



Potato Value Chain Programme and Economic Development in Plateau State.

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Abstract

This article set out to look at the agricultural programme on potato value chain as it affects the economic development in Plateau State. The programme is tailored towards emphasizing 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. The study adopted both primary and secondary method of data collection and establishes that the potato value chain programme through its intervention by the African Development Bank in Plateau state is aimed at building agribusiness economy capable of delivering sustained prosperity in meeting domestic food security goals. It is also aimed at generating exports and supporting sustainable income and job growth with the focus in contributing to employment generation, improvement in the competitiveness of the potato commodity value chain and increase in income of the commodity value chain actors. The study recommended that the linkage to achieve stability in potato production and value chain should be strengthened to increase mass production in the agricultural sector which will in turn contribute to the economic growth and development of the State.

Keywords: Potato, Value chain, Programme, Economic development

Introduction

Throughout human history, food continues to be the basis for the wealth, strength and security of nations. Indeed, without agriculture, there is no national culture; and without a developed agricultural sector, no other sector (Education, Science, Technology, and Health) can develop



(Ozo, Robinson & Reeves, 1987). Ancient Egypt, Rome and Greece were powerful because of the priority they placed on agriculture which remains the backbone of their economic development. Modern UK, Europe, USA, China and the entire developed world, Malaysia, Thailand, South Korea, Indonesia, India and the developed world have evolved or are evolving very efficient system in the food sector (Ango, 2001). Abubakar (2002) observed that agricultural development has helped to a greater extent in the process of industrialization of these countries. Thus, industrial and agricultural developments are not alternatives but are complementary and are mutually supporting with respect to both inputs and outputs.

Agriculture has led to the economic development of many nations since the industrial revolution. The history of England is a clear evidence that agricultural revolution preceded the Industrial Revolution in countries (Oni, 2003). In the United States of America and Japan, agricultural development has helped to a greater extent in the process of their industrialization (Oni, 2003). In line with this, Stringer (2001) opines that a fast tract development of the agricultural sector is crucial for other sectors (health, education, science technology) as well. The strong and efficient agricultural sector of these countries has fed the growing population of these countries, provide employment, play a vital role in foreign trade, earn foreign exchange and has succeeded in providing a strong base to their industries. More so, it is generally admitted that in the present development debates and academia that one percent of annual growth rate in the agricultural sector tends to fuel 2.1 percent of industrial and service sectors' acceleration (FAO, 2001). Similarly, Faluyi (2005) observed that various underdeveloped countries (Somalia, Haiti, Bhutan, Kiribati, Cosmos) of the world engaged in the process of economic development have learnt limitations of over-emphasizing on industrialization as a means to attain higher per capital real income.

Increased agricultural output and productivity tend to contribute substantially to overall economic development of a country. Therefore, it will be rational and appropriate to place greater emphasis on further development of the agricultural sector.

Obiechinna (2007) mentioned the contribution of agricultural sector to the growth of non-agricultural sectors such as health, education, science and technology. This implies that investments and policy reforms in agriculture might actually foster overall economic growth even though agriculture itself might grow at a slower pace than non-agriculture. The fact is that without development in the agricultural sector through value chain, the industries will collapse and poverty will thrive.

Growth in agriculture is highly beneficial for poverty reduction and economic development. The bulk of the poor rely on subsistence farming for survival, therefore growth in the sector can bring succor to the poor and their deplorable state of living. Grewal, Grunfeld and Sheehan (2012) opined further:

The importance of agriculture in poverty reduction derives from two basic circumstances: (a) the incidence of poverty is disproportionately high in



developing countries; and (b) the poorest households also have few assets and no skills, they typically rely more on agriculture and generally face many obstacles in connecting with the non-agricultural economy for income and employment. Social and economic exclusion further reduce alternative groups, including women, youths, ethnic minorities and indigenous people. Thus, by providing a greater share in employment of the poor and unskilled workforce, agriculture plays a crucial role in making economic growth and development.

