



Harnessing the Economic Potential of Cassava production in Nigeria



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Executive summary



Nigeria is the largest cassava producer globally, accounting for about one-fifth (21%) of total production worldwide. The demand for cassava and its constituents is high in the domestic economy. However, the supply has been unable to meet the huge demand.

The demand for cassava and its constituents is high in the domestic economy. However, the supply has been unable to meet the huge demand. For instance, the supply-demand gap for High-Quality Cassava Flour (HQCF) stands at about 485,000 metric tonnes (MT) per annum while the gap for cassava starch is about 290,000 MT.

PwC estimates that Nigeria would need about 28.3 million metric tonnes of fresh cassava root planted annually on about 1.2 million hectares of land to meet the country's demand for some of the cassava by-products and derivatives listed here: ethanol, cassava-based constituents in sugar syrup, HQCF, garri (a fine to coarse granular flour of varying texture made from cassava roots), cassava-based adhesives such as cassava starch, caustic soda, formaldehyde, hydrochloric acid and sodium silicate) (see section 5 for more information).

Overall, from the total output of 59.5 million metric tonnes (MMT) of cassava produced in the country based on 2018 estimates, Nigeria has the economic potential to generate revenues of US\$427.3 million from domestic value-addition and derive income of US\$2.98 billion in agricultural exports of cassava. Furthermore, the local value-addition to cassava via local manufacturing and processing could potentially unlock about US\$16 million in taxes to the government.

Part of the reason for the inability to satisfy domestic demand and boost production for the export markets is linked to the traditional method of cassava farming which has led to low yields and post-harvest losses over the years. Furthermore, the perishability of the crop and poor logistics along the cassava value chain can also lead to huge losses.

The importance of value-addition to cassava via local manufacturing and processing to support local industrial activities cannot be overemphasized. There is significant local industrial demand for the derivatives and by-products that the commodity can provide, in addition to local consumption for primary output of cassava. This is because there is a three-yearly glut cycle that occurs in cassava farming in Nigeria. The cycle implies that harvesting of cassava is characterised by a cycle of glut that occurs every 3 to 4 years and results in excess output of cassava for local consumption. This excess output leads to depressed prices in the local markets due to over-supply following a period of scarcity and high prices.¹

This glut can be eliminated if the value-chain for cassava is diversified to include industrial processing, as the crop is primarily being used almost entirely for traditional foods (e.g. garri), of which local consumption is not often enough to absorb the glut cycle that occurs periodically. It is therefore important that government improve access to finance, enhance the cassava value-chain from end-to-end, incentivize and stimulate domestic production and manufacturing of cassava derivatives, increase agricultural extension services for cassava farmers and ensure more funding for agricultural research and development.

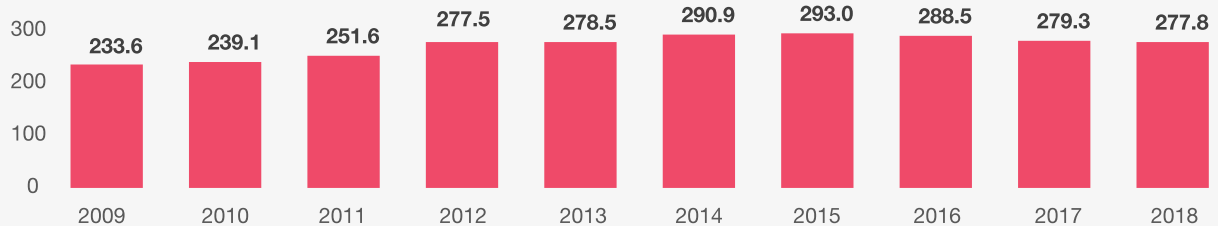
1. https://www.agriknowledge.org/file_downloads/xg94hp56z

Assessment of the global cassava production

In 2018, global cassava production was estimated at 277 million tonnes and is expected to reach 291 million tonnes by the end of 2020, with Africa contributing about 62% of global production. Nigeria is the world's leading producer of cassava and contributed about 21% of total global output in 2018.

Since 2016, global production levels have been contracting. Despite this, total world production of 277.6 million tonnes in 2018 was firmly above its 10-year average (2009 – 2018) of 270.9 million tonnes.

Figure 1: Global Cassava Production (Million tonnes)



Source: FAOSTAT, PwC Analysis

Nigeria leads in global cassava output

With 59.5 million tonnes of cassava produced in 2018, Nigeria maintained its top spot in global cassava production, since the country outpaced Brazil by total output produced in 1991.

