obtain GFSI certification if the flour (even potentially) is intended for bakery production.

Finally, European consumers are increasingly favouring organically produced products. Obtaining organic certification will require compliance with the provisions of Regulation (EU) 2018/848, which enters into force on January 1st 2022 and repeals Regulation (EC) 834/2007 on organic production and the labelling of organic products. Imports of organic products from non-EU states must comply with additional requirements, in order to obtain an e-COI certificate of inspection for electronic organic products. The import regime for organic products from third countries under Regulation (EC) 834/2007 has, since 2020, been amended by the implementing Regulations (EU) 2020/25 and (EU) 2020/479.

d. Opportunities

i. Development of local companies

The processing of cassava into flour can help to avoid the spoilage attributed to the short shelf life of the cassava tuber and to reduce its weight, as well as remove the toxic hydrogen cyanide, while also enhancing its overall value. These problems particularly affect small-scale producers of roots and tubers, such as cassava and sweet potato, which require prompt distribution: smallholder farmers are often isolated, making their producers dependent on collectors. If collectors are slow to collect the produce, it often spoils and is no longer suitable for fresh consumption.

For example, Nigeria's cassava production is estimated to be close to 60 million tonnes produced from around 6.5 million hectares, with a yield of 9.1 tonnes/ha.³

Nigeria has an annual demand for cassava flour estimated at 750,000 tonnes, compared with a current supply of an estimated 50,000 tonnes. This means that Nigeria is limited in the volume of the crop it can export, according to the Nigeria Bureau of Statistics report. Also, according to the Observatory of Economic Complexity, "in 2019, Nigeria exported US\$735,000 in cassava, making it the 61st largest exporter of cassava in the world."

There is therefore a huge market potential to be exploited for cassava in Nigeria. Currently, some cassava is produced in remote regions of the country and often spoils due to poor market aggregation.

The out-grower programmes introduced by Psaltry International, Nigeria, for farmers within an 80 km radius of its factory, is a good example of how cassava flour production has been promoted and marketed across the southwest region. The out-grower programmes cover over 8,000 hectares of farmland and have employed more than 300 staff, with an asset worth of US\$20 million. Psaltry International has Fairtrade-certified production and trade relations with multinational companies, as well as with companies in Europe. Psaltry International's processing plant also allowed a significant change in activity in 2019, with the start of processing lines for other cassava products, such as cassava sorbitol for pharmaceutical and confectionery use. This, among other factors, has allowed Psaltry International to diversify and evolve from a rural cassava processor in 2005 to one of the biggest indigenous cassava processing facilities in Nigeria. It has also created both direct and indirect jobs, improving the rural livelihoods of the population of Ado-Awaye. Since its inception, Psaltry has employed more than 300 people. While there were just four trucks in the Ado-Awaye hamlet (a town of 15,000 people) prior to Psaltry's arrival, there are now 250 vehicles and more than 50 tractors. Many people now have the financial

³ Food and Agriculture Organization



means to transform their mud dwellings to concrete houses, which are stronger, safer and longer-lasting.

Similarly, the cassava processors in Ghana have been able to explore the increasingly high demand for cassava flour. One such organisation is Neat Foods, which began producing yam flour in 2009. The company now processes a variety of flours, including cassava flour and plantain flour, in addition to yam. Neat Foods is part of a larger holding company that also operates a radio station (Peace FM), which has aided in the promotion of the Neat Fufu brand in Accra. Neat Fufu is prepared from a combination of 80% white yam and 20% cassava starch. Neat Food cassava flour is not only popular across Ghana, but can also be found in supermarkets and small shops across the United Kingdom and Europe.

Caltech Ventures Limited, also in Ghana, was established in 2006. In the last few years, the company has become a significant buyer and seller of cassava by-products. Caltech Ventures farms about 3,000 ha of land around the Volta Region, where it is able to take advantage of the favourable agro-

climatic conditions for cassava cultivation. The company operates an area of up to 800 ha nucleus farm, while out-growers/smallholders farm about 330 ha and block farmers 50 ha of block farmers,⁴ totalling about 1,180 ha of land for cassava production. Caltech Ventures Limited aims to target a further six districts in the Volta Region, covering 1,500 famers in 100 communities. The rural livelihood of farmers in the Volta Region has greatly improved as a result of the activities of Caltech Ventures.

The Ghana Root Crops and Tubers Exporters Union (GROCTEU), a non-profit organisation that promotes the export of root crops and tubers, was established in 2001 as the apex body for four major yam exporters/farmers organisations: Ghana Yam Producers & Exporters Association, Ghana Assorted Foodstuffs Exporters Association, Konkomba Yam Farmers & Exporters of Ghana and Sea Freight Yam Exporters of Ghana. GROCTEU offers support to small and medium farmer groups and farmer-based organisations

⁴ The block farming model is used to manage supply chains in an inclusive and sustainable way, with the goal of achieving smallholder inclusiveness in supply chains. The block farm is a piece of land under the control of the processor and assigned to a smallholder for cultivation.

