

Potentials of the Agro Industry towards Achieving Food Security in Nigeria and Other Sub-Saharan African Countries

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Abstract The potentials of Agro Industry towards nation's development can not be over-emphasized in any country, especially developing countries like Nigeria. Nigeria is among the highest producers of many crops, which could be processed into value added products (VAPs) to enhance foreign earnings. Many advantages abound when effective policies are enacted and implemented in the agriculture sector towards realising potentials. However, policy formulations and implementation have remained a major problem in the development of their Agro food Industry in the sub-Saharan African countries, including Nigeria. The required processing techniques to convert crops and tubers into VAPs are usually hampered because of non availability of necessary processing facilities, and when available the power required to run them is lacking or grossly insufficient. Many other challenges are encountered in most developing countries of Africa, some of which have been identified in the current report. Summarily, Nigeria, and indeed sub-Saharan African countries, could benefit immensely from the potentials inherent in the Agro Food Industry towards achieving food security, if the challenges currently confronting the sector are tackled headlong and the policy formulations are proactively implemented.

Keywords: *Agro Industry, value added products, processing techniques, sub-Saharan African countries, food security*

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1. Introduction

The Agro food industry is a vital integral of economic growth of any country. Various cash crops that are produced in different countries could be major sources of economy if properly managed. This has been the case in many developing countries such as Malaysia. A strong and efficient agricultural sector would enable a country to feed its growing population, generate employment, earn foreign exchange and provide raw materials for industries. The agricultural sector has a multiplier effect on any nation's socio-economic and industrial fabric because of the multifunctional nature of agriculture [1]. Agriculture could be said to be the mainstay of many economies and it is fundamental to the socio-economic development of a nation because it is a major element and factor in national development.

The Agro-foods industry plays a fundamental role in the creation of income and employment opportunities in developing countries. The agro-processing sector is by far the most significant component in the agro-food industry and covers a broad area of postharvest activities, packaged agricultural raw materials, industrial and technology intensive processing of intermediate goods and the

fabrication of final products derived from agriculture (UNDP, 2012).

The agricultural sector has been described by Okolo [3] as the most important sector of the Nigeria economy which holds a lot of potentials for the future economic development of the nation as it had done in the past. In most developed countries of the world, 15% of their national earnings are generated from agro industries while in Nigeria, less than 10% of their national earnings is generated. Despite the poor percentage that agriculture contributes to total earnings in Nigeria, agricultural performance in the economy continues to decline when compared to the contribution of other non-agriculture sectors of the economy such as petroleum towards gross domestic product (GDP). Worst still, the budgetary allocations to agriculture has been reduced in the past few years in Nigeria [4].

Food security has been defined in terms of food availability and its accessibility to people [5]. It is believed that there can be no food security without its availability; its safety must however be guaranteed. Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life [6].

The challenge of feeding the growing world population, which is expected to reach 9 billion people in 2050, requires new strategies and new multicultural and multisectorial rethinking capable of generating new forms of dialogue, at different specialist levels, towards a more sustainable use of the available natural and human resources, to ensure food and nutrition security [7]. Food consumption and production trends and patterns are among the most important drivers of environmental pressures [8].

The present report seeks to examine some potentials of Agriculture towards economic development and food security, and identify some of the challenges faced by Agro Industry sector in Sub-Saharan African Countries, especially Nigeria..

2. Materials and Methods

The materials used in the present report were obtained from various sources including International Institute of Tropical Agriculture, United States Agency for International Development, United Nations Industrial Development Organization, United Nations Development Programme, United Nations Industrial Development Organization, Food and Agriculture Organization etc. Some data were also obtained from various literatures, especially learned Journal publications. Descriptive, narrative and comparative methods were adopted during data collations and presentations [7].

The report stressed on the importance of Agriculture in Nation's development as canvassed by International Organizations. The states of Agriculture before and after discovery of petroleum in Nigeria were described towards ensuring a holistic assessment. The paper identified some of the major challenges facing Agriculture in Sub-Saharan African countries, particularly Nigeria; and possible solutions were suggested in addressing them in order to foster food security. Holistic approaches were imbibed during the course of preparation of the report.