According to Ojoma (2016), the Nigerian poverty data are generated from the Nation's Living Standards Survey (NLSS) conducted by the National Bureau of Statistics (NBS) using National Consumer Surveys (NCS). It is therefore the responsibility of every government to assist its citizens to come out of poverty through various policies and programmes of government. One of such policy is in the area of agriculture which has been with humans since the Neolithic time.

Agriculture is practiced in the rainy or dry seasons. One of such initiatives of faming agricultural product either in the rainy or dry season in Nigeria is potato farming which is being cultivated particularly in the North Central Nigeria (ASTC, 2013). Plateau State is prominent in potato farming concentrated at the Central and Northern Zones of the State. The potato (*solanumtuberosum*) is a root and tuber crop which was first introduced in Nigeria by European miners in the 1940s, but over the years, the food crop (potato) has been an indigenous food crop to the people of Bolivia or Peru (FOA, 2008). The Plateau State Government over the years has embarked on several agricultural programmes and also established parastatals and agencies such as Plateau Agricultural Development Programme (PADP), Agricultural Services Training Centre (ASTC), and Potato Value Chain for the development of potato for agro-allied industries to increase the economic development of the State (PVC, 2015).

Nigeria has been identified as the seventh biggest producer of potatoes in Africa with production yield of 1,284,370 tons per year. While Algeria is the first producer of potato with a harvest of 4,606,400 tons and Egypt followed with 4,325,480 tons (FAOSTAT, 2019).

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 in part, to a lot of post-harvest wastage including lack of adequate technology, improper storage facilities, inadequate stock of improved varieties and lack of improved practices to explore processing options. 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 (Sylvanus & Kitsche, 2014).

Plateau State account for 95% of Nigeria's potato production and from Plateau, potatoes is exported to Ghana, Niger, Chad and other African countries (Leadership, 2015). In 2015, African Development Bank (AfDB) came up with a comprehensive programme that will affect lives of



100,000 farmers in different ramifications. It is expected to create 60,000 jobs in a potato value chain from processing, storage, replacement of current inputs and indeed, export (PVC, 2015).

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 ending extreme poverty by 2025; end hunger and malnutrition by 2025; Turn Africa into Net Food Exporter by 2025; and Move 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 the 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, Joluso and Onwualu, 2013).

Conceptual Clarification

There are basically three concepts which require clarification in this paper. These concepts are agricultural programmes, value chain and economic development.

Agricultural Programme

Fundamentally, to have an understanding of the concept of agricultural programme, the definition of programme is very germane. Public discourse today is saturated with the advocacy or criticism of various programmes. It is very common to hear of programmes in almost every area of government activities.

The concept of agricultural programme therefore is very central to government or public sector as it serves as raw materials to other sectors of the economy. The concept of agricultural programme involved the provision of infrastructural facilities such as roads, water supply in rural areas at the right time in right quantity and quality for the purpose of agricultural production.

Yale (2017) opined that a programme is a comprehensive plan that includes objectives to be attained, specifications of resources required and stages of work to be performed.

Agricultural programme in this paper has to do with plan and objectives set by Plateau State Government which serves as a framework of activities which specify how potato value chain can add to the economy and development of the State.

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).

Food and Agricultural Organisation (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.

Agrobig, (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.

Food and Agriculture Organization Corporate Statistical Database (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 facilitates 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.

Economic Development

The earliest concept of development was interpreted in terms of growth of output over time and later in terms of per capita output (Subba, Raghu, Neelakanta and Bhavani (2009).

During the 1950 and 1960s, many developing countries realized their economic growth targets but standard of living of the people did not change (Goel, 2001). In fact, existence of mass poverty, illiteracy and ill health continued to plague the developing countries. This implies that there was something wrong with this position with regards to economic development. Most of the economists clamoured for dethronement of GDP and look at it in terms of removal of poverty, illiteracy, disease and change in the composition of output of goods and services and in income does not imply an improvement in the standard of living of the people because GDP is a narrow indicator of economic development that does not include non-economic indicators such as leisure time, access to health, education, environment, freedom or social justice (Fajombo, 2004). Economic development is thus a multivariate concept hence there is no single satisfactory perspective of it. Economic development is a process where low income national economies are transformed into modern industrial economics. It involves qualitative and quantitative improvements in country's economy. Political and social transformations are also included in the concept of economic development in addition to economic changes (Goel, 2001).

