

Cassava, a 21st Century Staple Crop: How can Nigeria Harness Its Enormous Trade Potentials?

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Abstract

Nigeria possesses enormous potentials in the agricultural sector especially in the cassava sub-sector. This paper reviews the cassava production, consumption and utilization along its value chain globally. The paper focuses on Nigeria's cassava trade outlook and how it can compete favourably with other exporting nations while examining its prospects, strategies for development and challenges the cassava sub-sector is facing in recent time. Cassava production in Nigeria reached the highest level with an estimated value of 59million and accounted for 20.4% world share in 2017. Egypt is the only African country ranked among the top ten highest exporters of cassava in the world with export value of \$20.7million and also the highest cassava exporter in Africa even though not among the highest producers of cassava in Africa and globally. Cassava is unarguably the most important root crop in Nigeria in terms of consumption. As the highest producer of cassava in the world, Nigeria recorded a small total export value (\$1.25million) when compared to other leading producers like Thailand with highest export value of \$1.19billion in 2017. Nigeria and the rest of African nations are yet to harness the great trade possibilities in the cassava sub-sector when compared to other regions (like Asia and North America) of the world.

Keywords: Cassava Value-Added Chain; Cassava Production; Exports; Imports; Nigeria

Introduction

Cassava (*Manihot esculenta* Crantz) is an important staple crop recognised as a 21st century crop mostly for smallholder farmers [1,2]. According to Food and Agriculture Organisation of the United Nation (FAO), it is one of some 100 species of tree, shrub and herbs of the genus *Manihot* believed to have been introduced from northern Argentina to the United States of America [1]. Other studies opined that cassava has several centres of origin beginning from southern edge of the Brazilian Amazon [3-6].

According to Liu, *et al.* (2014), Cassava production may be said to have originated from the north eastern part of Brazil/Paraguay to Mexico/Guatemala in more than 4,000 years ago. It was believed to have been introduced to western part of Africa in 1588 through Portuguese merchants and first cultivated in Gulf of Guinea and the Congo Basin. The cultivation later spread Madagascar and other eastern part of Africa.

Towards the middle of the nineteenth century, cassava production and consumption became an important staple food widely

cultivated in Africa [7]. Cassava is regarded as the most widely cultivated root crop in the tropical region and a crop that persistently contribute to food security mainly because of its ability to store its matured edible roots in the ground for about three years and unarguably the sixth most important crop (following crops like wheat, rice, maize, potato, and barley) in the world [8].

Cassava is a drought-tolerant crop that can be grown in areas with uncertain rainfall patterns which usually results in unsuccessful cultivation of many other crops. Recently, the world cassava production stands at 291 million tonnes (Table 1, 2017 estimate) with leading countries like Nigeria, Congo DR, Thailand, Indonesia ranked 1st, 2nd, 3rd and 4th respectively (as shown in Table 2) with production in the Africa (177 million in 2017) regarded as the world largest cassava growing region and unarguably Nigeria remained the highest producer of cassava in the world with about 59 million tonnes in 2017 [9].

	2012	2013	2014	2015	2016	2017
World	277,683	278,454	292,054	295,244	296,043	291,993
Africa	158,033	159,836	169,595	173,343	177,736	177,948
America	30,487	30,519	32,338	32,436	30,267	28,038
Asia	88,953	87,849	89,867	89,122	87,798	85,763
Caribbean	957	1,134	1,256	1,528	1,481	1,378
Oceania	210	250	253	252	241	245

Table 1: World (Regions) Cassava Production ('000 Tonnes).

Source: Authors' compilation using FAOSTAT 2019 [9] data

Country	Production (Tonnes)	Percentage Production
Nigeria	59,485,947	20.4
Congo, DR	31,596,046	10.83
Thailand	30,973,292	10.61
Indonesia	19,046,000	6.52
Brazil	18,876,470	6.47
Ghana	18,470,762	6.32
Angola	11,747,938	4.02
Cambodia	10,577,812	3.61
Vietnam	10,267,568	3.51
Rest of the world	80,950,811	27.71
World	291,992,646	100

Table 2: World Leading Cassava Producers (Tonnes) (2017).

Source: Authors' compilation using FAOSTAT 2019 [9] data.

