

ASSESSING THE IMPACT OF AGRICULTURAL PROGRAMME ON POTATO VALUE CHAIN AND ECONOMIC DEVELOPMENT OF PLATEAU STATE

by

Dakusuk, Markus Jimwan

Yilret Academy, Jos

mdakusukjimwan@gmail.com.

Dr. Canice Erunke

Department of Political Science,
Nasarawa State University, Keffi

Dr. Astiya Godiya Pius

Department of Political Science,
Nasarawa State University, Keffi

Abstract

This paper set out to assess the impact of agricultural programme on potato value chain in Plateau State. The programme is aimed at ensuring that the programme contributes to employment generation and shared wealth creation along the potato community value chain as well as food security through increased access to rural infrastructure. The study specifically established that the potato value chain programme through the African Development Bank (AfDB) has intervened in key local governments areas of Mangu, Bokkos, Barkin Ladi and Riyom where potato is produced in commercial quantity. The study relied on secondary data drawn from arrays of published and unpublished materials. The study recommends amongst others that the potato tissue culture (TC) laboratory at Mangu should be strengthened including a screen house by providing necessary laboratory equipment and materials, creating linkages between the tissue culture laboratory and engage farmers who are the direct beneficiary of the intervention.

Keywords: Agriculture, Programme, Potato, Value Chain, Economic Development

Introduction

Fundamentally, agriculture is adjudged as an indigenous occupation in Nigeria and has gone through various stages of development. This development largely, is an effect of government policies and programmes and state approach to agriculture which to some extent demerits or heightens the impact of the sector in the nation. Based on the Central Bank of Nigeria Report in 2016, the sector in 1960's contributed 85% of the Nigeria foreign exchange earnings, 90% employment generation, and about 80% to Gross Domestic Product (GDP). Available data also shows that at independence in 1960, the contribution of agriculture to the GDP was about 60% which is typical for developing agrarian countries. It means that agriculture is the mainstay of the economy prior to the discovery of oil (Makama, 2016).

Agriculture is practice in rainy or dry seasons. One of such initiative of farming agricultural product either in the rainy or dry season in Nigeria is potato farming which is been cultivated particularly in North Central Nigeria (Yale, 2016). Plateau State is known in potato farming which is concentrated at the Central and Northern zones of the State. The potato (*solanum tuberosum*) is a root tuber crop. Potato was introduced in Nigeria by European miners in 1940s but over the years, the food crop has been an indigenous food crop to the people of Bolivia or Peru (FOA, 2008). The Plateau State Government over the years have made several agricultural programmes that are been implemented.

Programmes been implemented by government ministries, agencies and parastatals for the development of potato for agro-allied industries to increase the economic development of the State (ASTC, 2013).

Nigeria has been identified as the seventh biggest producer of potatoes in Sub-Saharan Africa with production yield of 1,284,370 tones per year. While Algeria is the first producer of potato with a harvest of 4,606,400 tones, Egypt 4,325,480 tones while South Africa account for 2,450,540 tones.

Despite being the seventh largest producer of Irish Potatoes in Africa, Nigeria spends ₦76.4 billion (\$250) million every year on importation of processed potato chips from South Africa, Belgium and Holland (Leadership, 2015). This irony is due to a lot of post-harvest wastage, lack of adequate technology, improper storage facilities and lack of improved practices to explore processing options. It is also a fact according to report that out of 1,284,370 tones of Irish Potato produced annually in Nigeria about half of it goes to waste due to poor distribution chains and channels as well as lack of good storage facilities. Due to the moisture content of Irish potatoes, large quantities are spoilt on their way to Nigerian markets and end up unsold and thrown away (Volmala, 2017).

Plateau State account for 95% of Nigeria's potatoes production and from Plateau, potatoes is exported to Ghana, Niger, Chad and other countries (Leadership, 2015). In 2014, African Development Bank (AfDB) came up with a comprehensive programme that will affect 100,000 farmers. It is expected to create 60,000 jobs in a potato value chain from processing, storage, replacement of current inputs and indeed, export (Plateau State Potato Value Chain Report, 2018).

The potato value chain intervention is in line with the African Development Bank (AfDB) group "HIGH 5" goals of light up and power Africa, feed Africa, industrialized Africa, integrate Africa and improve the quality of life for the people of Africa. It is also aligned with the Bank's Feed Africa – Strategy for Agricultural Transformation in Africa (2016 – 2025). The intervention will contribute to the four strategic goals of the African Agricultural Transformation Agenda which includes contribute to ending extreme poverty by 2025; end hunger and malnutrition by 2025; Turn Africa into Net Food, Exporter by 2025; and More Africa to the top of key global agricultural value chain by 2025.

To underscore the contribution of potato in addressing the world food crisis, the United Nations officially declared 2008 as the "international year of the potato" in order to raise its profile in developing nations, calling the crop Hidden Treasure" (FOA, 2008). Potato has been identified to be the fourth most important root crop in Nigeria after cassava, yam and cocoyam (Okonkwo, 2009). With an efficient tuber crop in the country in terms of tuber yield and days of maturity, not much has been done towards promoting the industrial uses of the crop, thus, the need to study the entire value chain of potato. Efficient processing and increased utilization of potato as an industrial raw material will reduce losses arising from the high rate of perishability of the harvested product. The value chain approach which has been rediscovered recently by the international cooperation community can be very helpful in this regard. Although, the value chain intervention is not very new, practical guidelines, best practices or experiences are still largely underdeveloped with regards to potatoes farming in Plateau State (Ugonna, Jolauso and Onwualu, 2013). Therefore, the main objective of the paper is to assess the impact of agricultural programme on potato value chain and economic development of Plateau State.