Literally, economic development can be seen as a passage from lower to higher "stage which implies change" (Linch, 2004).



Charles and Herrick (1958:103) pointed out that:

Economic development is generally define to include improvements in material welfare especially for persons with its correlates of illiteracy, disease and early death, changes in the composition of inputs and output that generally include shifts in the underlying structure of production away from agricultural towards industrial activities, the organization of the economy in such a way productive employment is general among working age population rather than the situation of a privileged minority and the corresponding greater participation of broad based groups in making decision about the direction, economic and otherwise in which they should move their well”.

In the broadest sense, Fajombo (2004) asserted that economic development encompasses three major areas:

- i) Policies that government undertakes to meet broad economic objectives including inflation control, high employment and sustainable growth.
- ii) Policies and programmes to provide services including building highways, managing parks and providing medical access to the disadvantaged.
- iii) Policies and programmes explicitly directed at improving the business climate through specific efforts, business finance, marketing, neighborhood development and others.

Economic development is thus a broad concept which includes both economic and non-economic aspects referring to the issue of development. Economic development as used in this paper is a broad concept which includes both economic and non-economic aspects of a nation. It is also seen as an event constituting a new stage in a changing situation. Additionally, it is concerned with economic, social and institutional mechanism that are necessary for bringing large scale improvements in the level of living of the masses.

Developmental State Theory

The development state theory was first coined by Chalmers Johnson in 1982. Developmental state can be defined 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 rules 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 governments. 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. Johnson therefore describes the United States as an example of a “regulatory state” while the Japanese states is depicted as a “developmental state”. The key differences between these two different states lies in their divergent rationales with regard to state-market relations. The rapid industrialization of the Japanese economy was rendered possible through a “planned rational” strategy of the Japanese state. Contrary to the neo-classical view that free market mechanism is the only way economically, the Japanese case demonstrates that a state led development strategy could lead to rapid industrialization and high levels of economic growth for late developing countries. 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 agricultural programme on potato value chain and economic development, there is virtually universal recognition that the state is the central actor in economic development programme (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 potato value chain. Massive investment in potato production is seen as a result of government intervention through the potato value chain programme in the agricultural sector (Kolawole, 2016). Rwang (2016) argues that the developmental state theory centres on the ideas of active state interventionism to facilitate rapid industrialization and economic growth.

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 benefit from the chain's competitiveness. Through this policy of government intervention, it enables the MSEs including small scale farmers to create wealth and escape poverty (Yale, 2016).

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 emphasizes social capital networks of relationship and institutions that are critical to business and competitiveness.

This theory is quite relevant to this study because it 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 Plateau State where inputs are provided to farmers. Similarly, the developmental state because of its ideological component, 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).

Another relevance of the developmental theory is the believe that the state must have the ability and capacity to identify and correct state challenges in key sectors 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 arrive 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. The national policies and activities have aimed at maximizing the agricultural production extensively (ASTC, 2012). There are four institutions through which government of Plateau State intervened in agricultural production. More specifically, it intervenes through the Ministry of Agriculture and Rural Development (MARD), Plateau Agricultural Development Programme (PADP), Agricultural Science Training Centre (ASTC) and Plateau State Potato Value Chain (PS-PVC) (Rwang, 2016). Though, Plateau state has a dense network of rivers and mining ponds in its environment these networks does not adequately support agricultural production effectively as irregular weather changes often cause water shortage particularly during the dry season

(Chindung, 2014). Therefore, the intervention of AfDB by constructing tube wells, spring captures, wash bores and water harvesting for irrigation is important not only in enlarging the arable area, but also to increase productivity.

