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Evaluation of economic policy impacts on cashew supply and prospects for enhanced value addition in Nigeria

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Cashew supply had lagged behind demand for it both in the domestic and foreign markets. While the agro-industry faced serious problems in procuring the kinds and quantities of the commodity they want, producers of the commodity have remained poorly linked to the agro-industrial sector and availability of the commodity as raw material to agro-industry remained inadequate and irregular. This paper therefore examined how economic policy variables affect domestic supply and the prospects for diversification of increased cashew to agro-industry. Data for the study included policy variables such as real exchange rate, interest rate, wage rate, and government investment expenditure in agriculture. Data were analyzed using simultaneous equation regression model. Variables that significantly affected cashew supply included price of cashew, price of complementary crop, rural wage rate, government investment in agriculture and interest rate on agricultural loans. Rural wage rate had significant effect on cashew supply with coefficient of -0.38 at $p<0.05$. Government investment on agriculture with coefficient of 0.06 had significant effect at $p<0.05$. Interest rate on agricultural loans, with coefficient of -0.44, had significant effect on cashew supply at $p<0.05$. Policy strategies to expand supply of cashew and enhance diversification to agro-industry included improved infrastructure that will ensure effective market linkages.

Key words: Diversification, agro-industry, processing, export, income, employment.

INTRODUCTION

Up to the early 1960s, prior to the discovery and exploration of crude oil as the dominant foreign exchange earner for Nigeria, the country enjoyed a preeminent position in the World's agriculture with dominance in international agricultural trade and domestic self-sufficiency in the staples. However, as other countries maintained and gained international market share in cash crops like cashew, cocoa, groundnut, oil palm, and cotton in the latter part of the 1960s to the early twenty-first century, Nigeria stagnated and lost export market share as it failed to properly channel investment into the country's agriculture. With this failure and the associated poor access to modern farm inputs, modern agricultural research and technology, agricultural credit and agricultural infrastructure, Nigeria lost out in key variables of agricultural competitiveness like yield per hectare, cost

of production, efficient supply chains and value addition capacity. With the implementation of the Agricultural Transformation Agenda (ATA) of the current civilian administration, the Nigerian agricultural sector is now offering attractive investment opportunities with high potential impacts on the lives of Nigerians accounting for over 20% of Gross Domestic Product (GDP) and approximately 60% of employment (NBS, 2014). Conditions today indicate that the sector is ready for private investment in agriculture for a range of reasons. Firstly, there is global crisis in the price of oil which, in recent times, is witnessing astronomical fall, while government support for agriculture is increasing. This is illustrated by the implementation of Agricultural Transformation Agenda (ATA), increased public sector investment in agriculture, and new incentives to increase

domestic production. Secondly, there is rising demand for agricultural products as Nigeria's 170 million populations is expected to double in the next 30 years (Fund for Agricultural Finance in Nigeria: www.fafinnigeria.com). Thirdly, there exists a strong baseline characteristics supporting growth, including abundant land and water resources, availability of labour and an enormous domestic and regional market. Notwithstanding, the potential of the Nigerian agricultural sector is far from being fully exploited.

Cashew is a major cash crop with high potential to generate foreign exchange and to create employment, as well as curb desertification in Nigeria. The crop is an important industrial raw material with rising demand in the confectioneries, food, and beverage industries. It is also important in the conservation of environment. Industrial demand for the commodity is also increasing in the international markets. In 2004, about 50% of Nigeria's production of cashew representing about 30,510 metric tonnes was exported at a value of US$22.27 million. Nigerian producers currently supply the United States of America (USA) and United Kingdom (U.K) with cashew kernels. The commodity started generating revenue for the country as far back as 1970. Percentage share of cashew in agricultural exports rose from 0.09% in 1970-1975 to 5.25% in 2001-2007 (CBN Annual Report, various issues). There is a large and growing domestic and regional market for surplus kernels, as well as other cashew by-products. West Africa, Nigeria inclusive, is now a major supplier of raw materials to Indian processing powerhouse. Nigeria processes the same quantity of kernels as it exports as raw nuts. Majority of the kernels, about 75%, are processed for the local market thus providing employment for people, mostly women who are engaged in the processing (Adeigbe et al., 2015). Prices of kernels vary considerably from US$5 per kilogramme to US$14 per kilogramme depending on quality, packaging and marketing outlet including the United Kingdom, United States and the Middle East (Peter, 2011). However, the processors need support to build and strengthen their position in the international market so as to earn more foreign exchange for the country. For example, in 2001 the government of Nigeria earned a total of US$ 7.46 billion from cashew exports (Chemonics International Inc., 2002). About 30% of recorded Nigerian raw cashew nuts, valued at about US$12 million, are exported to the major processing countries, such as India, Brazil and recently, Vietnam, for further value-added processing.

