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CASSAVA PRODUCTION, UTILIZATION AND JOB CREATION IN KOGI STATE, NIGERIA: A REVIEW

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Abstract
Cassava production in Kogi State, Southern Guinea Savannah Region of Nigeria was purely subsistent about two decades ago, but now it has assumed the status of a cash crop, providing food, employment and income in a sustainable manner to millions of people in the State. The cassava value chain in the State has been able to meet the challenges of the nation through job creation, wealth generation and industrialization. *Gari* processing factory was the highest employer of labour (75 persons), while cassava production employed the least number (1 person). The major food products from cassava in the State are gari, fermented flour, unfermented flour and *akpu*. From the total harvest of fresh cassava roots in the state, about 36.57% were processed into gari, while 36.38% and 24.33% were processed into fermented flour and unfermented flour respectively. Majority (59.49%) of the population of Kogi State consumed cassava products at least 1-2 times in a week, while about 1.36% did not depend on any cassava product as food. A two year cycle of fresh cassava root glut has been a major problem facing producers which could be reduced through increased diversification of processing options, expanded markets and informed end users. Relevance of the State, in the cassava industry can be achieved by an increased area cropped to cassava and yield per hectare with more emphasis on production for industrial uses.

Keywords: Cassava production, value chain, job creation, Kogi State, and Nigeria

Introduction
Cassava (M*anihot esculenta, C*rantz) is a versatile crop that is critical for food security in Africa, Asia and Latin America. Millions of smallholder producers rely on cassava for their subsistence, especially during lean seasons. The roots and leaves are generally prepared and consumed in several ways. Globally, Nigeria is the largest producer of cassava followed by Brazil, Thailand, Zaire and Indonesia (FMARD, 1999). In Nigeria, cassava is one of the most important root and tuber crops. It is the most widely cultivated crop in the Southern Guinea Savanna and the Southern Rain Forest Regions in terms of area devoted to it and number of farmers growing it. The rapid increase in the production of cassava in Kogi State in the last two decades was driven by compatriots that were determined to make Kogi State a foremost producer of the crop in Nigeria. Formerly, cassava production and utilization were purely subsistence and rudimentary, just for the rural people with little or no industrial importance. However, within two decades (1997-2017), it has been transformed into the status of a cash crop, providing food and incomes in a sustainable manner to millions of Nigerians and indeed the people of Kogi State. Furthermore, cassava utilization and job creation roles have increased in recent years. The crop is fast replacing yam and other traditional staples within the production belts. The major food products from cassava in Nigeria are gari (creamy-white, partially gelatinized, roasted, free flowing granular flour with a slightly fermented flavour and sour taste), fermented flour, unfermented flour (sundried cassava chips milled in the form of flour) and akpu (fermented wet paste) (PIND, 2011). The high industrial and market potentials of cassava have attracted private sector participation in the cassava value chain. For instance, in Cote d'Ivoire and Nigeria, Nestle, a multinational food manufacturing company is now using cassava starch rather than maize starch in its manufactured culinary broths. This multinational company is supporting producers, providing them with improved cassava planting materials and buying their roots. Brewers are also focusing on brewing cheaper beers using locally grown crops as substitute for imported barley. Processors in the biofuel technology are not left out in the use of cassava for the production of cheap biofuel. In the ceramics industry, it is used as a

binder (Alhassan, 2018)