Methodology

This study adopted the documentary research design. The study relied on secondary data drawn from arrays of published and unpublished materials relevant to the study such as books, journals, magazines, conferences and seminar papers and newspapers. Other sources of

secondary data were reports and other quantitative publications related to the problems of the study. There were quantitative soft publications and entries in recognized and official websites.

Theoretical Framework: Developmental State Theory

This paper adopted developmental state theory coined by Chalmers Johnson in 1982 as its analytical framework. Developmental state is seen as a state where the government is intimately involved in the macro and micro-economic planning in order to grow the economy whilst attempting to deploy its resources in developing better lives for the people. Loriaux (1999) postulates that the developmental state is a kind of capitalist political economy that is characterized by the preponderance of a certain kind of actor, which pursues a certain kind of power. He clarifies the actor as the state bureaucracy, which is simulated by a certain kind of ambition referring to not only economic growth but also protection and promotion of national interests.

Development is an instinct of nations. According to World Development Report (World Bank, 1997), provision of goods and services like roads and institutions that flourish markets and promotes people's lives is the foundation of good governments in a changing world. Hence, without capacities to develop, the government cannot be regarded as good government. The changing world puts forward a much higher and more urgent requirement for development. Then the point is that without a developmental state, economic policies of government towards development are inconceivable in many under developed and developing countries. The theory is used to identify a specific form of state that is said to enjoy high levels of autonomy from different segments of the capitalist class and labour unions, and have strong institutional capacity, both of which allow this specific form of state to implement a set of successful state-interventionist policies in pursuit of developmental goals. The developmental state theory is with reference to the Japanese state. In Johnson seminal work, he makes a distinction between two forms of states: developmental and regulatory. According to him, the Western States that were first to industrialize hardly intervened in the markets and since the late nineteenth century, these states have undertaken regulatory functions; whereas in states that were late to industrialize, the state itself led the industrialization drive, that is, it looks on developmental functions. The developmental state theory is characterized by having strong state intervention, as well as extensive regulation and planning. The term has subsequently been used to describe countries outside East Asia that satisfy the criteria of a developmental strategy. Johnson view development strategy as a state that is focused on economic development and takes necessary policy measures to accomplish that objective. He argued that Japan's economic development had much to do with far-sighted intervention by bureaucrats, particularly those in the Ministry of International Trade and Industry (MITI).

Relating the developmental state theory to potato value chain programme in Plateau State, there is virtually universal recognition that the state is the central actor in economic development (Yale, 2016). As demonstrated by the early developers of Great Britain and United States of America, the level of state intervention in those cases has without a doubt gone well beyond expectation. Protectionism, promotion of infant industries and active provision of infrastructure as a result of government deliberate policies and programmes in the agricultural sector has formed a critical element of industrialization process in the developed nations. In Plateau State massive investment in potato production is seen as a result of government intervention through the potato value chain programme in the agricultural sector. Rwang (2016) argues that the developmental state theory centres on the ideas of active state interventionism to facilitate rapid industrialization and economic growth in the developing economies.

The intervention of government in potato value chain led to economic growth and development with poverty reduction through the integration of large numbers of micro and

small enterprises (MSEs) into increasingly competitive value chain in the agricultural sector. Through the influence of the state structures, systems and relationships that define value chain helps MSEs in the agricultural sector to improve (or upgrade) their products and process and thereby contribute to and benefits from the chain's competitiveness. Through this programme of government intervention, it enables the MSEs including small scale farmers to create wealth and escape poverty.

Guyang (2015) demonstrated that the quality of relationships between different stakeholders in the economy is a key factor affecting the functioning of the agricultural programme on potato value chain. He affirmed that strong, mutually beneficial relationship between the different actors in the value chain facilitate the transfer of information, skills and services all of which are essential towards fostering economic development. Inusa (2017) observed that the value chain on potato production emphasized: social capital networks of relationship and institutions that are critical to business and competitiveness. The developmental state theory as a framework of analysis on potato value chain programme and economic development in Plateau State has the following relevance:

- (i) The developmental state theory indicates that the state plays an indispensable role in directing economic development using state policies and utilizing the resources of the state to achieve development goals in key sectors of the economy. It gives priority to economic development as seen in the intervention of AfDB in the agricultural sector. Particularly to potato value chain in the State where inputs are provided to farmers.
- (ii) The developmental state, because of its ideological component, the state assumes a developmentalist character in which it conceives its mission as that of ensuring economic development and the associated high rates of accumulation and industrialization in the country through its interventions. The potato value chain programme of government has powered an economic revolution since its intervention in Plateau State. Growth and development was accelerated in terms of incomes of actors along the value chain and poverty rates have plunged to low level. There is an increase in SMEs that uses potato as its raw materials for production (PS-PVCP, 2017).
- (iii) Most importantly, the developmental state theory is believed that the state must have the ability and capacity to identify and correct state challenges in key sector of the economy. State should have the ability to solve specific problem. This informed the good governance consensus (Omer, 2016). The Plateau State Government through the AfDB intervention has played a pivotal role in leading the peasantry to overcome the development obstacles to arrived at the current success. In overcoming the production obstacles, the State has been active, proactive and effective in investing in directing and implementing the course of agricultural production.