For Nigeria, there is the need to strengthen and grow the very small market share at the international level. Major processing constraints that accounted for low market share at the world market include high cost of capital and challenges of purchasing and storing raw nuts to process throughout the year. In India which is the world's largest processor, raw nuts are available for purchase throughout the year at favorable financing rates to supplement domestic supply. However, the situation is contrary in Nigeria. In recognition of the economic importance of cashew and other agricultural commodities, various efforts were directed at promoting processing into high value products and export diversification through increased production. The Nigerian government had expended enormous efforts in policy design and implementation, which were directed toward provision of incentives for stakeholders in the agricultural sector to expand the supply of agricultural raw materials including cashew to meet an increasing demand of an expanding industrial sector. The efforts were also intended to enhance non-oil export earnings. Among these policies was reduction or elimination of export restrictions or taxes, and exchange rate devaluation, which was oriented to reduce overvaluation of the real exchange rate. Commodity marketing boards were dissolved to create price incentives to farmers. Apart from the dramatic structural adjustment programmes implemented during the second half of the eighties, the government at various times had implemented some programmes and initiatives on agricultural commodities in order to increase production and processing of agricultural export commodities, increase their foreign exchange earning capacity and further diversify the country's export base and sources of foreign exchange earnings. In the implementation of the initiatives, cashew was given considerable attention so as to profitably tap its potentials.

To complement the efforts of the government, other agencies such as state governments, international agencies, non-governmental organizations and professional groupings have implemented additional programmes to develop the production and the exports of cashew nuts from Nigeria. The efforts included National Accelerated Industrial Crops Production Programme (NAICPP). The government commenced this programme in 1994, in an effort to arrest the declining productivity of industrial crops and to restore the previous position of Nigeria in commodity export trade. The aim was to increase production of ten industrial crops including cashew. The main thrust of the project was to sensitize farmers to increase the productivity of the crop by using improved planting materials through an application of improved agronomic practices and use of appropriate agro-chemicals. Improved seedlings were produced by Tree Crop Units and the Small Holder Management Unit (SMU) of the States Ministries of Agriculture and other implementing agencies. The improved seedlings were distributed to farmers for new planting and for rehabilitation purposes at 50% subsidy. Since the implementation of the programme, a total of 1.1 million cashew seedlings, with a value of about US $50,000, were distributed to farmers and about 8,881 ha of cashew holdings was achieved. Another programme called Rural Transformation Programme was intended to develop the rural economy through economic empowerment of the

rural population. Development of cash and food crops, including cashew, as well as rural industries were central to this program. Also, another programme called massive Plants/Nurseries was implemented by the Federal Government by setting aside a substantial amount of money for massive multiplication programme for plant materials like nurseries, seeds and seedlings of major tree, cash and food crops, as well as for their acquisition and distribution to farmers at subsidized prices.

More importantly, Cashew Development Programme under Tree Crop Development Programme was aimed at rehabilitating and resuscitating moribund plantations. Other objectives of the programme included training of extension staff and farmers, provision and distribution of inputs such as seedlings, and agrochemicals, quality control at primary (farm) level, and strengthening the management of information system in the cashew sector. The program was implemented over a period of four years from 2001 to 2004. It was based on establishment of 2,321 ha of cashew plantation; strengthening capacity of Cocoa Research Institute of Nigeria (CRIN) to allow development and production of high yielding, disease resistant, cashew varieties for distribution to farmers, with a view to double the total annual output. Similarly, assistance was obtained through Food and Agriculture (FAO) Technical Co-operation Program (TCP) for Tree Crops. FAO supported the agricultural development of Nigeria through sponsorship of a TCP on major tree crops, including cashew. Areas of assistance included seed multiplication, germplasm conservation, and capacity building. United States Agency for International Development (USAID) also implemented Tree Crop Programme. USAID has chosen five agricultural products with export potential in order to assist in the agricultural development in the country. The criteria used for the selection of these products comprised their demand and export market trends, their supply constraints and potential, their competitiveness situation, the environmental impact of their cultivation and the employment generation, and foreign exchange earning capacity. USAID assisted in activities related to product and market development and the improvement of quality. The five products selected are the Gum Arabic, Sesame seed, Ginger, Cashew nut and Leather products.