Figure 2: Top 5 Cassava Producers (in million tonnes), 2018

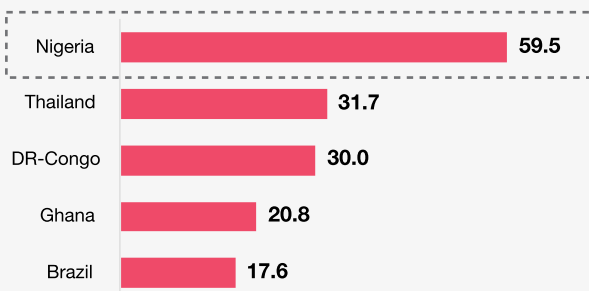


Figure 3: Nigeria's cassava production (million tonnes), 2018

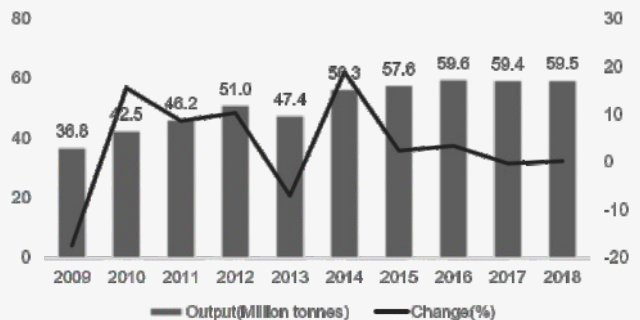
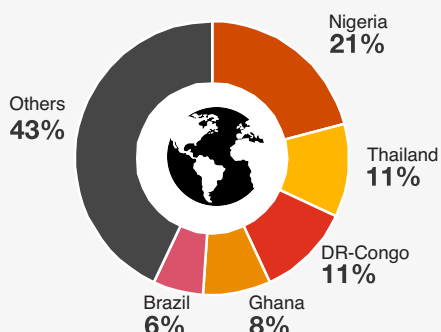
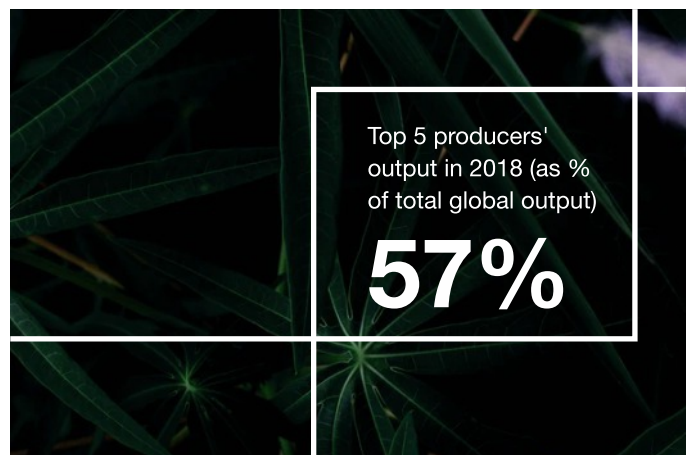


Figure 4: Top five cassava producers (as % of global production), 2018



Source: FAOSTAT, PwC Analysis



Thailand dominates the cassava export market

Although Nigeria has the largest output of Cassava, global trade flows are mostly situated in South and East Asia, with Thailand being the largest exporter in the world. In 2018, total volume of cassava exports was estimated at 13.9 million tonnes, and Thailand contributed about 46% of the total volume. However, total cassava export was estimated to have declined by 7.9 million tonnes or 36% in 2018 compared to the preceding year. This was mainly due to China's reduction of its stockpiles. Japan, Indonesia and Malaysia also reduced their volume of cassava imports. The reduction in imports from these countries was mainly due to increased benchmark quotation for the commodity.

As a result of strategic positioning, Thailand's bilateral deals with China and the European Union (EU) boosted the country's cassava exports into these markets.

Remarkably, the Thai government developed variants of cassava derivatives such as cassava to sugar, cassava chips and pellets, raw cassava tubers and ethanol in a bid to boost export performance. Furthermore, the Thai government also established a Food Innopolis in 2016. Food Innopolis is a food innovation hub focused on the research and development of its booming food industry.