3. Results and Discussions

3.1. Importance of Agriculture in Nation's Economy

Civilization began with agriculture. When our nomadic ancestors began to settle and grow their own food, human society was changed favourably. Human communities, no matter how sophisticated, could not ignore the importance of agriculture. To be far from dependable sources of food was to risk malnutrition and starvation. In modern times, however, many in the urban world have forgotten this fundamental connection. Insulated by the apparent abundance of food that has come from new technologies for the growing, transportation and storage of food, humanity's fundamental dependence on agriculture is often overlooked [9]. The importance of agriculture in the economy of any nation cannot be over emphasized. Agriculture plays a major role in virtually all social and economic activities of countries.

The World Food Summit held in Rome in 2009 served as an important opportunity in reiterating the fundamental

importance of agriculture. According to the resolutions reached by the heads of nations at the summit, the global food insecurity problems (most especially in developing countries) could be properly addressed by giving due attention to agriculture.

Proactive utilisation of agricultural resources of any nation could help promote her economy. It could enhance increase in the GDP, provide food and employment for the populace and reduce poverty [10]. No nation can develop without giving due attention to agriculture. Unfortunately, many developing countries, especially Nigeria, have great potential for agricultural development but are not maximising the opportunities. This is evidenced in the favourable weather and large cultivable lands, a large percentage of which is grossly underutilised.

3.2. Agriculture during Pre-Petroleum Discovery in Nigeria

The Nigerian economy, during the first decade after independence, could reasonably be described as an agricultural economy because agriculture served as the engine of growth of the overall economy [11]. Agriculture was of enormous importance in terms of occupational distribution and contribution to the GDP. During this period Nigeria was the world's second largest producer of cocoa, largest exporter of palm kernel and largest producer and exporter of palm oil. Nigeria was also a leading exporter of other major commodities such as cotton, groundnut, rubber and hides and skins [1]. The agricultural sector contributed over 60% of the GDP in the 1960s and despite the reliance of Nigerian peasant farmers on traditional tools and indigenous farming methods, these farmers produced 70% of Nigeria's exports and 95% of its food needs [12].

3.3. Agriculture during Post-Petroleum Discovery in Nigeria

The agricultural sector suffered neglect during the period of the oil boom in the 1970s. Since then Nigeria has been witnessing extreme poverty and the insufficiency of basic food items. Historically, the roots of the crisis in the Nigerian economy lie in the neglect of agriculture and the increased dependence on a mono-cultural economy based on oil. Within the last decade, the agricultural sector accounts for less than 10% of Nigeria's GDP and less than one percent of export earnings, oil accounting for the rest [1].

Nigeria has substantial economic potential in its agricultural sector. In spite the importance of agriculture in terms of employment creation, its potential for contributing to economic growth is far from being adequately exploited. It has been observed that the sector's importance has fluctuated with the rise and fall in oil revenue. Over the past decades, the Nigerian agricultural sector has remained stagnant while the contribution of the manufacturing sector to the GDP had declined significantly. The neglect of the agricultural sector and the dependence of Nigeria on a mono-cultural, crude oil-based economy have not augured well for the well-being of the Nigerian economy. In a bid to address this, the Nigerian government as from 1975 became directly involved in the commercial production of food

crops. Several large scale agricultural projects specialising in the production of grains, livestock, dairies and animal feeds were established. Sugar factories were also established at Numan, Lafiagi and Sunti [12]. The Nigerian Agricultural and Co-operative Bank was established in 1973 as part of government's effort to inject oil wealth into the agricultural sector through the provision of credit facilities to support agriculture and agro-allied businesses.

In spite of these efforts, it is unfortunate that as from the mid 1970s, Nigeria became a net importer of various agricultural products [1]. In 1982, Nigeria imported several tons of palm oil and cottons at the cost of 184 million USD. In the 70s and early 80s, millions of tons of wheat / rice and several thousand tons of maize were imported. This led to increase in the money used in food importation from the 60s to 80s (from N47.8 million in the 60s to N88.2 million in 1970 and about N1 billion in 1988 [13]. Since the 1990s Nigeria has been spending several millions US Dollar on food importation. According to a report, Nigeria spends about N300 billion on food imports alone [14].