Conceptual Clarification

In this paper, there are three basic concepts that require clarification. These concepts are agricultural programme, value chain, and economic development.

Agricultural Programme

Agricultural programme refers to a comprehensive framework designed by government that include objectives that the programme intend to achieved spelling out the specific resources to be deploy in order to achieve the intended programme. Elaborate plans are often times regarded as programmes and are collections of coordinated activities that are mutually directed towards the attainment of a definite goal. This means that agriculture programme is largely the plan of action designed by government to achieve food security within the country. These programmes are earmark fundamentally to ensure that farmers at all levels benefitted from the programme

by training and coaching them on modern means of farming which will in turn resulted to an increase in the earnings of the participatory farmers.

Value Chain

The idea of value chain as a concept was first suggested by Michael Porter in 1985 to depict how customer value accumulates along a chain of activities that lead to an end product or service. Porter (1985) described the value chain as the internal processes or activities performed “to design, produce, market, deliver and support its product”. Gibbon (2001) emphasized the relevance of value chain for agricultural commodities. The relevance of the agricultural commodities became clear when the approach was applied to high-value product within so-called “buyer-driven” chain (Dolan and Harris-Pascal, 1999, Ponte, 2001; Kaplinsky, 2000 and Kaplinsky, 2001).

FAO (2012) affirmed that value chain development can be initiated through the building of competitive businesses in any given segment of the chain. The existence of such competitive and growing businesses constitutes a kind of segmental growth pole. However, development in one segment may not be enough if it does not spill over into the other segments of the value chain; overall development of the chain is limited to its weakest parts (Ponte, 2001). For policy makers and investors, it is therefore important to identify growth poles in value chains but also focus on the weaker segments of the chain and to define measures to strengthen those and remove bottlenecks.

Agrobiz (2016) observed that the value chain as a concept is a sequence of interconnected business activities that ultimately adds value to products or services as they move through production, processing, marketing and sales usually involving input from multiple businesses. At this process, inputs, raw material, services, intermediate and final products are owned by different actors or stakeholders. Each actor in the chain adds value to the product. Public and private services such as business development services, certification, labeling, packaging, transportation and financial services also play a crucial role in the value chain as do laws, regulations and the enforcement (RMRDC, 2015). However, Haggai (2017) observed that many small-scale producers lack both the means and the skills to participate in existing value chains and because of their relatively weak negotiating power, risk being exploited. Many also lack access to market information and coupled with a tendency to avoid risk, often miss viable business opportunities. Market regulators often favour certain interest groups and may not be well informed about market conditions. Combined, these factors can lead to market distortions that exclude small-scale producers and leave potential market opportunities unexploited.

FAOSTAT (2010) maintained that value chain encompass the full range of activities and services required to bring a product or service from its conception to its end use. Subramanian (2007) opined that:

Value chain include input suppliers, producers, processors and buyers; a range of technical business and financial service providers; and the final markets into which product or service is sold, whether local, national, regional or global.

Ugoma, Jolaoso and Onwualu (2011) maintained that value chain as a scholarly concept can be described as the chain that links the various production stages, collection and commercialization of a product from its production, distribution to customers. It also includes the research of resources with land labour and capital to produce commodities in a value chain system. FAO (2006) said that:

The farmers are linked to customers’ need, working closely with suppliers and processors to produce specific goods to meet customers’ demand. Similarly, through flows of information and products,

consumers are linked to the needs of farmers. Under this approach, through continuous innovation, the returns to farms can be increased and livelihoods enhanced. Rather than focusing on profit on one link alone, players at all levels of the value chain can benefit.

In this paper, value chain facilitate an improved understanding of competitive challenges and help in the identification of relationship and coordination mechanisms and assist in understanding how chain actors do with power and who governs or influence the chain. The paper further emphasized that the value chain as a framework, centres around three major segments that describe each product link in the value chain. These are; source, make and delivery.