Figure 5: Total Volume of Cassava exports (million tonnes), 2018

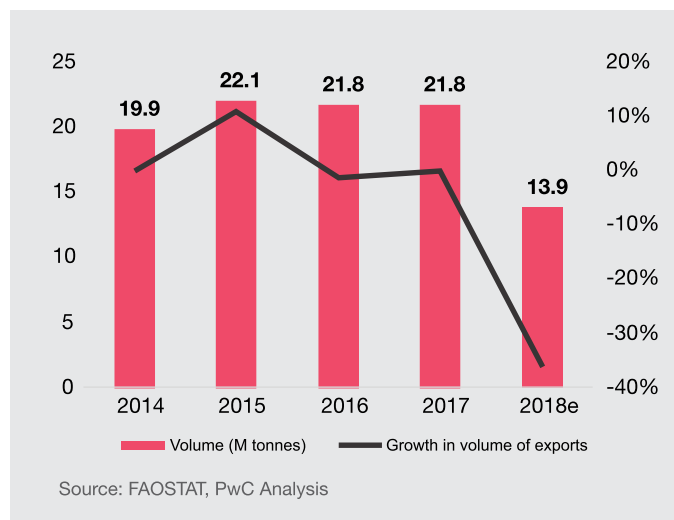
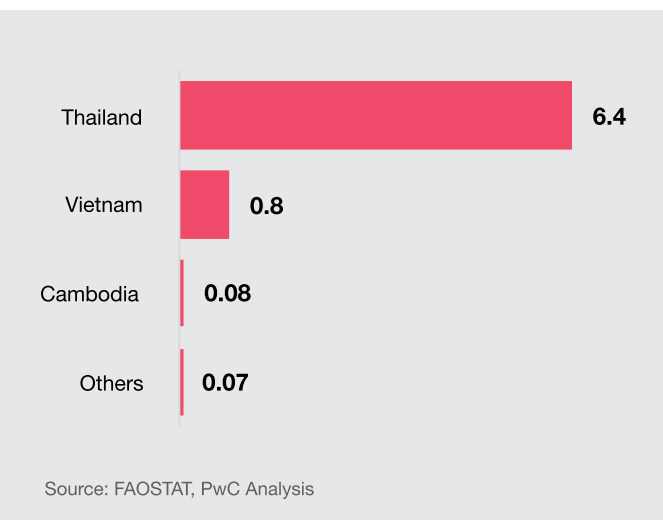


Figure 6: Top cassava exporting Countries (millions tonnes), 2018



The impact of COVID-19 pandemic on the global cassava value chain

The outbreak of the COVID-19 pandemic has had an impact on the global cassava value-chain given that ethanol from cassava is a key source of input for the manufacturing of alcohol-based hand sanitisers. The World Health Organization (WHO) recommends at least 60% alcohol in hand sanitisers. The WHO noted that healthcare professionals will need about 2.9 billion litres of sanitiser per month during the COVID-19 period.² Ethanol from cassava (and sugarcane) provide cheaper means for countries to locally produce hand sanitisers amidst the global shortages and increasing demand.

In Zambia, cassava production has risen by about 6% annually since 2015 with the government projecting a production of over 1 million tonnes by the end of 2020. Cassava has become a much sought-after crop in the country. Currently, more than 25,000 (2015: 5,000) farmers in the country are planting drought-tolerant varieties of cassava. It is estimated that about 250 tonnes of cassava flour a day are being turned into ethanol for hand sanitisers and other products sold locally or exported to neighbouring countries in Southern Africa.³ This has caused the price of cassava to increase by over 90% from US\$108 per ton in 2019 to US\$208 per ton in 2020.⁴

2. <https://www.bbc.com/news/stories-52126847>

3. <https://www.reuters.com/article/us-zambia-farming-climate-change-coronav/climate-smart-cassava-gets-new-use-in-zambia-hand-sanitiser-idUSKBN22D57W>