Between 1995 and 1998 the government further embarked on the reformation of the lending policies of the Agricultural Credit Guarantee Scheme (ACGS) for easier access to agricultural credit schemes. It also established the Calabar Export Processing Zone (EPZ) and initiated the Enugu, Kaduna, Jos, and Lagos EPZs with each specialising in specific food and export crops. In fact, the National Rolling Plan for 1996-1998 assumed that by year 2000, Nigeria would have been able to feed its population, develop the capacity to process agricultural raw materials both for local industries and for export and significantly increase the contributions of the agricultural sector to the GDP [12]. These lofty objectives have turned out to be unrealistic, probably due to corruption and lack of commitment on the part of those saddled with the responsibility of implementing the government's agricultural policies.

3.4. Challenges to Agriculture in Nigeria

According to Olayemi and Akinyosoye [15], Njoku [16] and NISER [17], the major factors challenging the development of agriculture that have been identified could be summarized as follows.

3.5. Technical Factors

Such technical factors include the high incidence of pests and diseases, inadequate infrastructural facilities, dependence on unimproved inputs, and rudimentary technology. Others are inadequate extension services, an inefficient inputs supply and distribution system, and high environmental hazards.

3.6. The Factor of Resource

One of the important problems of agricultural labour supply arises from the increasing migration of able-bodied youths from rural to urban areas. The consequence of the massive migration of youths is seasonal labour shortage, especially at the peak periods of labour demand such as during land preparation, planting, weeding, and harvesting. There is also the problem of low agricultural labour

productivity. There is an increasing population pressure on land as well as a declining quality of land. Rate of land improvement is low because of the low rate of capital investment by the predominantly traditional farmers.

3.7. Factor of Organization

Agricultural production is predominantly in the hands of a multitude of small-scale, unorganized farmers scattered across the country. Lack of organization, coupled with the dispersed nature of farm settlements, hinders the participation of farmers in agricultural and rural development. This hinders the supply of extension services, farm credit, and other vital inputs to farmers.

3.8. Policy Formulation Vis a Vis Implementation

The various policies by government towards improving agricultural development in Nigeria have been well reviewed by Manyong *et al.* [18]. However, despite the lofty policies, the objectives of increasing agricultural produce have not been realised. This, according to Manyong *et al.* [18], could be attributed to:

i. Policy instability

One of the major constraints to agricultural policy effectiveness was that of policy instability. Over the years, the rate of turnover in agricultural policies had been high, with many policies formulated and scrapped in rapid succession. Again, this problem could be partly ascribed to political instability as every successive military government tended to jettison most of its predecessor's policies and programs in the erroneous belief that a new government could only justify its existence or make its mark by adopting entirely new policies and programs.

ii. Inconsistency in policies

It had been observed that some agricultural policies and programs of Government tended to be mutually antagonistic rather than being mutually complementary and reinforcing. A popular example was the conflict, which existed between Government's domestic food production policy and its cheap food import policy. The latter was so antagonistic of the former that the domestic food production policy was rendered ineffective.

iii. Narrow base of policy formulation

The base of the agricultural policy formulation process in Nigeria had, in the past, been rather narrow as the level of involvement of the people and their institutions in the formulation of policies that affected their lives was minimal. In the circumstance, these policies tended to lack grassroots support and the popular mobilization required for their success.

iv. Poor implementation of policies

There was a tendency to regard the formulation of policies as ends in themselves, rather than being means to desired ends. As such, little attention is paid to the efficient implementation of policies. Bureaucrats and policy implementers tended to lose sight of the fundamental objectives of policies, instead, focusing on superficial issues. Poor managerial capacity, bureaucratic bottlenecks, corruption, and high rates of policy turnover tend to complicate the problem of policy implementation. Insincerity and lack of

commitment on the part of those saddled with the responsibilities of implementation are also important factors contributing to failure of the government agricultural policies.

v. Weak institutional framework for policy coordination Inadequate institutional arrangements for policy and program coordination had often led to a duplication of effort and general inefficiency in resource use among agencies and ministries of the same government, between federal and state agencies, and between states. Inadequate monitoring and evaluation arrangements for policy implementation had also led to situations in which policies and programs tended to lose sight of their focus and original goals without corrective measures being taken.

3.9. Poor Level of Collaboration between Research Institutions and Industry

There is need for collaboration between the industry and research institutions (Universities, Polytechnics, Research Institutes) if the Agro Industry is to improve on their performance. Research is required in finding solutions to emanating problems in the agro industry, thereby increasing product output. Unfortunately such required collaboration is lacking (or rather very poor) in Nigeria. This may in part be due to the problems endemic in research institutions in the country, which may have eroded the confidence reposed in them.