Also, global cassava production in terms of total area harvested has increased substantially in recent years. Nigeria also led the world in this aspect. Figures 1, and Table 3 show the world's top cassava producing countries by percentage total production and area harvested in 2017.

Country	Area Harvested (Ha)	% Area Harvested (Ha)
Nigeria	6,792,349	25.79%
Congo, DR	3,877,938	14.72%
Thailand	1,342,399	5.10%
Brazil	1,314,851	4.99%
Uganda	1,187,900	4.51%
Mozambique	1,070,377	4.06%
Angola	1,011,617	3.84%
Ghana	965,517	3.67%
Tanzania	896,365	3.40%
Rest of the world	7,883,017	29.92%
World	26,342,330	100%

Table 3: Leading Countries in Total Cassava Area Harvested (Ha) (2017).

Source: Authors' compilation using FAOSTAT 2019 [9] data.



The objective of this paper is to x-ray the current world cassava production and utilization and identify the leading players in the cassava sub-sector globally. Also, making a special focus on the Nigerian cassava sub-sector (the world's largest producer of the crop, its current state of development and identifying its enormous opportunities and challenges.

Materials and Methods

This review relied mainly on secondary data available at the Food and Agriculture organisation of the United Nations Corporate Statistical Database (FAOSTAT), FAO Food Outlook reports on global food markets and The Observatory of Economic Complexity (OEC) 2019 (an online resource for international trade data and economic complexity indicators). Other sources include; selected peer-reviewed journal papers, textbooks, handbooks, conference proceedings, bulletins, magazines, online materials that are relevant to this study were carefully consulted.

World Cassava Imports and Exports Outlook

In the world market, Thailand is the leading exporter of cassava followed by Viet Nam and Cambodia (in cassava flour and starch/chips and pellets) though her production level was not as high as that of Nigeria. According to FAO Food Outlook, 2018 (Table 4), a total of about 20 million tonnes of cassava flour and starch was exported globally in 2014 and this was increased to 22 million tonnes in 2017. Thailand led the cassava exporting world by exported 9.5 million tonnes of cassava flour and starch, and also, chips and pellets of 12.2 million in 2017.

	2014	2015	2016	2017
Total	19,948	22,061	21,765	21,805
Flour and Starch	9,068	9,040	9,749	9,576
Thailand	7,919	7,657	8,446	8,290
Viet Nam	788	1,011	1,055	1,048
Cambodia	29	56	64	146
Others	333	316	183	93
Chips and Pellets	10,880	13,021	12,016	12,229
Thailand	6,927	7,458	6,411	6,661
Viet Nam	2,995	3,607	3,241	3,200
Cambodia	808	1,805	2,182	2,230
Others	150	150	181	137

Table 4: World Exports of Cassava (000' tonnes) (Product weight of chips and pellets).

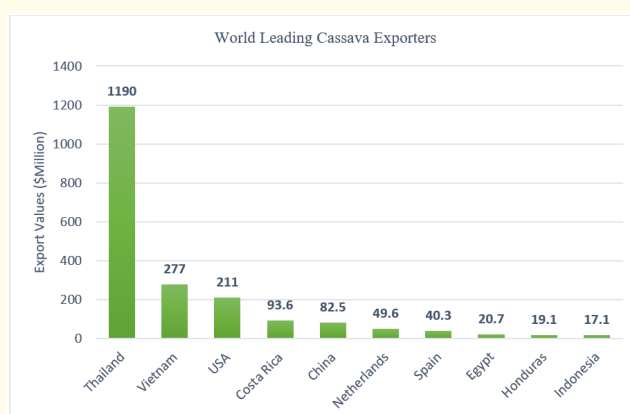
Source: FAO Food Outlook 2018 [10].

Moreover, China Japan, Indonesia are among the world leading importer of cassava products (flour, starch, chips and pellets). As shown in Table 5, China is world leading importer of cassava products, importing an estimated 9.5 million tonnes of flour and starch and also accounted for 63% world share of cassava import value in 2017 [10,11]. Meanwhile, according to The Observatory of Economic Complexity (OEC) 2019, African countries were not among the leading importing and exporting countries while the Asia led both the import and export cassava market with 72% and 73% contributions respectively. The top 10 cassava exporter globally (Figure 2) include; Thailand, Vietnam, USA, Costa Rica and China, Netherlands, Spain, Egypt, Honduras and Indonesia respectively.