4. <https://twitter.com/africafactszone/status/1266392595405602816?s=12>

Demand Vs. Supply of selected cassava products in Nigeria

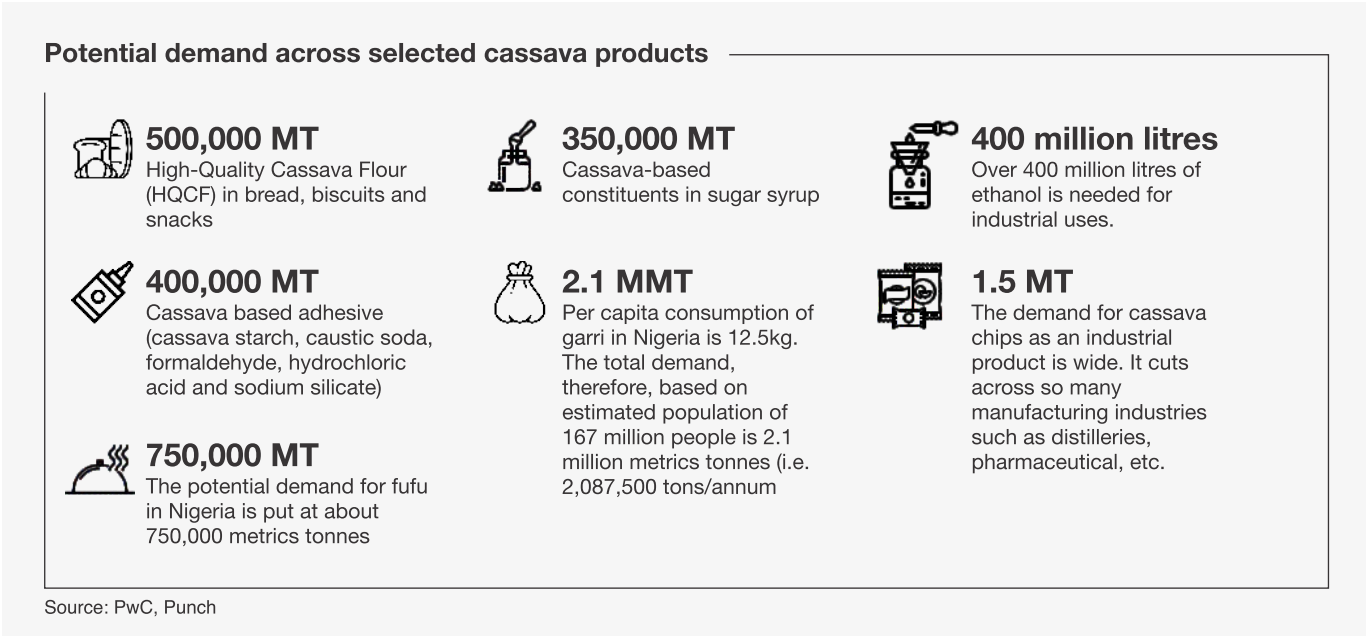
Over the years, the supply of cassava derivatives or by-products in Nigeria has fallen short of demand. For instance, the demand for High-Quality Cassava Flour (HQCF) for bread, biscuits and snacks is put at 500,000 metric tonnes (MT) per annum but supply of HQCF is less than 15,000 MT. In addition, while demand for cassava starch stands in excess of 300,000 MT, supply on the other hand remains below 10,000 MT, thus giving rise to a demand gap of over 290,000 MT.

The infographic below shows the potential demand for some selected cassava products in Nigeria. Despite the demand for these above selected products, the required supply is still very low. More startling is the near zero supply of ethanol (a constituent of cassava) in the country despite a huge potential demand of over 1 billion litres needed for industrial and domestic purposes. Specifically, Nigeria needs over 400 million litres of ethanol for industrial uses.

The country has always resulted to importation of ethanol to bridge this gap. In 2018/2019, Nigeria imported about 18 million gallons (i.e. 68 million litres) of ethanol valued at about US\$26 million from the United States.⁵

Recently the Nigerian National Petroleum Corporation (NNPC) disclosed its plan to cultivate about 32,000 hectares of cassava and 15,000 hectares of sugar cane in Kebbi state⁶ and another 20,000 hectares and 15,000 hectares of sugarcane and cassava plantations respectively in Kogi State.⁷ The output from these various plantations is intended to serve as a feedstock for the NNPC's proposed 84 million-litre-per-day ethanol plant in the Corporation's quest for renewable energy sources. As at June 2020, about 2,675 hectares of cassava plantations have been cultivated in Kebbi state.⁸

Figure 7: Potential demand for some selected cassava products



Given that a tonne of cassava produces 166 liters of ethanol, the country would need to produce 2.41 million metrics tonnes (MMT) of cassava to be able to meet this huge demand gap.

The table below shows the total number of fresh cassava roots (in metric tonnes) needed to meet the estimated demand in each of the selected cassava derivatives

enumerated in figure 7 above - alongside the acreage of yields required (in tonnes/hectares).

For instance, more than 12 MMT of cassava roots, from a total acreage of 501,000 MT per hectares, will be needed to meet the over 2.1 MMT of domestic demand for garri in Nigeria.