3.10. Lack of Farming Enhancing Facilities

These include the use of irrigated land, fertilizer consumption and tractors for land cultivation. Data presented in Table 1 indicates that use of these facilities is quite low in Africa and this has been found to be among the factors responsible for low agricultural outputs in the region, especially Nigeria. The use of crude implements that are manually operated has been rampant in most developing countries of Africa.

Table 1. Use of productivity-enhancing technologies in farming

Region	IL	FC	T/100km ² AL
East Asia and Pacific	-	-	89
E. Europe and Central Asia	11.2	34.7	185
Latin America & Caribbean	11.4	89.6	123
Middle East & North Africa	32.7	83.3	142
South Asia	38.9	106.7	129
Sub-Saharan Africa	3.6	12.5	13
Europe	17	205.9	1002

IL, Irrigated Land (percentage of crop land);
FC, Fertilizer Consumption (kg/ha of arable land)
AL, Arable land

3.11. Lack of Financial Support from Govt/Individuals

Many of the research institutions in Nigeria are in very poor state, especially in terms of availability of functional research facilities. This has serious effect on research activities. There is therefore the need for support (in form of research grants) from the government and private sector in the provision of these facilities. In the last four years, 2010 - 2014, budgetary allocations to Agricultural sector has consistently been on the decline when compared to

other non-Agricultural sectors of the economy [4]. This is not healthy for the Agricultural sector as such may invariably promote reduction food insecurity among citizens. In the developed world, Agro-industry is well developed, co-ordinated and incorporated into their economy, thereby promoting food security.

3.12. Energy as a Challenge to Agro Food Industry in Africa

Insufficient energy generation and poor distribution in Africa is attributable to policy and regulatory barriers, resource limitations and financing as well as to exogenous factors. High population densities in urban areas lead to a concentrated demand for energy and the opportunity to exploit economies of scale. The majority of Africa's population resides and obtains their livelihoods in rural areas that house agriculture and traditional Agro-industrial processes, and this is very pronounced in case of Nigeria. Such processes include preservation techniques as sun-drying (e.g fermented cassava and tempered yam slices for *lafun* and *elubo* production respectively, vegetables like pepper, okro etc), milling operations such as size reduction of dried yam and cassava cubes or slices) and energy intensive operations, including pulping of vegetables and fruits. These activities could be reasonably accelerated if access to energy is available to run modern equipment to provide fast throughput of samples for processing. Access to modern energy however, is either extremely limited, too expensive or of low quality in rural areas. Electrification rates show that Africa has lower energy penetration than other regions. Such low electrification constrain both Agro-industrial production and the consumption of processed food products, since many agricultural raw materials especially highly perishable food raw materials, need to be processed within a few hours of harvesting in order to ensure food conservation, food safety and marketability.

The dispersal of energy demand in rural areas of Nigeria also poses a unique challenge in view of the distribution and maintenance costs. This calls for a renewed approach to energy supply planning in Africa. While the need for increasing energy access is clear, developing countries must choose whether to prioritize rural areas, where the majority currently resides, or urban areas that will become the homes of the majority of future populations. This is a critical consideration, especially given the reality of limited resources and competing urgent basic needs in terms of food security, health and education.

Table 2. Investment requirements to attain universal access to reliable electric power by 2030

	Total Capital Investment (\$ Billions)			
	Generation	Transmission	Distribution	Total
Northern Africa	82	29	62	173
South Africa	77	5	10	92
Sub-Saharan Africa	102	54	119	275
Island States	4	1	2	7
Africa	265	89	194	547

Source: AfDB [19]

Table 2 shows the investment requirements for Africa to attain universal access to reliable electric power by 2030. This is an indication that the challenges faced by the

Agro food industry in Africa would linger before solution could be proffered, especially those that are affected (directly or indirectly) by power.

3.12. Other Challenges

Among other challenges to development of agriculture in Nigeria, and Africa as a whole, are high cost of inputs, lack of adequate processing and storage facilities. Access to inputs is fundamental to agricultural performance, but high prices due to high rate of inflation may constrain performance. Poor infrastructure including epileptic power supply, inadequate supply of potable water, and the skewed distribution of available infrastructure in favour of urban areas were also negatively affecting the agricultural development. Insecurity of lives and property was also an important inhibiting factor.