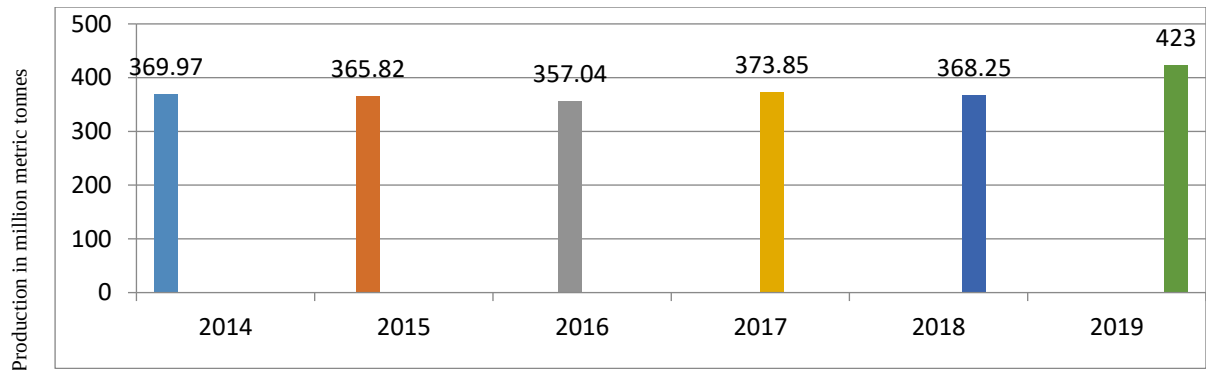
An Overview of Potato Production

Potato is generally considered to have originated from the region between latitude 10°N and 20°S at an altitude of 2000 meters but to be precise in Bolivia (Okonkwo, 1991). FAO (2008) identified the origin to be between Mexico and Chile but specifically suspected the Andean highland of Bolivia or Peru where the presence of wild species of the crop serves as clues. The neighbourhood of Lake Titicaca located at an altitude of 3512 meters above sea level in the Peru – Bolivia Plateau area is more definite. Potatoes were introduced outside the Andes region many centuries ago and have become an integral part of much of the world's cuisine. It is the world's fourth largest food crops following rice, wheat and maize (Hawkes, 2000).

Long term storage of potato requires specialized care in cold warehouse (Lang, 2001). Wild potato species occur throughout the Americas from the United States to Southern Chile (Langar, 2005). The potato was originally believed to have been domesticated independently in multiple locations (McNeill, 2009), but later genetic testing of the wide variety of cultivars and wild mild species proved a single origin for potatoes in the area of present day Southern and extreme north western Bolivia (from a species in the *solanum tuberosum* complex) where they were domesticated 7,000 – 10,000 years ago (McNeill, 2009). Following centuries of selective breeding, there are now over thousand different types of potatoes of these sub-species, a variety that at one point grew in Chile Archipelago (the potato's South Central Chilean Sub-centre of origin) left its genetic plasmas on over 99% of the activated potatoes worldwide (Salaman, 2008).

The crop moved out of the South America (centre of origin) by deliberate introduction to Spain in 1570 to England in 1586, then to Ireland by Spanish explorers from 1663, the crop was grown on a large scale in Ireland and become so popular such that it is not too surprising that it required the name "Irish Potato" (Randel, 1993). This is an indication that the English introduced potato into Virginia in 1621 and into Bermuda Island in 1913. Throughout Europe, the most important new food in the 19th century was the potato which had advantages over other foods for the consumer; its bulk (which satisfied hunger) and its cheapness. The crop slowly spread across Europe becoming a major staple food worldwide (Salaman, 2008). The total world potato production is estimated at 369.97 metric tones in 2014, 365.82 in 2015, 357.04 in 2016, 373.85 in 2017, 368.25 in 2018 and 423 million metric tones in 2019 (FAOSTAT, 2019). This is represented by the bar chart below.

Fig. 1: Yearly Global Production of Irish Potato



Source: FAOSTAT, 2019

Globally, there are top 30 potato producing countries in the world and are been ranked according to their production in metric tones as indicated in the table below.

Fig. 2: Global Ranking of first 30 Countries of Irish Potato Production

Rank	Country	Production in Tones
1.	China	99,205,600
2.	India	48,605,000
3.	Russian Federation	29,890,976
4.	Ukraine	22,208,220
5.	United States	20,017,350
6.	Germany	11,720,000
7.	Bangladesh	10,215,957
8.	Poland	9,171,733
9.	Netherlands	7,391,881
10.	France	7,342,203
11.	Belarus	6,414,755
12.	United Kingdom	6,218,000
13.	Iran (Islamic Republic)	5,102,342
14.	Turkey	4,800,000
15.	Peru	4,776,294
16.	Algeria	4,606,403
17.	Belgium	4,416,665
18.	Canada	4,416,665
19.	Egypt	4,410,829
20.	Pakistan	4,142,399
21.	Brazil	3,656,846
22.	Kazakhstan	4,142,399
23.	Romania	3,116,910
24.	Colombia	2,819,026
25.	Uzbekistan	2,793,689
26.	Nepal	2,691,037
27.	Argentina	2,454,001
28.	South Africa	2,450,541
29.	Spain	2,231,470
30.	Den Mark	2,171,000

In Africa, Irish potato (*solanum tuberosum*) was introduced in the 19th century by colonists who consumed it as a vegetable rather than a staple starch (Anderson, 1996). Irish potato was at first resisted by local farmers who believed they were poisonous (Demo, 2005). In the former

European colonies of Africa, the crop was initially consumed only occasionally, but increased production made it become a staple in certain areas. The crop tended to become more popular during war times due to being able to be stored in the ground (FAOSTAT, 2008). In higher altitudes region of Rwanda, Irish potatoes have become a new staple food crop. Prior to 1994, consumption was as high as 153 to 200kg per year, higher than in any Western European country (Lamin, 2013). In Kenya, the crop is the second most important staple food after maize (MOA, 2005). It is also an important food and cash crop that plays a major role in national and nutritional security in Africa (FAOSTAT, 2008).

Hijmans (2001) opined that Irish potato are grown under a wide range of conditions from irrigated commercial farms in Egypt and South Africa to intensively cultivated tropical highland zones of Eastern and Central Africa where it is mainly a small farm's crop. In some African countries, the production of Irish potato is growing very rapidly (Anderson, 2008).

Algeria has doubled its Irish potato production in five years and it has overtaken Egypt been the number one producer in Africa in 2013. Rwanda also doubled its potato production in the last five years and now ranks in the top ten potato producing countries in Africa (FAOSTAT, 2008).