6. <https://ethanolproducer.com/articles/16729/usgc-trade-mission-addresses-ethanol-in-nigeria-ghana>
7. <https://www.printfriendly.com/p/g/4MsTJK>
8. <https://leadership.ng/2020/02/10/bello-excited-as-nnpcc-begins-work-on-biofuel-refinery-in-kogi/>
9. <https://nairametrics.com/2020/07/23/nnpcc-cultivates-2675-hectares-of-cassava-for-ethanol-production/#:~:text=The%20Nigerian%20National%20Petroleum%20Corporation,Mohammad%20Ka'oje.>

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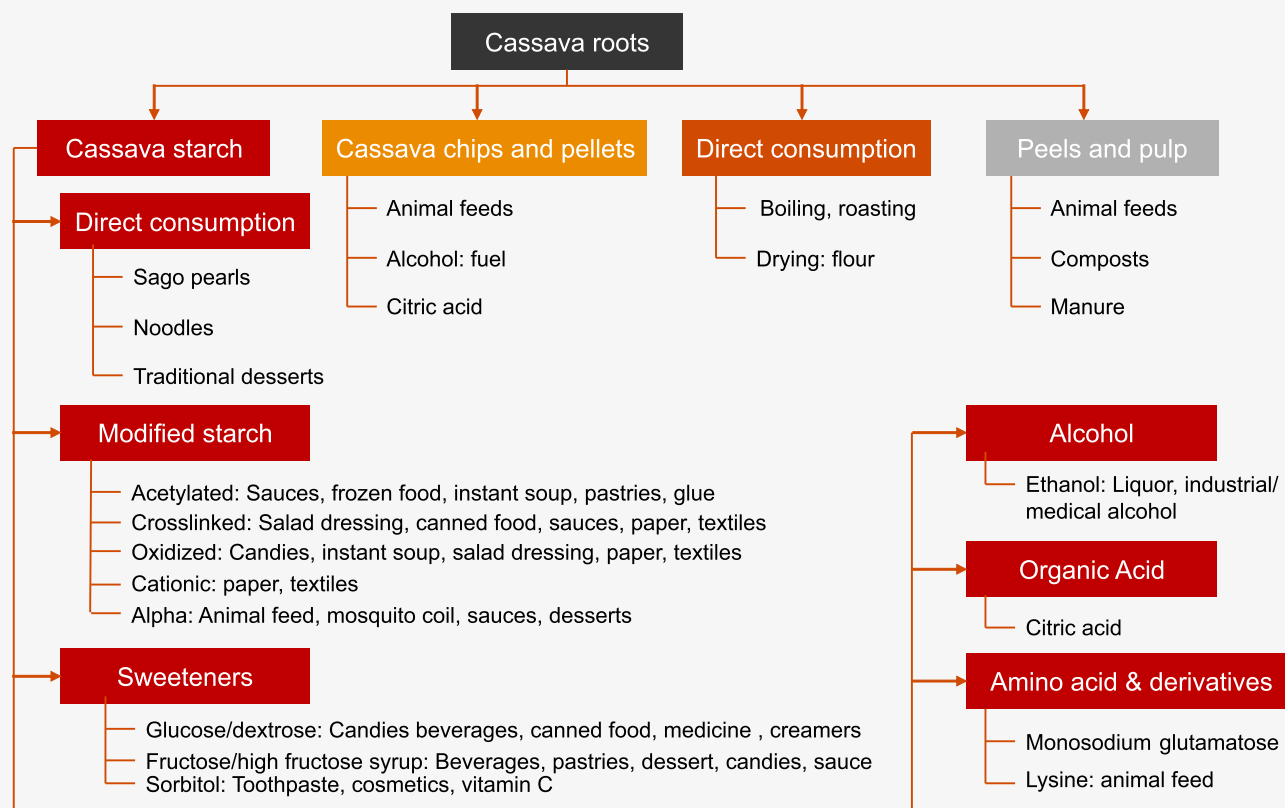
Figure 8: Fresh cassava roots and acreage required to meet demand for selected products

Cassava derivatives	Fresh root equivalent to meet estimated Demand (metric tonnes)	Acreage required (25 ton/ha)
Cassava based adhesive(Starch)	2,000,000	80,000
High-Quality Cassava Flour (HQCF)	20,000	80,800
Cassava-based constituents in sugar syrup	1,750,000	70,000
Dried chips for export and animal feed	5,600,000	224,000
Fuel-grade Bioethanol	3,571,428	142,857
Ethanol (for industrial uses)	2,857,142	114,286
High quality gari for export and supermarkets	12,525,000	501,000
TOTAL	28,323,570	1,212,943