	2014	2015	2016	2017
Total	17,380	21,444	21,260	22,081
Flour and Starch	7,554	8,497	9,375	9,577
China	3,813	4,205	4,922	5,535
Japan	916	851	884	980
Indonesia	880	1,256	1,339	752
Malaysia	525	586	580	622
Others	1,412	1,600	1,650	1,688
Chips and Pellets	10,880	13,021	12,016	12,229
Thailand	6,927	7,458	6,411	6,661
Viet Nam	2,995	3,607	3,241	3,200
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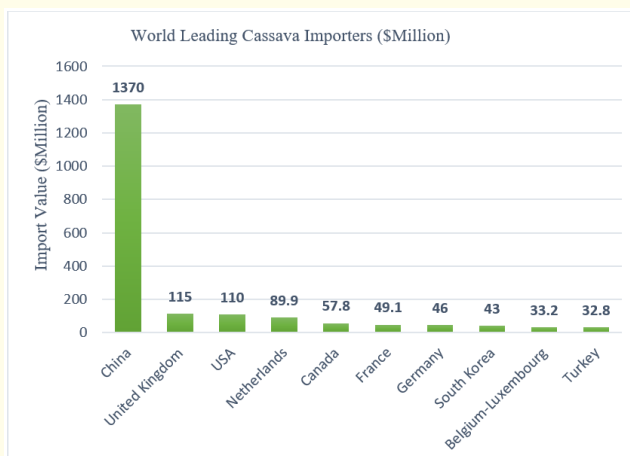
Source: FAO Food Outlook 2018 [10].



Source: Authors' graph using OEC 2019 [11] data.

Figure 2: Top 10 World Cassava Exporters (2017).

Thailand exported a total cassava valued at \$1.19billion while China's total cassava import in 2017 stood at \$82.5million. Moreover, China, United Kingdom, USA, Netherlands and Canada are among the top 10 leading cassava importing countries (figure 3) with China ranked number one, exporting cassava worth of \$1.37billion while Canada's cassava export was \$57.8million [11].



Source: Authors' graph using OEC 2019 [11] data.

Figure 3: Top 10 World Cassava Importers (2017).

Nigeria's Cassava Production Outlook

Cassava is a staple crop of choice across cultures and social divides in Nigerian households, widely eaten by all though processed differently. The majority of the tuber produced is consumed locally as traditional meals. It is the most important crop by production, and the second most important by consumption [12]. It is capable of growing on marginal soils because of its drought-tolerant nature.

Cassava is grown in virtually all the states in Nigeria but there are 11 states that are recognized as major cassava producing states in Nigeria, these are Benue, Kogi, Enugu, Imo, Cross-River, Ondo, Ogun,, Delta, Anambra, Edo, and Taraba, States [13,23].

A growing middle class and increasing urbanization is fostering innovations both in the processing and in the packaging of cassava. For example, in order to meet the needs of the growing urban population that is increasingly shopping in formal outlets such as supermarkets, traditional products such as fufu, and gari are subject to innovative packaging and are being sold at more re-

munerative prices. New products are also being introduced which provide increased convenience (e.g. gari/sugar/peanut all-in-one package), and offer new tastes (e.g., fruited gari). New cassava varieties have also been introduced which either reduce waste during peeling, are biofortified with vitamin A, or generate higher yields than traditional varieties. There have also been innovations around using cassava peels for animal feed as a substitute for maize. Apart from Cassava, Nigeria is also the world’s largest producer of yam, cowpea and sorghum [14]. Table 6 shows Nigeria’s other important staple crops which include; yam, millet, maize and sorghum.