Another step that was taken by the Federal Government was the establishment of three commodity development and marketing companies in 2004 in order to revitalize the agriculture and to bring it back to its past performance, by addressing the present near collapse of the commodity marketing system especially in terms of its effect on welfare of the farmers. Consequently, three multi-commodity and marketing companies have been established namely: Arable Crops Development and Marketing Company, which comprises five groups of products, including cashew, citrus, mangoes and breadfruits that are grouped together. Others included Tree Crops Development and Marketing Company, as

well as Livestock and Fisheries Development and Marketing Company. The companies were owned and managed by farmers, with equity shares of USD500,000 to be divided into 60 and 40% equity shares between farmers and the Federal government, respectively. However, the Federal government share was expected to be divested within five years. The functions of the companies included promoting the production of tree crops through the production and distribution of inputs, including seeds/seedlings, fertilizer, and other agro-chemicals and farm machinery; promoting and funding agricultural research and extension services; promoting the development of rural infrastructure; providing market information services; undertaking buying and selling agricultural produce; promote processing, preservation, storage and distribution of agricultural produce among others.

Furthermore, the decades after implementation of structural adjustment programme had witnessed widespread repetition in the agricultural policy structure. Agricultural input subsidy withdrawal came to climax in 1997 when the subsidy on fertilizer was completely removed, but it was reintroduced in the last quarter of l999. Also, post-liberalization era saw the removal of mandatory sectorial allocation of credit and a regulated interest rate regime. Interest rates were generally liberalized, while a number of incentives were put in place to enhance lending to the real sector. Some of the incentives included creation of an agricultural credit guarantee scheme by the Central Bank of Nigeria (CBN), restructuring of the Nigerian Agricultural and Cooperative Bank into Bank of Agriculture and subsequent increase in subvention allocation to the bank to meet increasing demand for agricultural credit. Some complementary policies implemented under the agricultural transformation agenda included Nigeria Incentive Based Risk Sharing System for Agricultural Lending (NIRSAL) which addresses challenges of credit delivery to economic actors in agriculture at single digit interest rate. In addition, staple crop processing zones concept was initiated to improve processing technology and to improve farm-market road networks, under the transformation agenda. Furthermore, growth enhancement support scheme (GES) was implemented to deliver inputs, mainly improved seeds and fertilizer to farmers. Also guarantee minimum price (GMP) programme was implemented to address price support for farmers' produce while agricultural enterprise hiring programme (AEHP) was implemented to provide tractor services more timely and more appropriately to farmers.

These policies and programmes have been implemented under the assumption that they would result in expanded domestic supply of agricultural commodities, increased profitability and income to farmers and expanded sources of foreign exchange earnings for the country. However, the efforts have not yielded appreciable dividend in cashew industry. Supply of

cashew is lagging behind the demand for it both in the domestic and foreign markets. While the agro-industry face serious problems in procuring the kinds and quantities of the commodity they want, producers of the commodity have remained poorly linked to agro-industrial sector and availability of the commodities as raw material to agro-industry remained inadequate and irregular. Growth potentials of the commodity are far from being fully exploited in Nigeria, while many existing cashew trees in the country have reached the end of their productive cycles. Majority of export from Nigeria is still in form of raw nut without processing, thereby losing substantial income and employment opportunities. In this regard, some questions may be asked. Are the factors, which historically helped to increase crop production in the past still present? How responsive are farmers supply of cashew to price increases? What are the effects of changes in real exchange rate, interest rate, wage rate, and government capital investment in agriculture on the supply of cashew? What are the constraints to expanded supply of the commodity? How can the constraints be removed? Thus the major focus of this paper is to provide answers to these issues.