3.12.1. Upgrading Value Chains

Farmers, traders and processors based in Africa are said to upgrade when they acquire new capabilities or improve existing ones. According to Ponte and Ewert [20], upgrading paths can be characterized as follows:

a) Product upgrading: moving into more sophisticated products with increased unit value, or with more complex content, or that match more exacting product standards.

b) Process upgrading: achieving a better transformation of inputs into outputs through the reorganization of productive activities, and/or from improving standards in quality management, environmental impact and the social conditions of production.

c) Functional upgrading: acquiring new functions that increase the skill content of activities and/or improve profitability (for example, moving from production only, to production and primary processing).

d) Inter-sectoral (or inter-chain) upgrading: applying competences acquired in one function of a chain and using them in a different sector/chain.

e) Other forms of upgrading: matching strict logistics and lead times (time to market), consistently delivering supplies reliably and homogeneously (a major challenge in agro-food products), being able to supply large volumes (thus improving economies of scale).

3.12.2. Many advantages of Agro Food Business

Table 3 shows the sectoral shares in employment of the Agro business in Africa. Alongside its role in stimulating economic growth, Agribusiness and Agro-industrial development has the potential to contribute substantially to poverty reduction and improved social outcomes and a consensus is emerging that Agro-industries are a decisive component of socially-inclusive, competitive development strategies [21]. Evidence of the link between growth and poverty reduction varies according to country, this is however more pronounced in leading developing countries of the world. Spectacular economic and industrial growth in China lifted 475 million people out of poverty between 1990 and 2005, though large pockets of poverty still exist in growth-oriented areas and rural communities due to structural rigidities. In sub-Saharan Africa, despite strong growth in recent years, the number of people living on less than \$1.25 a day increased by 93 million during the same period [22,23]. The achievement of the Millennium Development Goals (MDGs) in sub-Saharan Africa has

been constrained by two factors: firstly, most countries have not met the required GDP growth rate to reach the MDG target. Secondly, labour absorption and employment intensity have been low due to a concentration of growth in some capital-intensive extractive sectors. Strong synergies exist between Agrobusiness, agricultural performance and poverty reduction for Africa. Efficient Agribusiness may stimulate agricultural growth and strong linkages between agribusiness and smallholders can reduce rural poverty thereby promoting food security. A focus on value addition in agribusiness is therefore central to existing strategies for economic diversification, structural transformation and technological upgrading of African economies. Such a focus can initiate faster progress towards prosperity, by affecting the bulk of the continent's economic activities and by harnessing critical linkages between the major economic sectors. This 'people-oriented' strategy will improve welfare and living standards of the vast majority of Africans, both as producers and consumers, and from the perspective of employment, income and food security.

Table 3. Sectoral shares in employment, world and regions, 1997 and 2005 to 2007

	Employment in sector as share of total employment		Female employment as share of sector total
	1997	2007	2007
Agriculture			
World	41.4	34.9	41.3
North Africa	35.4	32.8	23.9
Sub-Saharan Africa	72.1	64.7	44.4
Industry			
World	21.1	22.4	31.2
North Africa	19.9	20.6	17.7
Sub-Saharan Africa	8.5	9.6	25.5
Services			
World	37.5	42.7	43.2
North Africa	44.7	46.6	26.9
Sub-Saharan Africa	19.4	25.7	43.4

Source: ILO [28]

On the demand side, food expenditure often represents the largest single item of household expenditure, rising to more than half of total expenditure for poor households in some countries, and therefore the efficiency of post-harvest operations is a major determinant of the prices paid by the urban and rural poor for food, and thus an important factor in household food security [24]. Agro-industrial development can contribute to improved health and food security for the poor by increasing the overall availability, variety and nutritional value of food products, and enabling food to be stored as a reserve against times of shortage, ensuring that sufficient food is available and that essential nutrients are consumed throughout the year. This is a major challenge in most sub-Saharan African countries including Nigeria.