Year	Cassava	Maize	Sorghum	Millet	Yam
2000	32,010,000	4,107,000	7,711,000	6,105,000	26,201,000
2001	32,068,000	4,596,000	7,081,000	5,530,000	26,232,000
2002	34,120,000	4,890,000	7,534,000	5,884,000	27,911,000
2003	36,304,000	5,203,000	8,016,000	6,260,000	29,697,000
2004	38,845,000	5,567,000	8,578,000	6,699,000	31,776,000
2005	41,565,000	5,957,000	9,178,000	7,168,000	34,000,000
2006	45,721,000	7,100,000	9,866,000	7,705,000	36,720,000
2007	43,410,000	6,724,000	9,058,000	8,090,000	31,136,000
2008	44,582,000	7,525,000	9,318,000	9,064,000	35,017,000
2009	36,822,248	7,358,260	5,279,170	4,929,950	29,091,980
2010	42,533,180	7,676,850	7,140,970	5,170,430	37,328,180
2011	46,190,248	8,878,456	5,690,145	1,271,370	33,134,172
2012	50,950,292	8,694,900	5,837,106	1,280,700	32,318,900
2013	47,406,770	8,422,670	5,300,270	909,560	35,618,420
2014	56,328,480	10,058,968	6,883,294	1,398,667	45,151,589
2015	57,643,271	10,562,050	7,005,025	1,485,387	45,677,939
2016	59,56,5916	11,547,980	7,556,076	1,552,576	49,384,352
2017	59,485,947	10,420,000	6,939,000	1,500,000	47,942,712

Table 6: Nigeria’s staple crops (Production Levels) 2000-2017 (Tonnes).

Source: Authors’ compilation using FAOSTAT 2019 [9] data.

It is estimated that more than 90% of cassava production is processed into food [15,16]. But a significant industrial demand exists for cassava, primarily as substitution for imported raw materials and semi-finished products. There is high demand for High Quality Cassava Flour (HQCF), primarily from 10% replacement in bread flour and for use in bouillon, noodles, and the adhesive industry (dextrins). Similarly, it is useful in the production of native and modified starches. It is also useful in the paint, pharmaceutical and sweetener industries [17].

Cassava is the subject of many expansion programmes in the Sub-Saharan African region, as commercializing cassava and domestically producing staple crops – in order to limit imports – remains a key objective of many West African governments. In Nigeria, the regional production leader, the “Anchor Borrower’s Programme” (ABP), initiated by the country’s Central Bank (CBN),

provides preferential loans to smallholder farmers who provide their product to the processing sector. However, while cassava is one of the many commodities listed in the programme, the implementation of ABP has, in effect, made rice more lucrative to cultivate and led to farmers shifting out of cassava [18].

Cassava Production in Nigeria

Nigeria is referred to as the 49th largest export economy globally and indicated as the 124th most complex economy by the Economic Complexity Index (ECI) in 2017. Moreover, in 2017, Nigeria total export value of \$46.8billion and total import value of \$34.2billion giving a positive trade balance of \$12.7billion. Figure 4 shows trade outlook of Nigeria from 2000 to 2017 where a positive trade balance of \$12.7billion in net exports was recorded in 2017 [11].

Source: Authors' graph using OEC 2019 [11] data.

Figure 4: Nigeria's Trade Outlook (Exports and Imports) 2000 -2017.

Cassava is unarguably one of the most important starchy crops while its storage root is used as a source of food and starch products. Globally, cassava production hit approximately 278 million tonnes in 2012 and in 5-year period, the global production level increasingly stood at 291 million tonnes in 2017 pNigeria, as the biggest producer of cassava globally with about 43 million tonnes in 2007 has witnessed an unprecedented surge in production capacity reaching 59 million tonnes with share 20.4% of global production in 2017 (Table 2 and figure 5).

Source: Author's graph using FAOSTAT 2019 [9] data.

Figure 5: Nigeria Cassava Production Levels (2007-2017).

Generally, in Nigeria fresh cassava (tuberous roots) are mainly consumed locally as food and very few are separated for export purposes. About 90% of cassava is processed as food while not more than 10% is used for industrial production and less than 1% of cassava output is exported. Also, The dietary calorie equivalent of the daily per capital consumption of cassava in Nigeria is estimated to be 238kcal and gari, chips, flour and mostly fermented paste are major forms in which cassava is consumed [19-22]. The average production figure of total area harvested in Nigeria was 3.8 million tonnes/ha in 2007 but has increased to 6.7 million tonnes/ha in 2017 (Table 7) but this has not translated to harnessing the enormous opportunities in exporting the huge tonnes of these products to other countries and Nigeria is still depending on other countries to meet her industrial demands. Thailand recorded the

highest cassava export value of \$1.19billion with 54% share of the world's total value in 2017 [11].