Strengths and opportunities in cassava production

The strength of Kogi State in cassava production, utilization and job creation lies with its natural endowments. Majority of the population are unemployed and depends primarily on cassava for their survival and sustenance. Kogi State was created out of former Benue and Kwara States along with eight others on 27th August, 1991. The State is located within the equator and thus spans the tropical rain forest on the southern fringes and the woody derived savannah and Guinea savannah in the northern extreme. There are approximately 228,964 farm families in Kogi State (Kogi ADP, 1997). The rainfall pattern in Kogi State is generally adequate with enough sunshine, which is ideal for most crop production. Generally, the soils of Kogi State consist of ferruginous tropical soils, forest soils, which are rich in humus and moderately acidic with low organic matter content. Alluvial soils abound along the Niger and Benue valley and their flood plains. The cultivation of food crops such as rice, yam, cassava, sorghum, maize, millet, cowpea and groundnut prevail the agricultural practice, while mixed cropping is the common farming system (Kalu and Norman, 1987). On livestock production, virtually every rural household in the State has a head of livestock with fowls averaging 7-10 birds per household and 3-5 of goats (Kogi ADP, 1997). Multiple cropping is the predominant farming practice in which there are many combinations of crop mixtures. Cassava based mixtures are most common in the farming system (Kalu and Norman 1987). Average farm size is between 2-3ha per farm family with average family size of 6-7 persons. Cassava is widely grown in all the LGAs of the State. Indeed, it is grown by almost every household (RTEP 1997). Kogi State is one of the major producers of cassava in Nigeria. It produces over 4.16million metric tonnes of fresh cassava roots annually from over 269,270 hectares of cassava farms (Kogi ADP, 2014).The major production outputs are from Ankpa, Dekina, Kabba-Bunu, Ijumu LGAs. Before the cassava production revolution of the early part of this millennium, cassava was utilized mainly as food in the State leaving little for industrial uses, most of which were rudimentary and rural based. The little starch produced was for local laundry services. There were 134,635 cassava farms in Kogi State on an area of 269,270 hectares (Kogi ADP, 2017). Average yield per hectare was 12 tonnes, which was the national average.

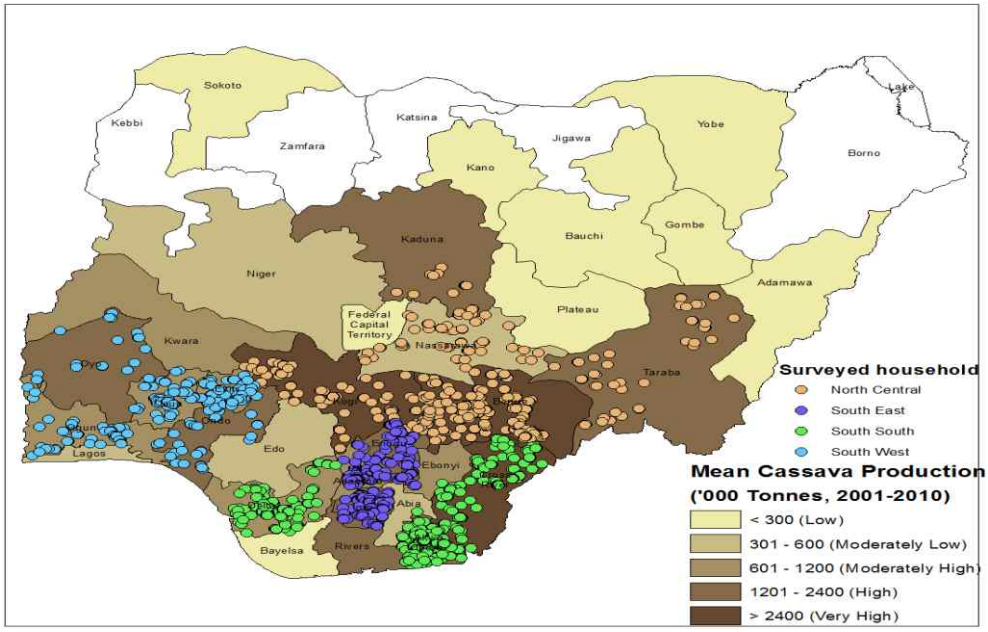

Figure 1: Map of Nigeria showing areas of cassava production

Food dependence on cassava

The major food products from cassava in the State are gari, fermented flour, unfermented flour and akpu (Table 1). From the total harvest of fresh cassava roots, 36.57% were processed into gari, while 36.38% and 24.33% were processed into fermented flour and unfermented flour respectively. At the Local Government Area (LGA) Level, from the total harvest in Ankpa LGA, 60% were processed into fermented flour, 20% into gari and only 5% for akpu, while in Yagba West and Yagba East LGAs, 65% of the total harvest went into gari, 30% to fermented flour, while 3% and 2% were used for unfermented flour and akpu respectively (Table 1). From same table, the western part of the State probably prefers gari to other products of cassava. But in Lokoja LGA, 30% of harvested cassava were processed into akpu. This high preference for akpu in Lokoja might be due to its urban status as the State capital. Apart from these four major products, there are others of minor consideration by local processors. These include: frying grated cassava tuber as *Akara*, boiling cassava tuber for consumption, and substituting High Quality Cassava Flour (HQCF) for wheat in the baking and confectionery industry. The use of cassava in the confectionery industry is highly limited in Kogi State despite the enormous awareness created by the Kogi State

Agricultural Development Project, especially the use of HQCF as a substitute for wheat (Kogi ADP, 2010). Majority (59.49%) of the population of Kogi State consume cassava products at least 1-2 times in a week, and about 1.36% did not depend on any cassava product as food. The consumption of cassava products has no defined trend but the central parts of Kogi State (Okene, Okehi and Adavi LGAs) consume cassava products more than four times in a week (20%), compared to 8% in Ibaji LGA (Table 2).