Irish potato production in Africa is estimated at 25 million metric tonnes with a yield per hectare of 13,215.4kg/ha and per capita consumption (fresh and processed) of 18.76kg/capita/year (FAOSTAT, 2019). The top 10 producers of potato in Africa are shown in table below.

Fig. 3: Africa 10 Top Producers of Irish Potato

Rank	Country	Potato Production (in Tones)
1.	Algeria	4,606,400
2.	Egypt	4,325,480
3.	South Africa	2,450,540
4.	Morocco	1,924,870
5.	Tanzania	1,749,201
6.	Kenya	1,519,870
7.	Nigeria	1,284,370
8.	Malawi	1,226,600
9.	Ethiopia	932,701
10.	Rwanda	846,184

Source: FAOSTAT, 2019

Over time, Nigeria's agricultural policy and programme was designed to stimulate growth and develop agriculture so as to impact on overall growth of the Nigerian economy to reduce poverty (Mohammed, 2010). The main features of the agricultural policy and programme include the evolution of strategies that would ensure self-sufficiency and improvement of the level of technical and economic efficiency in food production. This means that it was to be achieved through the adoption of improved seeds, appropriate machinery and equipment, efficient utilization of resources, encouragement of ecological specialization of the roles and potentials of small farmers as the major producers of food in the country (Mohammad, 2016).

With the coming of Irish potato being one of the agricultural farm produce in Nigeria by the European tin miners in the 19th and 20th centuries, the northern provinces of Nigeria (Jos, Plateau) constituted the main center of production in those early days of production (Okonkwo, Amadi & Nwosuki, 2009). The Jos Plateau was favoured as a result of the high altitude thus cool climate which favour the development of the crop. At that time, cultivation of Irish potato did not reach appreciable level until the outbreak of the Second World War in 1939. To this end, one may regard the earliest effort to increase potato production in Nigeria

as principally directed to meeting the food need of Europeans in the armed forces and the civil service mainly in West Africa sub-region to support expansion of potato production (Randel, 1993). The colonial government initiated studies as far back as 1940 to test the suitability of some European variety under Jos Plateau environment. These experiences established the superiority of varieties such as grent scot, graig defiance and Irish cobbler over the early pre-war introduction although they did not perform as well as in Europe. It is known that the “local” varieties grown in Jos Plateau originated from these early introductions (Akpoko, Kudi & Yada, 2008).

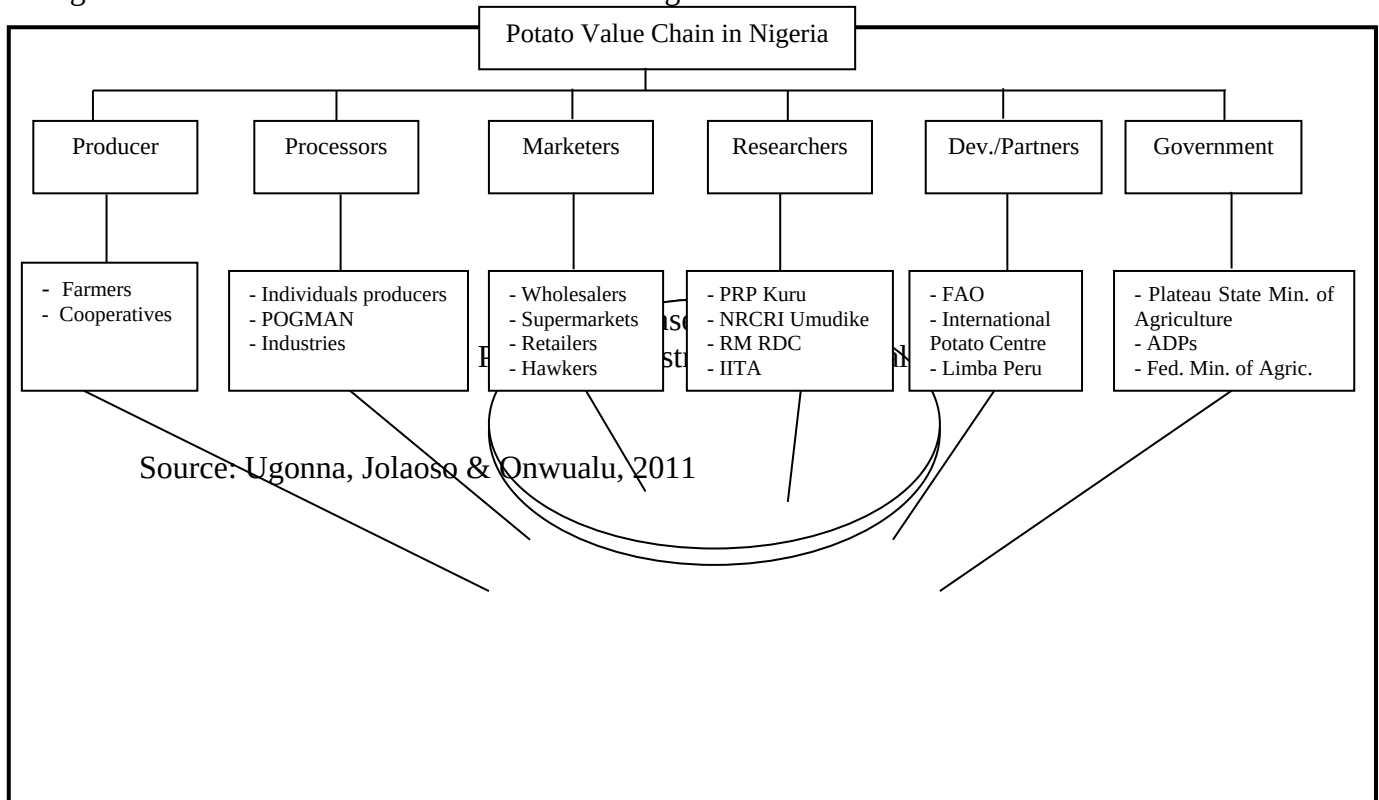
As the potato sub-sector gained high importance over the years as staple food and contributes to national food security in Nigeria, the Federal Government of Nigeria through the present Agricultural Promotion Policy (APP) has placed high priority on developing value chains of crops as a key instrument to drive sustained prosperity for all Nigerians in domestic food security goals, exports, improve the competitiveness of the potato commodity value chain and supporting sustainable income and job growth (Yakubu, 2017). The Agricultural Promotion Policy (APP) is anchored on three main pillars:

- (a) Promotion of agricultural investment;
- (b) Financing agricultural development projects; and
- (c) Research for agricultural innovation and productivity.

These pillars have contributed to the Agricultural Promotion Policy in the promotion of agricultural investment and financing agricultural development programmes (Yale, 2017).

Besides the main actors such as suppliers, processors, farmers, traders, wholesalers and retailers that are involved in the production and trading in Nigeria along the value chain, there are various stakeholders that are currently involved in the Nigerian potato value chain. This can be seen in the diagram below.

Fig. 4: Stakeholders in Potato Value Chain in Nigeria



Irish potato has been reported to be a major efficient crop in terms of tuber yield and days of majority (Sanusi & Babatunde, 2017). Within 80-90 days, it matures as compared to 9-12 months for other tubers such as yam and cassava. Nigeria is the fourth largest Irish potato producer in Sub-Saharan Africa and seventh largest producer in Africa with an output of 1,284,370 metric tonnes and yield per hectare of 37,201hg/ha (3,720.1kg/ha) (FAOSTAT, 2019).

Agricultural Programme on Potato Value Chain

Agricultural programme on potato value chain have been an important feature of agricultural trade and investment landscape for a few decades and it has change the way farmers produce and distribute their farm product (Harvie & Teerawat, 2015).

Technological advances in the agricultural sector have been essential to the emergence of global value chain in the production of potato. Falling in transport costs, advances in information and telecommunications technology (ICT) and developments such as containerization have made it easier to coordinate production processes over large distances and ship inputs, parts and components as required. This has made it feasible for firms that deals with Irish potato as raw materials to locate various stages of their production in different countries (Pavcnik, 2017).

Revenge and Anabel (2017) observed that the agricultural policy and programme on potato value chain has succeeded in facilitating and also improved understanding of competitive challenges and helps in the identification of relationships and coordination mechanisms that assists in understanding how chain actors do with powers and who governs or influences the chain in the international market. Value chain policy gives room for a set of interdependent economic activities and to a group of vertically linked economic agents. The policy and programme stipulates that a value chain starts with the production of a primary commodity, ends with the consumption of the final product and it includes all the economic activities undertaking between these phases such as processing, delivery, wholesaling, retailing of the product at the international market (Anderson, 2008).

Anderson (2008) said that the policy on potato value chain tends to provide answers to prominent policy concerns such as:

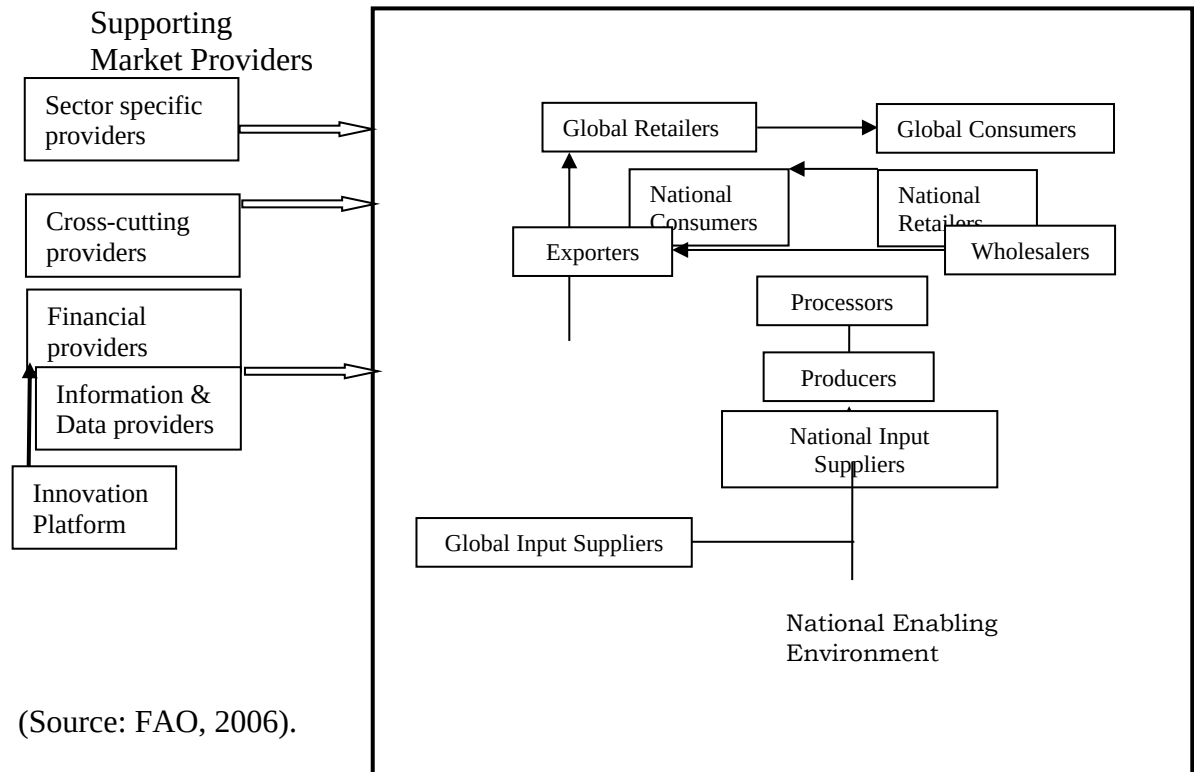
- i. Is a value chain creating value added?
- ii. Who is creating value within the value chain?
- iii. What is the relation between value added creation and profit earning?
- iv. What is the income distribution within the value chain?