Potato Value Chain Programme and Economic Development in Plateau State: The Nexus

In the view of Patrick (2017), the pivotal role played by agriculture in the industrialized economies like the USA, England and Japan can also be replicated in Nigeria despite the present hiccup being experienced. Reference was also made in the work to some of the developing economies like China and Brazil whose economic growth and development can be linked to agriculture. It was submitted that more than 50% of the economic growth of Nigeria in the first twelve years as an independent nation can be linked to agriculture. Therefore, if Nigeria is to return to the economic growth path, it must develop and faithfully implement an efficient agricultural policies and programmes with an inbuilt strategy for value addition using clusters of micro, small and medium agro-industries through private participation.

It was also established by the researcher that agriculture has the capacity and potentiality to catapult any country into remarkable economic advancement. This means that the agricultural programme on potato value chain in Plateau State is aimed at ensuring its contribution 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 increased on a sustainable basis, the income of smallholder farmers and rural entrepreneurs that are engaged in the production, processing, storage and marketing of potato. Agricultural Promotion Policy (2017) opined that the outcomes of the potato value chain within the few years of existence includes but not limited to:

- (a) Facilitate access to improved irrigation and agriculture (access roads, community markets, storage and processing facilities).
 - i. Infrastructure will upgrade the status of the farms and farmers in the project areas;
 - ii. Access to improved irrigation facilities has facilitated good water management for small reservoirs, increase production and boost agricultural activities in the project areas and potentially allow for the diversification of crop production;
 - iii. Access roads has connected the rural population to local and urban markets which create incentive for agricultural commercialization of the rural sector through better access to more competitive marketers and traders and improved farm gate price for most commodities; and
 - iv. Processing center has provided opportunities for improved nutrition diversified agriculture, increased incomes and the protection of genetic and agricultural resources. Improving the quality of produce and addition of value through agro-processing of primary products is now recognized as an engine of economic growth and food security.



- (b) Gender and youth involvement – the programme on potato value chain has stimulated and created opportunities for youth and women engagement in potato value chain through increasing their participation in project implementation, community representation and decision-making throughout the entire management of the project life.
- (c) Employment to local indigenes – the programme has brought expansion in agricultural and value addition facilities with the improvement of associated complementary activities thereby creating more long-term job opportunities.
- (d) Income generation from material equipment suppliers and contractual engagement. The contractual phase of the programme has led to an increase in the income of contractors and suppliers in the communities and beyond from suppliers of materials, equipment and labour.
- (e) Risk reduction through food security – the programme has helped small, medium size and commercial agricultural investments to have increased output and corresponding revenue with a positive impact on food security.

The aim of the agricultural policy on potato value chain in Plateau State is to ensure that it contributes 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 increased on a sustainable basis, the income of smallholder farmers and rural entrepreneurs that are engaged in the production, processing, storage and marketing of potato. Agricultural Promotion Policy (2017) opined that the outcomes of the potato value chain within the few years of existence includes but not limited to:

- (a) additional income for 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 (PS-PVCP, 2015). The programme has brought significant environmental and social benefits to Plateau State through increased access to improved irrigation and agricultural support infrastructures and capacity development interventions. Specifically, the programme is to 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.

Conclusion and Recommendations

The Nigerian Government over the years has formulated good agricultural programmes meant to encourage food production and economic benefits to ensure that the economic development is enhanced but such programmes have been found inefficient to a large extent ineffective since the intended results were not realized. This study has been able to assert that the potato value chain programme has succeeded in creating job employment and awareness to farmers on new methods of production processing and storage of potatoes. But never the less, the potato value chain programme is still confronted with the challenges of storage facility, good market, improved variety of seedlings amongst others. Based on these, the paper made the following recommendations:

- i. African Development Bank should intensify its intervention in providing adequate and conducive storage facilities that can contain the quantity of tons been produced as this will aid in achieving the aim of potato value chain programme.
- ii. The linkage to achieve stability in potato production and value chain should be strengthened to increase mass production in the agricultural sector which will in turn contribute to the economic growth and development of the State.
- iii. Concerted effort should be made by government through the African Development Bank (AfDB) to ensure that adequate storage, pest control management and adequate funding of research work are put in place.

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