Egypt is the only African country with highest cassava export value of \$20.7million and still with less than 1% share (0.94%) of the total export value globally [11]. The Nigeria export value was \$1.25million with quite embarrassing infinitesimal (0.057%) share of the world cassava export which stood at \$2.19billion in 2017 even though, Nigeria is ranked number one in cassava production globally [11]. According to OEC 2019, (Table 9), the data revealed the leading African countries with highest cassava export value in 2017 but remained very negligible when compared with top cassava exporters globally. The average yield of cassava in Nigeria cannot be compared with the Thailand, the biggest exporter of cassava globally. Thailand has total yield of 22.92 tons/ha in 2007 which has increased to 23.07 tons/ha in 2017 but Nigeria moved from a total yield of 11.20 tons/ha in 2007 and now reduced to 8.76 tons/ha [9].

Year	Production (Tonnes)	Area Harvested (Ha)	Yield (tons/ha)
2007	43,410,000	3,875,000	11.20
2008	44,582,000	3,778,000	11.80
2009	36,822,248	3,129,030	11.77
2010	42,533,180	3,481,900	12.22
2011	46,190,248	4,120,166	11.21
2012	50,950,292	6,401,996	7.96
2013	47,406,770	6,741,300	7.03
2014	56,328,480	6,458,435	8.72
2015	57,643,271	6,216,434	9.27
2016	59,565,916	6,150,574	9.69
2017	59,485,947	6,792,349	8.76

Table 7: Cassava Production in Nigeria (2007-2017).

Source: Author's compilation using FAOSTAT 2019 [9] data.

Nigeria cassava opportunities

- Nigeria has a total of 20.4% (59million tonnes) world share of cassava production in 2017 and remained the highest producer of cassava in the world [9].
- Cassava is regarded as an important staple food for human consumption (90%) and also as secondary industrial material (5-10%) mainly used as animal feed [20,23].
- 10% of Nigeria's industrial demand consisting of High Quality Cassava Flour (HQCF) is used in biscuits and confectioneries, dextrin pre-gelled starch for adhesives, starch and hydrolysates for pharmaceutical products and as seasonings
- Gari accounted for 70% of human food from cassava. Other common cassava products mainly for human consumption include; elubo/lafun, fufu/akpu, abacha among others.
- Processed cassava primary products include; gari, fufu, lafun/elubo, starch, pellets (obtained directly from cassava tu-

- berous roots). Meanwhile, further processed primary cassava product include; glucose syrup, dextrin and adhesive which are obtained from starch (including; liquid starch, pre-gel starch and dextrin based adhesives).
- Nigeria’s secondary products obtained from cassava include; modified cassava starch, glucose syrup, extra neutral meat, noodle, bakery and confectionery industries, meat and textile processing.
 - There is a huge potential demand of about 250,000 tons/year in the HQCF through the initiative of 10% HQCF replacement in bread flour (as wheat flour is also used in bread making) and also required in bouillon, noodles, the adhesive industries
 - Huge demand for local and modified starch was reported to surpass 230,000 tonnes per year in the food, paint, and pharmaceutical industries in Nigeria
 - In the confectionery industries, a growing demand of 150,000 tonnes per year existed in fructose syrup which serves as a means of replacement for growing demand for imported sugar in Nigeria
 - Dried cassava chips market has a potential demand of about 900,000 tonnes and also about 520,000 tonnes demanded by the China export market.
 - Adoption of blending gasoline with 10% ethanol (E-10 policy): this will create about one billion litres in a year for fuel ethanol with a potential demand of 2.3million tonnes of fresh cassava roots [17]
 - From [17] which clearly identified the opportunities that can be harnessed through this plan are shown in the Table 8 below.

Value-Added Chain	Estimated Demand (tonnes)	Fresh root equivalent to meet estimated Demand (metric tons)	Acreage required (25ton/ha)	Number of Job created (one direct job on farm per ha and one off-farm)
Starch	230,000	1,150,000	46,000	92,000
Flour	250,000	1,000,000	40,400	80,000
*Sweeteners	190,000	950,000	38,000	76,000
Dried chips for export and animal feed	900,000	3,360,000	134,400	268,560
**Fuel Ethanol (E-10)	0.5 billion litres	3,571,428	142,857	285,714
High quality gari for export and supermarkets	455,000	2,730,000	109,200	218,400
Total		12,758,429	510,337	1,020,674

Table 8: Estimated Demand of Cassava in the Industrial and Export Markets, Acreage required and Estimated Number of Jobs Created.