(FBO) to enable them to access international markets. It also helps farmers to produce excellent roots and tubers that fulfil customer standards. GROCTEU has developed direct ties with FBOs in 24 key root and tuber-growing districts. In recent years, FBO member farmers have increased their output by using modern planting methods to produce standard roots and tubers for local retail outlets (supermarkets) and export. With the goal of modernising production and handling, GROCTEU collaborates with public and private sector agencies to improve production and marketing within the agricultural export value chain, particularly for cassava and yam due to their emerging markets. GROCTEU aims to provide opportunities for its member companies to gain certification and traceability in order to comply with international best practices, which is critical to the long-term growth and sustainability of their enterprises. In 2019, GROCTEU carried out routine training and support activities with the help of the Ghana Export Promotion Authority, and registered more farmers, particularly those interested in conventional or organic farming. These farmers have been provided with clean planting materials on a plot-by-plot basis in order to extend the shelf-life of Ghana root produce.

In Cameroon, the town of Ngoulémakong's Cassava Processing and Commercialization unit, Ultracom, has a processing capacity of 7–8 tonnes per day and was recently commissioned by the Minister for SMEs, Laurent Serge Etoundi Ngoa. The Government of Cameroon disbursed CFA 36 million for the implementation of this industrial unit specialised in the production of tapioca and cassava flour, to target the high demand for cassava produce in Cameroon and in neighbouring countries such as Nigeria.

Ngoulémakong is one of Cameroon's key producing basins (7,600 tonnes produced annually) and is not far from Sangmélima, which houses the SOTRAMAS, another important industrial unit. This factory processes up to 120 tonnes of cassava per day.

ii. The potential of European demand for root and tuber flour

Europe is an important and growing market for cassava flour. The Netherlands, Italy, Ireland, United Kingdom, France, Greece and Germany are the main importers. To a lesser extent, Belgium, Sweden and Spain are also significant markets.

In the worldwide cassava flour market, the interest in cassava flour is expanding, likely because it is gluten-free. Increasing interest in manipulated foods is prompting larger ventures and the creation of new food companies that focus on creating gluten-free items. These organisations are utilising cassava flour as a substitute for gluten-based flour in their products, including in products such as thickening sauce, graving or even pie filling.

The volumes of root and tuber flour imported by the EU28 have been growing continuously since 2004 (+ 4,427 tonnes in 15 years). The United Kingdom and France remain the main European outlets for root and tuber flour, even if imports have been consistent over the last decade.

Focusing on imports of root or tuber flours (HS 110620), the opportunities are slightly different, although the main outlets remain the same: the United Kingdom, Ireland and Italy. It is interesting to note that imports have been increasing overall over the last 5 years in the main markets. However, there has been a decrease in volumes imported by the Netherlands.

V. CONCLUSION

The market and the demand for cassava flour are continually increasing. While the demand for root and tuber flour is not yet well developed among end consumers, the demand from agribusiness and food industry professionals is growing rapidly. A structural dynamic is enticing, and every investment that allows for the expansion of cassava flour production is welcomed.

Moreover, as in many West African countries, the local offer is undervalued at the level of fresh cassava marketing. However, there are numerous barriers to entry into this industry, including mastery of market standards, equipment and infrastructure investment, and global competition. With the growth of urban consumption by the middle classes and distribution by supermarkets looking for volume and local items, opportunities abound, particularly in the local and regional market.

These opportunities, however, necessitate a high level of technical and sanitary expertise, as well as a strong distribution relationship in consumer countries, particularly in the EU. It appears risky to try agri-food processing for the first time on this type of product. Cassava flour production necessitates the use of facilities that can process a considerable volume of roots. To produce to 4 tonnes of cassava flour and thereby compete in the international market, a minimum of 10 tonnes of fresh cassava root is required. To validate a viable economic model, a study of the market and supply chains for additional items other than cassava is needed.

To take advantage of this potential, West African roots and tuber flour producers should take into account the following considerations:

While the Asia Pacific market has the greatest potential for expansion, this should not benefit to Nigerian flour. Asia Pacific (especially Thailand) grows most of the root and tuber it processes into flour itself, amounting to approximately 31.08 million tonnes. The root and tuber are the same as those produced in Nigeria.

European demand for cassava flour is increasing and presents interesting export opportunities for Nigerian producers. However, access to the EU market is subject to compliance with various EU regulations.

The growth of organic farm produce is a key current trend in the agricultural food market. To export organic flour to the EU, Nigerian producers and exporters must comply with the EU rules specific to organic food and its exportation.

While the processing of root and tuber flour allows production losses to be limited, it requires a high level of logistics and appropriate infrastructure. These investments are substantial, while the size of the market for cassava flour in Nigeria remains limited.

Although the production of root and tuber flour meets the growing needs of the international market and consumer tastes, flour from the West African region cannot compete in terms of quantity, logistics and competitiveness with certain large producer countries, such as Thailand. Therefore, in order to differentiate itself on the international market and to gain market share, producers in the West African region must promote the quality of their product by increasing the volumes that are certified as organic and by promoting a strong geographical origin. The EU market is vast and diversified in terms of potential customers. African agricultural producers have the opportunity to target potential buyers throughout Europe (industries and not intermediate traders) while also highlighting their specialities with an adapted marketing policy that could be based on the image of cassava that is already well known and recognized in Europe.

Other opportunities to be explored include the regional market, due to the logistical advantage; and the Middle East market, which is expanding even though it is highly competitive.

The manufacturing of alternative sweet potato flour is a final option worth considering. The procedure is similar to that used to make cassava flour, but allows potential for a composite flour mix and with the production of smaller batches. The sweet potato industry is growing, and Ghana, a major sweet potato exporter, is currently posing serious competition in the flour market.



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