Source: PwC estimates

Cassava and cassava derivatives

Cassava has enormous potentials as outlined below:

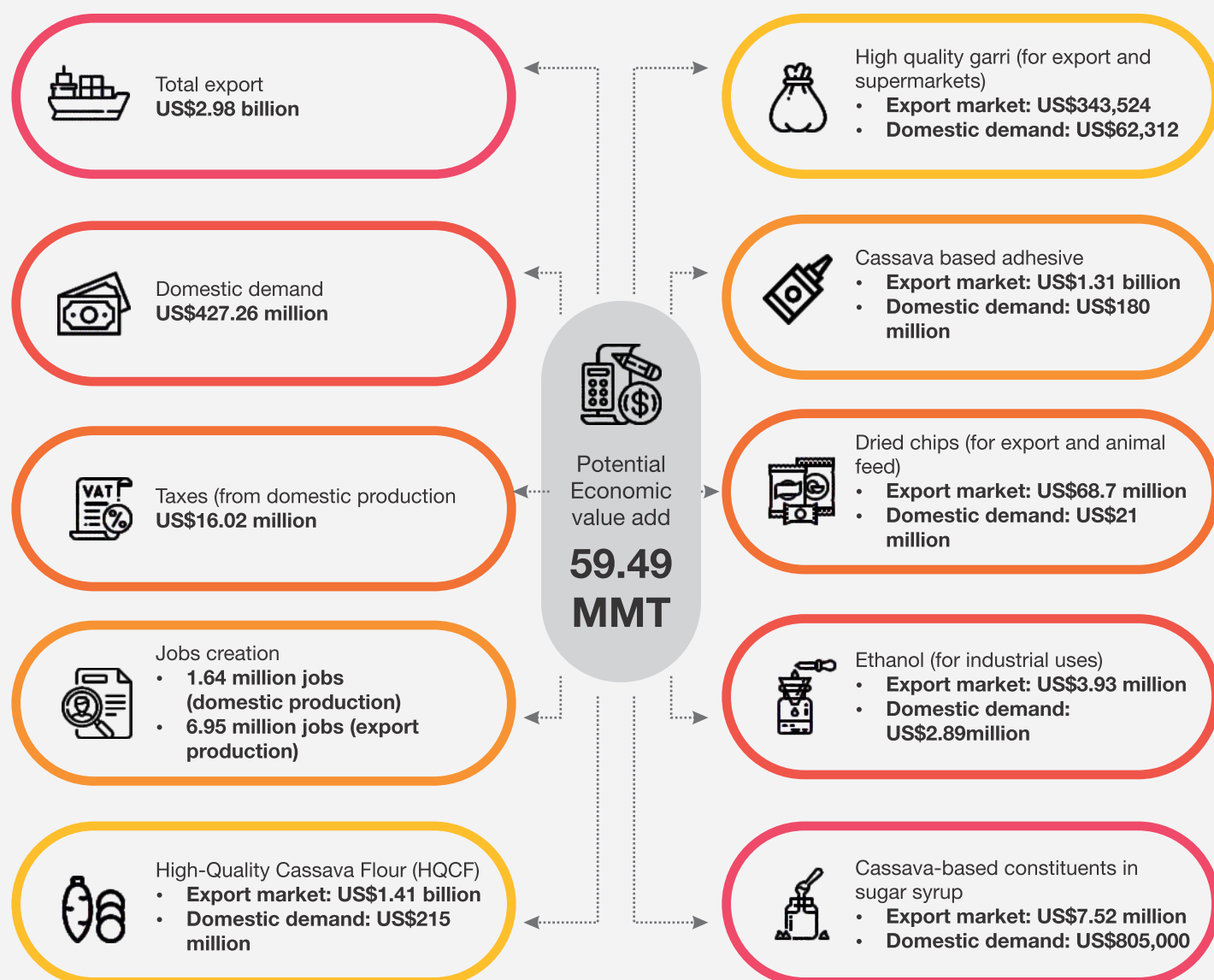


Source: ResearchGate, PwC

Economic potential of cassava in Nigeria (estimate)

Nigeria can generate significant economic value add from the country's estimated cassava output of 59.5 million tonnes (2018 estimate), through concerted and coordinated strategy and execution aimed at optimizing the domestic value-chain for the crop. An enhanced cassava value chain could generate total exports of US\$2.98 billion. PwC estimates the revenues from meeting the entire domestic demand for cassava could reach as much as US\$427.3 million. Furthermore, satisfying this demand via local manufacturing and processing could potentially unlock about US\$16 million in taxes to the government.