Source: [17] Assumes 50% replacement of imported sugar in the sweetener industry Assumes 50% from cassava as feedstock.

Nigeria cassava challenges
Developing the Nigeria’s cassava sub-sector

In pursuance of the total transformation of Nigeria’s cassava sub-sector in order to attract a level competitiveness both home and especially in the international markets of cassava products which include; starch, sweeteners, Ethanol, HQCF, and dried Chips through the adoption of highly improved production and processing technologies and connecting an effective link between producers and processors into efficient value-added chain. According to [17], the strategy is of two-fold:

- Ensure the formation of farmers in clusters involving both small- and large-scale processing factories and disseminate improved production innovations to them for optimum productivity.
- Create markets for the farmers to sell their cassava roots by means of effective supply chains. Also, secure a guaranteed minimum price scheme with government as buyers of last resort.

Policy interventions to support Cassava transformation in Nigeria include the following:

1. Market policies: These include; 10% cassava flour substitution for bread wheat flour; 10% ethanol in petrol (E-10)
2. Fiscal policy: This includes; tax holidays mainly for investors to strategically put processing plants in Staple Crop Processing Zones (SCPZ)
3. Other policies such as increased import levies on commodities that can be produced locally in Nigeria like starch, sugar and wheat flour, incentives for investors particularly those establishing plants for ethanol production and securing a guaranteed minimum price for cassava products
4. Policies on Export incentives for non-oil sector (applicable to starch/ethanol): These include (i) a 10% tax concession for 5 years for Nigerian industries involved in exporting at least sixty (60%) percent of their products, (ii) Retention of export proceeds in foreign currency, (iii) Exporting companies’ access to financial assistance through Export Development Fund (EDF), (iv) Access to Nigeria Export-Import (NEXIM) Bank foreign exchange facilities [17,23].

Rank	Country	Percentage share in world cassava export (2017)	Total Export Value (in USD)
1	Egypt	0.94	20.7M
2	Senegal	0.36	6.99M
3	Uganda	0.24	5.27M
4	South Africa	0.14	3.06M
5	Ghana	0.14	3.02M
6	Tanzania	0.13	2.76M
7	Niger	0.11	2.45M
8	Cameroon	0.073	1.61M
9	Mali	0.063	1.38M
10	Nigeria	0.057	1.25M
11	Cote D'Ivoire	0.051	1.12M
12	Burkina Faso	0.050	1.09M
13	Togo	0.023	515K
14	Madagascar	0.011	237K
15	Zambia	0.0099	216K
16	Morocco	0.0060	132K
17	Kenya	0.0052	114K
18	Rwanda	0.0015	33.9K
19	Malawi	0.000063	1.39K

Table 9: Leading African Countries in Cassava Export 2017.

Source: Author's compilation using OEC 2019 [11] data

Note: Total cassava export value are in US dollar.

M means million and K, thousand.

Production and marketing challenges

In Nigeria, cassava is widely cultivated and it plays a crucial role in the food security of both rural and urban economy owing to its capability to thrive under unfavourable weather and marginal soil conditions and also its tolerance to drought [24-26]. With Nigeria sitting as the world's largest producer of cassava, having a world share of 20.4% and consistently followed by Congo DR, Thailand, Indonesia and Brazil as other top producers globally. Nigeria is yet to harness the enormous possibilities and wealth embedded in cassava sub-sector. The following are challenges the Nigeria cassava sector is facing in recent time:

- **Low Productivity:** The average cassava yield in Nigeria has experienced a dramatic reduction in recent times (from 11.20 tons/ha to 8.7 tons/ha in 2017) while that of Thailand, the leading cassava exporter has witnessed a constant increase in the annual yield moving from 21.1 tons/ha in 2006 to 23.07 tons/ha in 2017 (FAOSTAT, 2019).
- **Low Inorganic Fertilizer Usage:** The major cause of lower productivity in terms of cassava yield is mainly because of overdependence on organic manure and farmers rarely bothered about applying chemical fertilizer to boost productivity [17].