On the supply side, Agro-industrial development has a direct impact on the livelihoods of the poor both through increased employment in agro-industrial activities, and through increased demand for primary agricultural produce. Though varying significantly by subsector and region, Agro-industry, particularly in its initial stages of development, is relatively labour-intensive, providing a

range of opportunities for self and wage employment. Agro-industrial activity in Africa is also frequently distinguished by a high percentage of female employment, ranging from 50 per cent to as high as 90 per cent. For example, the non-traditional export sector (vegetables, fruit and fish products), which is currently the most dynamic in terms of exports from sub-Saharan Africa. Similarly, the small-scale food processing and catering operations ubiquitous throughout much of the continent are typically operated predominantly by women; a study of small-scale urban Agro-processing and catering enterprises in Cameroon found that more than 80 per cent were managed by women, with men being present almost exclusively in the mechanical milling/grinding and meat preparation activities [25]. It has also been noted that the gender bias apparent in many Agro-processing activities may contribute to the general underestimation of both Agro-industrial activity and female employment in national accounting, noting that a very high share of these activities are undertaken as secondary activities and are generally hidden behind subsistence agriculture [26].

Alongside job creation, Agro-industrial enterprises often provide crucial inputs and services to the farm sector for those with no access to such inputs, inducing productivity and product quality improvements and stimulating market induced innovation through chains and networks, facilitating linkages and allowing domestic and export markets to become mutually supportive [27].

Agro-industry is also amongst the most accessible of industrial activities - frequently undertaken at small-scale, with low initial cost and technological barriers to entry. Small medium enterprises remain key actors in the largely informal trading and processing networks, which dominate food procurement in much of urban Africa, and have proved remarkably adaptive and resilient in the face of a range of economic, institutional and infrastructural challenges.

3.12.3. Cassava Processing

Many vegetable crops are available in Nigeria, among which is cassava. Nigeria is the largest producer of cassava in the world [29]. Despite several reports on the processing of this crop into useful products, a number of possible improvements could be applied to domestic cassava in enhancing its value [29] and these include:

i) Animal Feed:- The livestock sector in Nigeria is expanding rapidly and a continuing rapid demand for animal feed is predictable. In view of the relatively high-income elasticity for meat products, it is likely that this trend will continue in the next decades. Processing cassava into pellets has the advantage of both transport cost reduction and quality enhancement.

ii) Flour:- The blending of cassava flour with wheat flour has occurred in the past, but due to the use of unreliable quality cassava flour, and the general negative perception of cassava as a poor man's crop, the practice may have been affected. If at all it occurs, bakeries may not admit to using cassava flour. There is therefore the need for research to ensure consistency in the quality of cassava flour that would be recommended for use as composites of wheat flour in bakery products. This will promote the use of local crops and enhance great savings instead of the more expensive imported wheat flour that has to be paid for in foreign currency.

iii) Starch:- The key issue for the operational starch plants in Nigeria is to reduce cost of raw materials. Therefore possibility of producing starch from cassava is of paramount importance. This is an important development priority for cassava production and processing in Nigeria as it offers the best opportunity for further processing into modified starch products as well as for potential exports.

iv) Ethanol:- Agro Industries capable of producing ethanol from cassava should be encouraged in the country. Ethanol production plants may source their raw materials from other cassava processing plants. The possibility of production of other biofuels should also be exploited.

Table 4. Area and output of cassava roots by state in Nigeria

State	Annual ha planted	Annual MT produced (x1000)	Mean yield (MT/ha)	Indicative prices of fresh fruits (Naira/MT)		Surplus cassava rating
				1998	1999	
Benue	261.1	3551	13.6	-	-	High
Kogi	184	2605	14.2	3379	2987	High
Enugu	186.5	2085	11.2	4360	7410	Low
Imo	156.5	2052	13.1	6340	5980	Medium
Cross River	177.5	1958	11	7800	8820	Low
Kaduna	206	1835	8.9	6600	9230	Low
Rivers	167.5	1735	10.4	15800	11600	Low
Ondo	73.2	1267	17.3	3500	3120	High
Ogun	75.7	1178	15.6	5890	3075	High
Oyo	121	1019	8.4	2430	4910	High
Osun	66	915	13.9	5100	4560	High
Akwa-Ibom	117.8	893	7.6	6070	4300	Medium
Delta	70	811	11.6	4350	5179	Low
Ekiti	41.2	651	15.8	3500	2000	Medium
Anambra	53	627	11.8	24250	4800	Low
Edo	45	545	12.1	3810	-	Low
Niger	73.5	535	7.3	14880	10390	Low
Bayelsa	30	459	15.3	30000	70000	Low
Ebonyi	29	435	15	1070	3350	Medium
Kwara	30	425	14.2	-	-	Medium
Plateau	26.9	345	12.8	10920	2340	Medium
Lagos	25.1	300	12	-	-	Low
Abia	15.7	265	16.9	5650	2320	Medium
Nasarawa	25	248	9.9	8720	5870	Medium
Taraba	12	111	9.3	13910	15230	Low