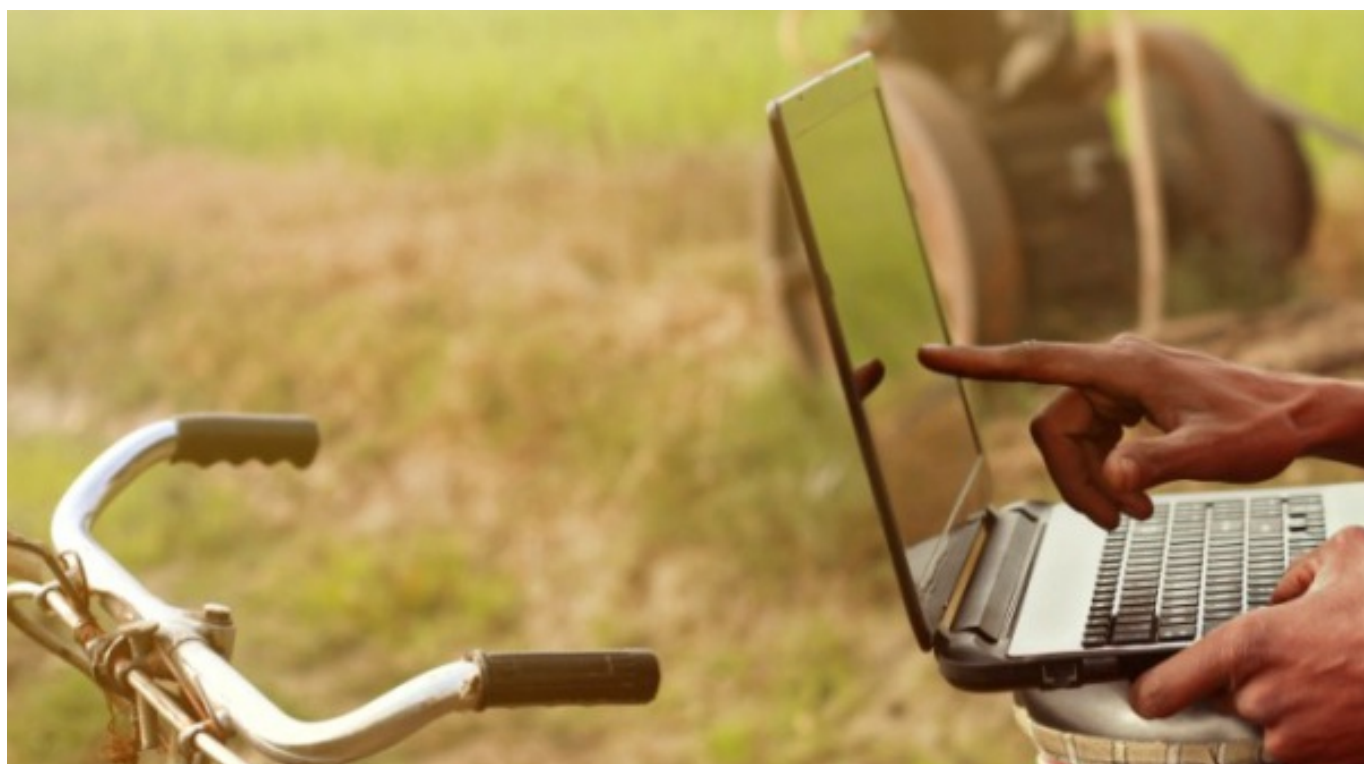
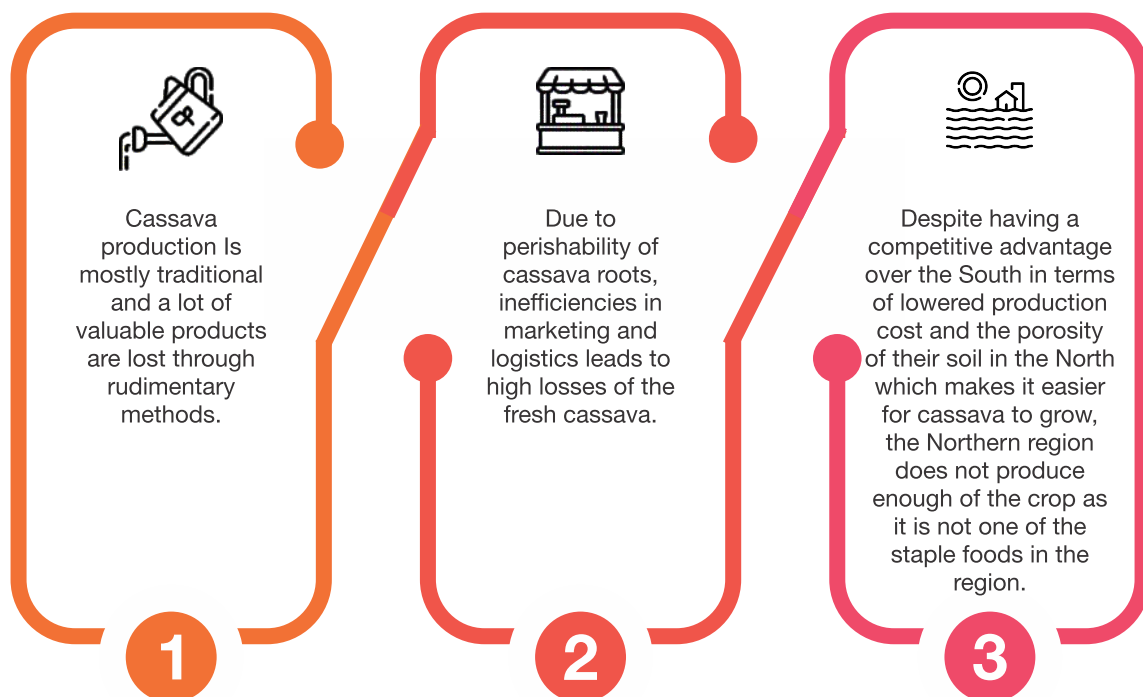
Adding value to the commodity to produce derivatives and by-products (such as sweeteners, ethanol, cassava starch, etc.) through local manufacturing and processing to meet local industrial needs and direct consumption is strategically important to the growth of the agriculture sector and the overall economy. This value-addition via industrial processing will also eliminate the challenge of the glut cycle that occurs every 3 to 4 years. The glut period is usually accompanied with very low prices of cassava in the local markets with significant losses to local farmers and processors of traditional cassava-based foods (e.g. garri).