- **Small-Scale Cassava Farming:** Major cassava farmers (about 95%) in Nigeria are smallholder farmers cultivating less than 2 ha while those with more than 5 ha are about 5%. Farmers produce and process cassava in a subsistent level with no possibility of commercializing the crop and compete with other cassava exporters in the world [24].
- **Continuous Cassava cyclical gluts:** This is due to the inability of the cassava markets to absorb excess supplies. This is occasioned by scarcity of cassava in a season which resulted into price increase and farmers are encouraged to cultivate more and production also received a boost. Meanwhile, this increase in production later brings down the price of cassava and farmers are discouraged to cultivate more because of reduction in the price of cassava and this continues until the price picks up again with 2-3 years. [17,24].
- **Policy inconsistencies:** Nigerian government is yet to enforce the inclusion of 10% cassava flour as substitute for wheat flour in bread production and also, the blending of 10% ethanol in petrol (E-10) is yet to be implemented. This would have increase cassava production and utilization both at the small-scale and commercial levels.
- **Low level of credit availability for cassava farmers:** Cassava farmers in Nigeria are not enjoying access to agricultural credit especially from the commercial banks due to lack of collateral security. This will go a long way in procuring farming inputs such as fertilizer disease and pest resistant cultivars among others.
- Inadequate use of yield-increasing and labour-saving technologies in cassava production and processing is one of the reasons the Nigerian cassava sector cannot compete with other exporters like Thailand, Vietnam and Cambodia even though it has the largest production level globally.
- Non-mechanisation of cassava along its value chain: Cassava farming in Nigeria are generally carried out with simple and crude implements which can barely sustain small-scale production. Farmers were not able to have access to these mechanised machineries such as peelers and dryers (for cassava processors) leading to low-rated quality products.
- Issues on Land Tenure and Cassava farms fragmentation: Inability of the cassava farmers to secure land especially for large-scale production will result to low commercialisation of cassava. Moreover, inability of farmers especially the commercial farmers to secure large expanse of land for cassava production and this will make possibilities of large-scale mechanisation difficult for the farmers.
- **High Transaction Costs:** High transaction costs, mainly concerning increased transportation costs of cassava by the transporters because cassava is perishable with short shelf life, if not consumed within few days must be processed into other valued products.

- Poor state of infrastructure: No access roads leading to increase transportation costs, epileptic power supply, and shortage of potable water have crippled the cassava transformation initiatives in Nigeria and remained clog in the wheel of cassava commercialisation both internally and internationally.
- Incidence of Pests and Diseases: Even though, there is availability of disease resistant cultivars of cassava stems, this is still a serious issue for many small-scale cassava farmers. Moreover, seventeen cultivars haven been released to the farmers and other stakeholders but according to [27], only five haven been made available to the farmers and two varieties (TMS 30572 and 4(2) 1425) dominated and cultivated by farmers.

Conclusion and Recommendation

Cassava is regarded as second most important staple crop in Nigeria after Maize. Nigeria as the number one producer of cassava in world has enormous export potentials in competing favourably in the cassava export markets. There is no doubt that cassava production in Nigeria is witnessing a continuous growth for about 10 years, recording a total production of 59million tonnes with 20.4% world cassava production share in 2017. Moreover, when we compare Nigeria's cassava export with other producing countries in Africa and globally, it is disheartening to know that Nigeria has not yet harnessed the export potentials in the cassava sub-sector (starch, flour, ethanol and animal feeds) like other leading countries such as Egypt (ranked among the top 10 leading cassava exporters in 2017) and Thailand ranked number one with an estimated total export value of \$1.19billion while Nigeria had meagre \$1.25million export value in 2017. In order to achieve a remarkable growth in the cassava sub-sector, the following points are recommended;

1. Incentives must be given to farmers and processors and other stakeholders along the value chain in order to boost cassava production and total export value.
2. Reliable and consistent trade policies that favour the growth of cassava production, consumption and utilization must be implemented and properly monitored
3. Issue relating to cassava glut should be tackled by the government in order to encourage cassava farmers with an assurance that there is ready market for their production with guaranteed minimum price.
4. Nigerian government must enforce the policies on 10% inclusion (replacement of wheat flour) of HQCF in bread making and blending gasoline with 10% ethanol (E-10) while providing an enabling environment for its effective implementation.
5. Government should strengthen trade relationship with countries like United Kingdom, Austria, Spain, China and other countries for greater export possibilities.

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