Table1: Processing of cassava into gari, fermented flour, unfermented flour and akpu as a percentage of total harvest in Kogi State (%)

LGA	Gari	Fermented flour	Unfermented flour	Akpu
Ankpa	20	60	15	5
Olamaboro	10	70	15	5
Omala	40	28	30	2
Ofu	8	65	24	3
Dekina	15	65	18	2
Idah	20	35	25	20
IgalamelaOdolu	25	20	30	25
Bassa	30	28	40	2
Ibaji	40	38	20	2
Okene	20	40	30	10
Okehi	30	25	40	5
Adavi	20	30	45	5
Ajaokuta	30	25	35	10
Ogori magongo	55	30	10	5
Kabba Bunu	60	30	5	5
Mopa muro	60	30	8	2
Yagba west	65	30	3	2
Yagba East	65	30	3	2
Ijumu	60	30	5	5
Lokoja	50	15	5	30
Koton Karfe	45	15	15	25
Average percentage	36.57	36.38	24.33	8.19

Source: Kogi State ADP, 2017

Table 2: Frequency of cassava consumption in Kogi State

LGA	Population (2006)	Percentage Consumption per week			
		Nil	1-2 times	3-4 times	Greater than 4 times
Ankpa	266,176	0.5	62.5	20	17
Olamaboro	158,490	0.2	60.5	22	17.3
Omala	107,968	1.2	59	29	10.8
Ofu	191,480	0.2	51.3	30.5	18
Dekina	260,968	0.3	41	40	18.7
Idah	79,755	0.4	42	37.6	20.0
Igalamela/Odolu	147,048	0.3	60	22.70	17
Bassa	139,687	0.8	70	19.2	10
Ibaji	127,572	5.0	71.5	15.5	8
Okene	323,574	0.2	33.8	44.5	21.5
Okehi	223,574	0.2	33.8	45.5	20.5
Adavi	217,219	0.3	36.7	43.0	20.0
Ajaokuta	122,432	1.0	70.0	20.5	8.5
Ogori-Magongo	39,807	1.5	71.5	20.5	6.5
Kabba bunu	144,579	2.0	76	17.5	4.5
Mopa Muro	43,760	1.5	75.5	18.0	5.0
Yagba West	139,928	2.0	72.5	20.0	5.5
Yagba East	147,641	1.7	71.0	21.0	6.3
Ijumu	118,593	2.0	73.0	19.5	5.5
Lokoja	196,643	10.0	61.5	25.0	3.5
Koton-Karfe (Kogi)	115,100	1.8	56.2	30.5	11.5
Total	**3,311,994**	**28.60**	**1,249.30**	**541.50**	**255.60**
Average	**157,714**	**1.36**	**59.49**	**25.78**	**12.17**

Source: Kogi State ADP, 2017

Status of cassava production in Kogi State

Kogi State is the largest producer of fresh cassava roots in Nigeria (NFRA, 2008). It produced over 4.16 million metric tonnes annually (Table 3). Starting from 1994, when the first Crop Area Yield Survey (CAYS) was conducted, cassava production in the State was 1.227mmt from an area of 121,260 hectares, with an average yield of 10.12t/ha. Production of cassava increased steadily in Kogi State to 2.794mmt in 1999 from an area of 182,790ha, and a per hectare yield of 15.28tonnes. This improved performance was due mainly to the funding intervention of the Cassava Multiplication Project (CMP) which was inherited from Benue State after the States creation exercise of 1991. The CMP came to a technical close in 1998. Expectedly, cassava production declined in year 2000 (2.506mmt) and yield per hectare also reduced (13.47t/ha) (Table 3). From 2003 to 2011, production of cassava in Kogi State again increased to an all time high figure of 5.032mmt and a yield per hectare of 19.32 (Kogi ADP, 2017). This feat could be attributed to the funding intervention by the Root and Tuber Expansion Programme (RTEP) of the Federal Government of Nigeria (FGN), supported by the International Fund for Agricultural Development (IFAD). Following this improved production, the problem of glut emerged in the cassava supply chain. The challenge then became how to encourage producers to continue production at a profit. Cassava producers were seriously experiencing surplus which was cyclic in nature; a two year cycle of cassava fresh root over supply followed by two year scarcity. The main task of Kogi ADP was to ensure the availability of planting materials every year in order to sustain production and reduce the cassava surfeit.