Source: PwC estimates

Challenges of cassava production in Nigeria

Some of the identified challenges of cassava production in Nigeria include:



Recommendations

1. Enhance the productivity of farmers: Farmers need to get regular training to ensure they are using the best production methods. The capacity of producers also needs to be strengthened to ensure that they can deliver quality produce in a timely manner and increase yields to reduce the supply gap.
2. Adopt enhanced farming techniques and technology: There is need for investment in mechanized agriculture in addition to other equipment and tools, as well as the adoption of enhanced farming techniques in the planting and harvesting of cassava.
3. Improve the cassava value-chain: The process of supply from farmers to processors needs to be streamlined and clearly outlined in order to ensure that cassava tubers are delivered in a timely and cost-effective manner.
4. Invest in the production of other cassava derivatives: Significant portion of cassava harvested in Nigeria are processed into garri⁹ and fufu¹⁰. There is need to consider investment in the production of other cassava derivatives such as sweeteners, ethanol and monosodium glutamate (MSG). For instance, significant opportunities exist for cassava-based ethanol production. Nigeria can leverage its position as the largest cassava producer in the world, by prioritizing ethanol production from cassava with a view to creating rapid growth across ethanol-based industrial activities.
5. Increased access to funding: Cassava production is capital-intensive, and a large chunk of cassava produced in Nigeria comes from smallholder farmers. There is need to ensure unhindered access of cassava farmers to funding to guarantee their ability to use best-in-practice tools and technologies.
6. Ensure improved funding of research and development activities of the agricultural research institutes, with a view to conducting research to produce new cassava varieties, that can withstand unfavourable weather conditions that will germinate and grow better root tubers.



9. Garri is a creamy-white, granular flour with a slightly fermented flavor and a slightly sour taste made from fermented, gelatinized fresh cassava tubers. Garri is widely known in Nigeria and other West African countries.
10. Fufu is a common staple food across many West Africa countries made by mixing and pounding separate equal portions of starchy food crop (like cassava, yams, plantain etc.) thoroughly with water.

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