The answers to these questions can guide policy interventions globally towards the reallocation of resources and support programmes for the benefit of the most vulnerable groups within the chain (Bellu, 2010). The potato chain policy is aims to contribute to the employment generation globally and ensure that wealth is created along the potato commodity value chain as well as food security through increased access to rural infrastructure. The programme is to ensure that there is an increase on a sustainable basis, the income of smallholder farmers and rural entrepreneurs that are engaged in the production; processing, storage and marketing of potato (Johnson, 2018). The key indicators of outcomes of the potato value chain policy and programme include: additional income of farmers and rural entrepreneurs, increased access to social and rural infrastructure and an improvement in the food security globally (Abubakar & Kaita, 2017).

Under the agricultural policy globally, the potato value chain system, the farmers are linked to consumers' need, while working closely with suppliers and processors to ensure that

specific goods are produced to meet the consumers' demand. The chart below shows the value chain system from the suppliers to the consumers.

Fig. 5: An Overview of the Value Chain Global enabling Environment System from Suppliers to Consumers



The Netherlands Development Association in an agreement with the global policy on potato value chain affirmed that:

“The value chain is a set of people, organizations and activities needed globally to create process and deliver a product or service from the supplier to consumer at the international market”.

This shows that there are actors in the value chains which include primary producers, processors, traders and service providers whose activities is to transform natural resources, raw materials and components into a finished product that is delivered to the end consumers. The value chain policy is rooted in the organisation of different actors and how they interact in their institutional environment.

Impact of Potato Value Chain in Plateau State

In an attempt to tackle the problems facing the agricultural sector in Plateau State, the Plateau State government domesticated the Nigeria National Agricultural Policies and programmes which was jointly formulated by the National Stakeholders and International Development Partners and approved by the Federal Government in 2002. According to Foluso (2007), the major components of the National Agricultural Policy and programme assign supportive roles to government while investments in the sector are left to the private sector initiative. The broad objectives of the National Agricultural Policy and programme includes promotion of self-

sufficiency in food and raw materials for industries; recognition that agriculture is business hence a private sector concern where the role of government is to facilitate and support private sector initiatives; promoting reliance on local resources; diversification of the sources of foreign exchange earnings through increased agricultural exports arising from adoption of appropriate technologies in food production and distribution which specifically responds to the needs of women bearing in mind that women constitute over 50% of the labour force in agriculture.

Based on these broad objectives, the Agricultural Programme on Potato Value Chain in Plateau State fall in line with these objectives as stated by the National Agricultural Policy. The programme on potato value chain emphasizes that there should be a link along the various production stages, collection and commercialization of the potato product from its production and distribution to the consumers.

Plateau State covers a landmass of about two million and six hundred thousand hectares (about two third is arable) which is approximately 53589.89 square kilometers (Giz, 2014). Irish potato was introduced into Plateau State by the Europeans notably by the tin miners in the early 20th century (Jwanya, Dawang, Zarmai & Mashat, 2014). The establishment of Irish potato programme in Kuru by NRCRI in 1976 paved way for the importation of improved varieties to be breed. These improved varieties were screened and those found adaptable to the temperate regions of the country were released to farmers for cultivation. Irish potato requires an optimum temperature of 15°C for tuber formation in which Jos Plateau meets this condition in both rainy and dry seasons (Hashimu & Danjuma, 2017). The annual Irish potato production in Nigeria stands at 1,284,370 metric tones. About 95% of the Irish potato production is from Plateau State. It is because of this that the African Development Bank (AfDB) saw the need for intervention in the potato production and its value chain.

The Federal Government of Nigeria (FGN) through the present Agricultural Promotion Policy has placed high priority on developing value chain of Irish potato on the Plateau being one of the major staple foods in the country. According to the National Bureau of Statistics (2014), Plateau State is among the 10 poorest States in Nigeria with over 70% poverty rate. Plateau State through PADP recognized the need to explore its comparative advantage in the area of agriculture to move the vision of transforming the State economic fortunes for the better. Therefore, the Plateau State Government has diversified into agriculture through supporting an intervention that the State has comparative advantage to boost economic activities in the State.