Table 3: Cassava production in Kogi State (1994 - 2017)

Year	Production ('000)	Area cultivated ('000)	Yield/ha
1994	1227.90	121.26	10.12
1995	1635.16	128.19	12.75
1996	1858.28	145.64	12.75
1997	2319.21	178.69	12.97
1998	2771.38	183.17	15.13
1999	2794.32	182.79	15.28
2000	2506.00	186.00	13.47
2001	2704.00	177.90	15.19
2002	2785.12	177.90	15.65
2003	2854.85	173.20	16.48
2004	2969.63	175.24	16.94
2005	2666.41	180.75	14.75
2006	3394.71	214.18	15.84
2007	3631.94	243.96	14.88
2008	3741.90	252.84	14.79
2009	4011.26	269.27	14.89
2010	4396.34	289.96	15.16
2011	5462.79	282.61	19.32
2012	4094.36	290.34	14.10
2013	5032.93	294.65	17.08
2014	4131.16	221.77	18.62
2015	3048.98	198.77	15.34
2016	4621.46	317.62	14.55
2017	4806.62	283.07	16.98

Source: Kogi ADP, 2017

Table 4: Cassava Production in Southern Guinea Savanna region of Nigeria

Year	2003		2004		2005		2006		2007	
State	**Area cult ('000ha)**	**Prodn ('000mt)**	**Area cult ('000ha)**	**Prodn ('000mt)**	**Area cult ('000ha)**	**Prodn ('000mt)**	**Area cult ('000ha)**	**Prodn ('000mt)**	**Area cult ('000ha)**	**Prodn ('000mt)**
FCT	1.02	10.21	1.12	12.00	3.58	39.10	4.10	45.71	3.99	44.80
Niger	57.30	422.07	57.00	450.00	50.94	448.24	56.07	456.00	71.04	584.20
Benue	269.88	3,577.92	262.73	3,579.20	270.12	3,584.82	270.56	3,595.10	271.17	**3,571.48**
Kogi	173.199	2,854.83	175.24	2,969.63	180.75	2,666.41	214.18	3,394.71	243.96	**3,631.94**
Kwara	36.00	510.00	37	480.72	59.40	740.30	77.50	1,004.49	85.42	1,111.27
Nassarawa	19.17	204.76	22.04	242.42	89.71	1,115.94	97.34	1,276.62	61.08	871.12
Plateau	24.60	282.23	26.00	294.83	27.50	323.94	28.54	350.15	29.45	334.79

Source: NFRA, 2008

Stimulation of processing to reduce cassava glut

The next hurdle was to reduce and possibly eradicate the problem of glut experienced by producers every two years. The component of RTEP called Diversification of Processing Options and Products had to be implemented in detail in Kogi State. Recipes of cassava and end users were identified, staff of the Kogi ADP were trained and product demonstrations conducted in all the zones and major locations in the State. Master bakers were trained on the use of 10% High Quality Cassava Flour (HQCF) as substitute for wheat. Model Cassava Processing Centres were established across the RTEP participating LGAs of Ankpa, Dekina, Igalamela/Odolu, Okehi, and Yagba-West in addition to similar ones at Ijumu and Lokoja (Fig. 2). The establishment of these model processing centres was a major milestone in the quest to modernize cassava processing. This major intervention brought about improved processing capacity amongst processing groups arising from the use of modern processing equipment, enhanced product quality through training and better packaging. Production of cassava roots increased steadily due to availability of improved planting materials which were produced and distributed to producers to support the supply of fresh roots to the existing processing centres. Local fabricators were trained and empowered to provide maintenance services to producers and processors.