Source: Knipscheer *et al.* [29]

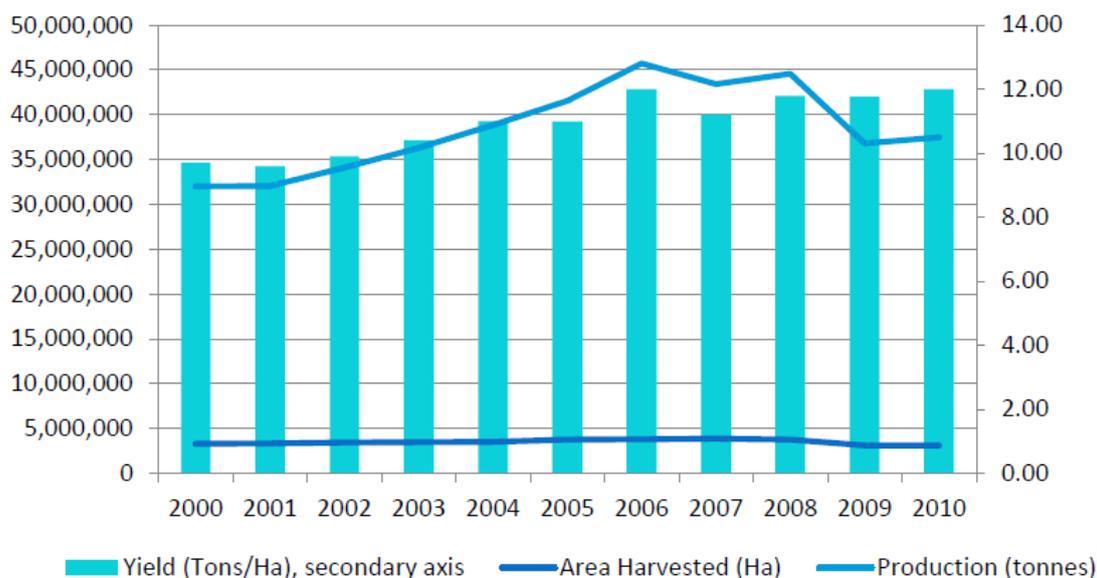


Figure 1. Main production figures for cassava in Nigeria (2000-2010) (Source: MAFAP [30])

Nigeria has very good potentials of profitably maximising utilisation of cassava grown across many of the states in the country. Shown in Table 4 is the analysis of cassava production across the major producing states in Nigeria. Also shown in Figure 1 is the cassava production, yield and area data. In 2010 production values reached about 37.5 million tonnes while yield and area values reached 12 tonnes per hectare and 3.13 million hectares respectively. The data also show that while area harvested remained overall stable during the past decade, production saw an increase of 15 percent between 2000 and 2006, with yields developing in correlation to production trends [30].

3.12.4. The Food Scientist's Role in the Agro Industry

The Food Scientist has a role to play in the Nigerian Agro Industry. The major role includes that of processing and preservation of agro raw materials. The food industry forms an important component of the Agro industry, which transforms agricultural materials into semi finished products in an effort to reduce waste/spoilage. The role of the Food Scientist in the Agro industry towards ensuring food security is very important. This is because there can not be any appreciable growth in any nation's economy under conditions of starvation and abject poverty. The many useful roles of the Food Scientist in ameliorating the food insecurity situations being currently experienced in developing countries, especially in Africa, have been reviewed in a recent report [31].

4. Way Forward and Conclusions

In order to maximally tap the potentials of Agro Industry in sub-Saharan Africa, and Nigeria in particular, certain factors that could promote agricultural performance should be properly addressed. According to a study by Manyong *et al.* [18], some of these factors include access to inputs, high demand for products (i.e. market availability), availability of transport facilities, availability of raw materials etc. Also the need for collaborations between Industry and research institutions should be encouraged. However, there is need for

upgrading research facilities in research institutions through adequate funding by government. The private sector should also contribute towards provision of necessary facilities in these institutions. This will help in fostering research activities and improving performance in the Agro Industry.