THEORETICAL FRAMEWORK

Changes in patterns of supply and demand operate through price mechanism. Relative price changes reflect changes either on the supply side or on the demand side, Increase in the demand will be reflected in an increase in price, necessitating changes in supply and vice-versa (Mamingi, 1997). It is known from theory and practice that such a response may be due to employment of resources depending on price rise or decrease, modification of scale or farm size, through technological advance, access to credit, market information and price certainty (Olayide and Heady, 1982). According to Mamingi (1997) and Olayide and Heady (1982), important factors that will influence supply are price of the commodity, prices of all other commodities, the prices of factors of production and the state of technology.

More importantly, macroeconomic policy climate dictates the environment in which agricultural activities are carried out. The macroeconomic policies comprise fiscal, monetary, trade and budgetary policies which govern macro-prices. These policies usually have major impact on profitability of the agricultural system and the welfare of farmers as they affect the flow of funds to the sector in terms of budgetary allocation, credit subsidies and taxes. Some elements of macroeconomic policy constraint, such as high exchange rate, high interest rate, poor trade policy, and policy inconsistencies have been perceived as causing high cost of production in the Nigerian agriculture (Manyong, 2003). This effect manifests in two forms. One is the high cost of investment and the other is the high cost of acquiring all necessary inputs required in the agricultural sector of the

economy. High exchange rate and inflation may have adverse effect on the prices of domestic inputs such as transport, electricity, and infrastructural maintenance and to some extent labour. This will lead to high cost of production. The high cost of production may limit commercialization and investment in production of cashew, which ultimately may reduce the level of output. Macroeconomic policy can affect farm profitability through control over output and input prices. Also, it exerts control on wages and interest rates, institutional arrangements such as access to credit, inputs, information and actions that affect profitability and productivity (Jaeger, 1992).

Construction of transport infrastructure will lower transport costs, reduce input prices and raise output prices at the farm-gate. Extension services can be seen as reducing the costs of information. Rural credit institutions make credit available at lower costs to farmers and research attempts to raise profits by way of technological change. Nominal exchange rates set an upper bound on the prices paid to farmers for exported commodities. In the same way, exchange rates together with import taxes and other restrictions set prices of inputs and agricultural imports, which compete with domestic production (Yiheyis, 2004). Price stability and equilibrium exchange rates are essential macroeconomic conditions for strong international competitiveness. Also, high levels of real wages and rigidity in the labour market as well as a high real exchange rate are important macroeconomic factors influencing competitiveness of major agricultural commodities.

Effects of government expenditure on agriculture can be traced from two perspectives. Firstly, is the direct effect on agricultural output. This output effect refers to the possibility of having increases in agricultural output as farmers begin to have access to improved technology and requisite infrastructure, which are financed by public funds (Olomola, 1998). Secondly, is the effect on farm input demand. Government investment in agriculture could stimulate the demand for agricultural inputs directly or indirectly. The direct effect on input demand manifests in farmers' use of inputs whose procurement internally or from external sources, forms a component of expenditure on agriculture. The effect is indirect when the demand for such inputs is affected by projects or programmes financed by the public funds. There is a link between government expenditure on agriculture and some critical inputs associated with farming in Nigeria. Expenditures on some of them are direct components of government expenditure on agriculture. For instance, expenditures on fertilizer, improved seeds and irrigation represent a considerable proportion of government expenditure on agriculture. Agriculture and land use can be enhanced with the availability of fertilizer, improved seeds, and irrigation water. Thus, government expenditure on agriculture can affect not only the supply of farm products but also the quality and quantity demanded of farm inputs. By and large, these policy measures are aimed at

reducing costs of production in order to raise profits and output and enhanced competitiveness of agriculture.

METHODOLOGY

On the basis of supply theory, the empirical model for analysing the supply of cashew is expressed as:

$$Q^{AX} = f(\bar{P}^{AX}, \bar{P}^{AN}, \bar{P}^{AM}, \bar{w}, k, h, t) \tag{1}$$

where Q^{AX} is the supply of agricultural exportables, P^{AX} is the price of agricultural exportable, P^{AN} is the price of agricultural non-tradables, P^{AM} is the price of agricultural importable, w is the wage rate, k is capital stock in agriculture, h is an index of weather (average rainfall), and t is an index of technical change.