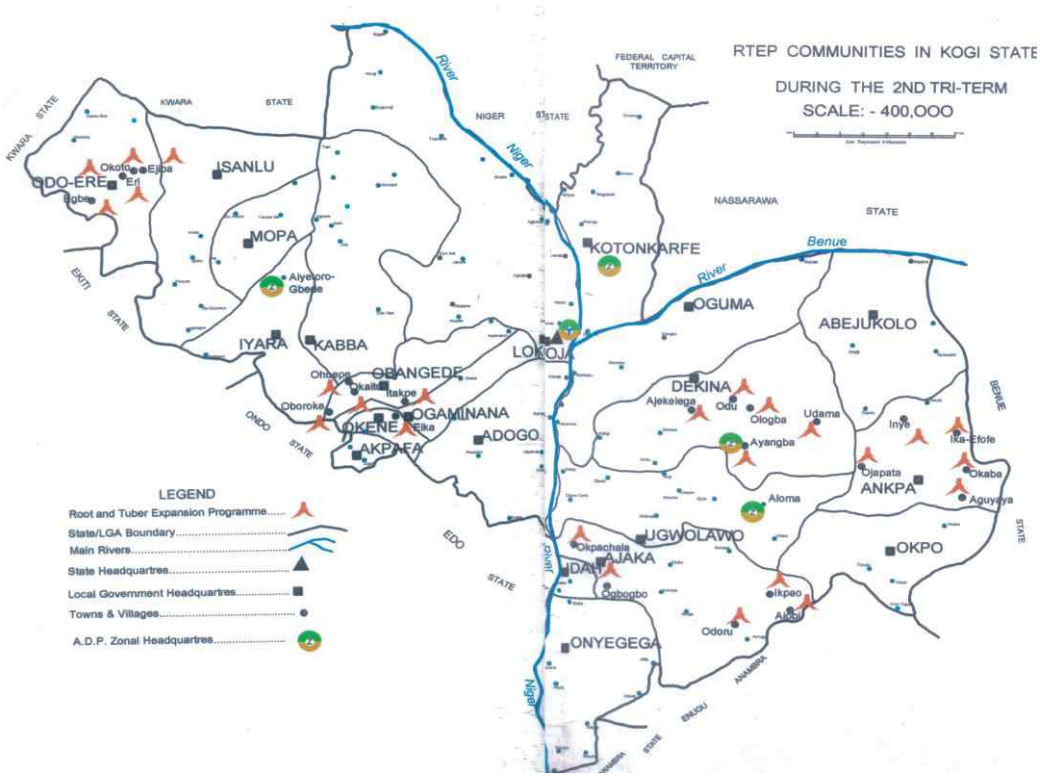

Figure 2: Map of Kogi State showing RTEP Cassava Processing Centres

Job creation within the cassava value chain

The cassava value chain has great opportunities for job creation, wealth generation and industrialization. There are a number of enterprises within the cassava value chain that could boost the actualization of these three noble potentials. From field survey conducted among producers and processors, it was revealed that a hectare of cassava could gainfully employ a person for a year, while a 1.50 ton per day capacity gari factory could engage 75 people (Table 5). From the table, gari processing factory was the highest employer of labour (75 persons), followed by High Quality Cassava Flour factory (70 persons), while cassava production employed the least number of persons.

Table 5: Employment generation by cassava based enterprises in Kogi State

Type of enterprise	Capacity	No employable/yr/person
Cassava production	tonnes	1
Processing into gari	1.50 ton/day	75
Processing into cassava chips	1.50 ton/day	30
Processing into HQCF	1.50 ton/day	35
Processing into HQCF	5.00 ton/day	70

Source: Kogi ADP, 2017

Apart from these core enterprises in the cassava value chain, there are a number of other ancillary service providers and chain actors that depend on the value chain for sustenance. These include: transporters, tractor operators, spare parts dealers, agro-dealers, spray gang operators, food vendors e.t.c.

Challenges of cassava production and utilization in Kogi State

The main challenges to production and utilization include the following;

- Poor rural infrastructure (bad rural roads and near absence of water in most rural areas)
- Drudgery in production and processing
- Limited land for mechanization
- Limited tractors and implements
- Adulterated agro-chemicals
- Weak and poorly manufactured sprayers
- Unstable market prices for fresh cassava roots
- High cost of cassava cuttings
- High transport cost

Envisaged level for cassava production and processing in Kogi State

For Kogi State to remain as a leader in cassava production, the State and other stakeholders in the industry should raise the bar on their efforts in achieving the following targets;

Increasing yield/ha to at least 35tons

Efforts should be made to replace low yielding varieties of cassava with improved high yielding ones. Cassava's full potential will not be realized until some critical production constraints like use of improved varieties and adequate plant density are mitigated. For instance, in an experiment conducted in Ethiopia on yield and yield components of cassava varieties, a yield of 23.93 t/ha was obtained from a variety. This high yield might be due to the difference in genotype and environmental variation (Chanie and Walelign, 2020). Similarly, in Brazil, yield of tuber increased (31.67t/ha) as planting density increased to 17,800 stands per hectare (Tiago *et al.*, 2013).