The agricultural programme on potato value chain in Plateau State is aim to ensure that it contribute to employment generation and shared wealth creation along the potato commodity value chain as well as food security through increased access to rural infrastructure (Yanung, 2018). In his submission, Guyang (2019) observed that the potato value chain has increase on a sustainable basis, the income of smallholder farmers and rural entrepreneurs that are engaged in the production, processing, storage and marketing of potato. It is adjudged that the outcomes of the potato value chain within the few years of existence includes but not limited to:

- (a) Additional income of farmers and rural entrepreneurs (50% of which are women);
- (b) Increased access to social and rural infrastructure works in the areas of production; and
- (c) Improvement in the food security situation of food beneficiaries (50% are women).

The potato value chain in Plateau State has contributed in job creation (of which 50% are women). The total direct household beneficiary stands at 11,500 households which have succeeded in creating 60,000 jobs along the value chain of priority commodity (Irish potato) of which 50% are women.

The Plateau State Potato Value Chain was classified Category II which is in accordance with the African Development Bank's environmental and Social Assessment Procedures (ESAP) and validated by the Quality Assurance and Results Development (QARD) on September 2nd, 2016. The project has brought significant environmental and social benefits to

Plateau State through increased access to improved irrigation and agricultural support infrastructures and capacity development interventions which facilitate the adoption of climate smart agricultural practices. Specifically, the project has enhance potato production, processing, storage and marketing capacities thereby improving the livelihoods of rural farmers and other value chain actors, reduce vulnerability of farmers to precarious weather condition, create employment opportunities and stimulate private sector engagement through value-addition investments (PS-PVCP, 2018).

PS-PVCP (2018) further affirmed that the project intervention may however, pose localized and mostly temporary negative impact that can be readily mitigate per measures recommended for effective environmental and social management during the time of project implementation. Some of the negative impact based on PS-PVCP report includes those typically associated with construction work temporary disturbance during the construction phase including loss of vegetation due to land clearing, sedimentation, occupational and public health risk and disruption to hydrological system.

Accordingly, the PS-PVCP (2018) further averred that an Environment and Social Management Plan (ESMP) was prepared which provide guidelines for the mitigation and enhancement of all potential environmental and social aspect of the potato value chain project. Mitigation measures proposed to manage the negative impact during construction and implementation phases of the project with regards to potato value chain include:

- a) Limiting vegetation clearing to the utmost necessary situation;
- b) Land and water conservation activities;
- c) Proper handling and management of construction wastes; and
- d) Maintain environmental flow and monitoring hydrological systems and other construction best management practices.

The capacity building component of the potato value chain project in the State ensure support for the training of farmers and other value chain actors to promote the adoption of integrated pest management (IPM), integrate sustainable fertilizer management (ISFM), water and management for irrigation scheme and waste management initiative for storage and processing facilities (PS-PVCP, 2018). Plateau State over the few years have enjoyed tremendously from African Development Bank (AfDB) specifically because of their interventions. The interventions of the AfDB are presented on the table below based on the key local government that cultivate Irish Potato in commercial quantity.

Fig. 6: Distribution of Agricultural Interventions in Four Local Government Areas of Plateau State

LGA	Infrastructure			
	Production (Irrigation)	Transportation and Storage	Processing & Marketing	
Mangu	Small earth dam, wash bore, tube wells, water catchment, spring capture, water pumps	Access roads, diffuse light stores	Community market, processing unit	
Bokkos	Small earth dam, wash bore, tube wells, water pumps, water catchment	Access roads, diffuse light stores	Community market, processing unit	

B/Ladi	Small earth dam, wash bore, tube wells, water pumps, water catchment	Access roads, diffuse light stores	Community market, processing unit	
Riyom	Tube wells, water catchment, spring capture, water pumps	Access roads, diffuse light stores	Community marketing	

Source: PS – PVC, 2019

Conclusion/Recommendation

Investment in the agricultural sector is necessary for the agricultural production to increase, even though huge investments have been carried out in the agricultural sector in Nigeria in the past. The sector have not been able to fulfill its traditional role of feeding the population, meeting the raw materials needs of industries gainful employment as well as provide sustainable export earnings for the economy. This necessitated government to initiated different policies and programmes. The programme on potato value chain sponsor by African Development Bank (AfDB) is to ensure that it contribute to employment generation and share wealth creation along the potato commodity value chain as well as food security through increase on a sustainable basis, income of smallholder farmers and rural entrepreneurs that are engage in the production, processing, storage and marketing of potato. Based on this, the paper has the following as a recommendation to further ensure the actualization of the programme.

- i. The potato tissue culture (TC) laboratory at Mangu should be strengthened including a screen house by providing necessary laboratory equipment and materials, creating linkages between tissue culture laboratory and engage farmers who are the direct beneficiary.
- ii. Mechanism like stakeholders platform should be set up to build trust among famers and traders and to facilitate improvement of supply of services.
- iii. They should ensure that female farmers as well as youths are actively part of the activities to be taken in the value chain and supported by the project (membership of platforms, meetings, training and access to credit facilities).
- iv. There should be an establishment of adequate linkage between research institutes on the one hand and farmers, on the other hand in order to promote adaptation and adoption of farming practices by smallholders.
- v. There should be increase knowledge among producers and traders of market trends and consumers need.

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