Another important factor that need be addressed is the issue of adequate staff welfare in research institutions. If this is given the required attention, many cases of diversion of research grants for personal use by researchers will be prevented. Remember, any hungry man will seek to appease his hunger before giving attention to any other thing.

For Nigeria to tap profitably into the available resources in the Agro-industry, there should be good focusing and re-focusing on agricultural policies. About 30-35 years ago the Malaysians came to Nigeria - looking for new agricultural products. They took some oil palm seeds, and applied science and technology to it. At that time, Nigeria, Ghana and Côte d'Ivoire were among the top five palm oil exporters in the world. With science and technology, and sound management, Malaysia produces more than 30 products from oil palm and tree, and is exporting a refined version of palm oil as bio-fuel [14].

Additionally, production of value added products from agricultural raw materials should be encouraged. This should be done through creation of industries (or encouragement of existing ones) that will help realise the objectives. For example Brazil and Thailand are among the largest producers of Cassava in the world, but Nigeria produces more than them. However, whereas in Nigeria (and the rest of Africa) we consume 90-95% of our cassava production in semi-processed or raw form, in Thailand and Brazil they use it for industrial purposes and only use about 10-20% for immediate consumption. We can only make meaningful and economic gains from the so-called cassava revolution in Nigeria, if we promote industries that transform cassava into value-added products. The bye-products (especially ethanol) which comes from molasses (a by-product of sugarcane) could be produced by the Agro Industry in Nigeria. Ethanol could be used to produce a brand of biofuel known as alcogas or green petrol; this can be used in complementing

petrol in the country. This will help in reducing Nigeria's dependence on imported fuel and save additional foreign exchange for other uses.

According to Ogen [1], there is need for the government of Nigeria to promote the establishment of Agro-based industries that are capable of processing agricultural raw materials efficiently, with particular emphasis on the processing of raw crops for local industries as well as for export. This will create more employment opportunities and additional income will be generated. The provision of agricultural subsidies for fertilizer, farm implements and equipment would also boost agricultural production. There is also the need to put in place an agricultural tariff regime that would protect Nigeria's agricultural produce from unbridled foreign imports and competition.

There is also the need for the provision of grants to cash crop farmers for replacement of their old trees with newer varieties, especially those that have been improved biotechnologically. It has been observed that in spite of the fact that these newer varieties are high-yielding and relatively easy to maintain with a shorter maturation period, most farmers are reluctant to do away with their old plantations because of the high cost of replanting new ones [32].

It is imperative to provide special welfare schemes for farmers that will form part of a social policy to alleviate rural poverty and the redistribution of income in favour of the rural poor. Government should also strive to promote greater efficiency in the rural areas by extending equal social benefits; establishing rational schemes for agrarian reforms and improving the quality of life in areas that are quite remote from the main centres so as to alter the movement of people from rural communities to urban areas [1].

Despite Nigeria's rich agricultural resource endowment, the agricultural sector has been growing at a very low rate. One of such factors responsible is that the country has not been able to maximise the use of available land for agricultural cultivation. It has been noted that less than 50% of the country's cultivable land is under cultivation [18]. Smallholder and traditional farmers who use rudimentary production techniques, with resultant low yields, cultivate most of this land. More lands should be cultivated to increase productivity of raw materials for use in the Agro Industry, this, however, requires the adoption of mechanized facilities. It is very important that the land tenure system be properly addressed to attract participation by investors from the private sector, so as to avoid dispute which is very common in the country.

Training of farmers, especially in the rural areas, on computer acquisition skills will be of tremendous importance. This will permit them to access the web and find out latest research findings in their respective area of interest. Also the need to create a database for all farmers is very imperative, as this will afford easy contact when necessary distribution of incentives and other issues arises. This way, the farmers will also be able to make contribution and support towards development of policies vis-à-vis implementation.

Nigeria is blessed with abundant agricultural resources from which the country can tap towards improving its Agro industry. However, many factors need to be properly addressed before this can be realised. For Nigeria to tap

from the potential inherent in the Agro Industry the right policies must be put in place with proper monitoring and implementation. Committed people must be used in pursuing the objectives of these policies.

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