Increase State production to 40.00million metric tons

To advance the suggested exponential production growth target of 40 million tonnes, an enormous intervention effort is required to propel cassava yields from their current trend (Phillips *et al.,* 2004). Increasing yields to 15 tonnes per ha is a significant challenge for the subsector. Push factors such as government support, new varieties, better farming practices and farmer motivation are typically cited as means to increasing yields. Pull factors such as consumer demand, industrial demand, favourable markets, and positive attitudes are not commonly mentioned. It is maintained that both the 'push' and the 'pull' are needed if the industry is to move forward (Phillips *et al.,* 2004).

Area cropped with cassava to increase to about 350,000ha

The State transverses two agro-ecologies, rain forest to the south and derived woody savanna to the north. The vegetation cover in the state places enormous constraint to large scale farming. To increase hectare cropped, there is the need for extensive land clearing and tractorization of land (Nkakini *et al.*, 2006). Expansion of cassava cultivation to non-traditional areas is an alternate strategy that should be adopted to increase area cropped (Edison, 2007). New planting and harvesting machinery are being developed, evaluated and perfected in the country. These machineries when deployed would reduce costs of production, free more labour for other uses and allow for large areas to be planted to cassava (Ceballos, 2000). The current subsistent nature of cassava production cannot suffice the demand for roots (Phillips *et al.*, 2004 and Akinnagbe, 2010).

Emphasis on production for industrial use

Cassava based industries would need tubers with high starch content, which could be obtained from timely harvesting of some varieties of cassava (Phillips *et al.,* 2005). The shift in focus of cassava from a food to an industrial crop would lead to a change in the breeding strategy for cassava. Niche varieties need to be developed and deployed to cater for increasingly diverse and competing end uses (Edison, 2007). Farmers should be encouraged to focus on production for the industries (Akinnagbe, 2010).

Less dependent as food

Cassava is the main staple food for most people in the State (Onyenwoke and Simonyan, 2014). This over dependence on the crop for food leaves little for industrial uses. It is strategic for the people of the State to widen the crops on which they depend for food and other human needs. Cassava is a reliable crop on one hand, but it can be used in several industrial pathways on the other (Ceballos, 2000). Farmers should be

encouraged to produce other substitutes like maize, sorghum in order to free cassava for other uses (Phillips *et al.*, 2004).

Recommendations to achieving the goals for cassava production in Kogi State

There should be more land cleared for cassava production. This is a major constraint to production. In other to attract youths to join the revolution, the State should provide clearedk2 and tractorable land. Sustained full mechanization of the entire production and processing value chains. Simple labour saving devices in both production and processing would greatly revolutionalize the cassava industry. This include: tractors, planters, sprayers, peelers, packers/trucks, harvesters e.t.c. While small and medium scale producers and processors are encouraged to thrive, the State should provide enabling environment for private sector participation which is key for cassava revolution. Governments (State and LGAs) should as a matter of necessity provide a favourable environment to doing business in the State. This should include among others adequate security and rural infrastructures (rural roads, potable water supply and electricity).

Conclusion

Cassava production holds a promise of longevity in Kogi State as the crop is the main staple of most of the farm families of the State. In order to sustain its production, there should be a shift in focus of cassava from a food to an industrial crop which would lead to a change in the breeding strategy for cassava. Niche varieties need to be developed and deployed to cater for increasingly diverse and competing end uses in several industrial pathways. In order to drastically reduce poverty and unemployment, there is the need for adequate government support, development of new varieties, adoption of better farming practices and farmer motivation. Furthermore, the State government should intensify efforts to promote rural economy and provide an enabling environment for entrepreneurial development with robust private sector participation. Provision of rural infrastructures especially roads, potable water and electricity is important to the attainment of the State vision for the cassava industry.

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