The supply function in equation (1) can be normalized by any one of the four prices to express the others in real form. Here, if it is chosen to normalize all prices and wages by P^{AM}, the supply function becomes:

$$Q^{AX} = f(P^{AX}, P^{AN}, w, k, h, t) \tag{2}$$

$$where\ P^{AX} = \frac{\bar{P}^{AX}}{\bar{P}^{AM}}, \bar{P}^{AN} = \frac{\bar{P}^{AN}}{\bar{P}^{AM}}, and\ \bar{w} = \frac{\bar{w}}{\bar{P}^{AM}}$$

Policy variable is incorporated into the supply function as shifter variable (Fankel, 1996; Kwanashie, 1998). Government expenditure on agriculture is incorporated into the farmers' output supply as a shifter variable. On the basis of profit maximization theory, output supply is a function of output and input prices. Thus, the supply function in equation (2) becomes:

$$Q^{AX} = f(P^{AX}, P^{AN}, w, k, h, Z_t, t) \tag{3}$$

where Z_t represents policy variables which included interest rate (the cost of credit), real exchange rate, and government capital investment in agriculture. An increase in the rate of interest would induce a reduction in credit demand, as cost of credit becomes more expensive, and this would reduce level of output and vice versa. Thus, interest rate on agricultural loans can be a constraining factor. The price of imported input such as fertilizer can also be incorporated into the supply function as a constraining factor. The supply function in equation (3) becomes:

$$Q^{AX} = f(P^{AX}, P^{AN}, w, k, h, Z_t, P^f, t) \tag{4}$$

where P^f is the price of imported input (fertilizer). The supply function in equation (4) contains price of

agricultural non-tradable and wage rate as endogenous variables. Each of these is explicitly derived as follows. With the assumption of market equilibrium, supply and demand theory suggests that the market prices of agricultural non-tradeables adjust to clear the domestic market.

That is:

$$Q^{AN} = f(P^{AN}, P^{AX}, k, w, h, t) = D^{AN} = f(P^{AN}, P^{AX}, P^N, E) \tag{5}$$

where Q^{AN} is the supply function of agricultural non-tradeable, D^{AN} is the domestic demand function for agricultural non-tradeables, P^N is the price of non-agricultural goods, and E is total domestic expenditure. Both P^N and E can also be normalized by P^{AM}.

From equation (5) price function for the agricultural non-tradeables is derived as:

$$P^{AN} = f(P^{AX}, P^N, w, E, k, h, t) \tag{6}$$

P^N is the price of non-agricultural output, which can be expressed as other services' component of consumer price index (CPI). This price is largely endogenously determined by their prevailing supply and demand conditions. On the basis of market equilibrium, the market for the non-agricultural good can be represented by:

$$Q^N = f(P^N, w, t) = D^N = f(P^N, P^{AN}, P^{AX}, E) \tag{7}$$

where the left-hand in equation (7) represents the domestic supply of nonagricultural goods and the right-hand their demand. Agricultural sector competes with the rest of the economy for allocation of labour. On the basis of an assumption that all factors of production in agriculture, with the exception of labour, are sector-specific, the prices of agricultural goods do not directly affect the supply of non-agricultural goods. The effect of agricultural goods prices on Q^N is indirect through their effect on the wage rate, W.

From equation (7), it follows that:

$$P^N = f(P^{AN}, P^{AX}, w, E, t) \tag{8}$$

Wage rate (the price of labour) is endogenous, reflecting the fact that there is competition for labour between agriculture and the non-agricultural sector of the economy. Wage rate is a function of the price level.

The wage function is specified as:

$$w = f(P^{AN}, P^{AX}, P^N, w_M, t) \tag{9}$$

where W is the wage rate in the agricultural sector, W_M is the minimum urban wage (also normalized by P^{AM}).

Production of agricultural exportable could compete with agricultural importable and agricultural non-tradables for sector-specific resources. In the labour market, there could be competition for labour, which may be reflected in the wage rate. A major interaction between agricultural sub-sector and the non-agricultural sub-sector of the economy take place through the level of real wage (Enwere, 1998). An expansion of non-agricultural sector could cause greater demand for labour and for agricultural non-tradable goods and vice versa. This could lead to higher wages and higher prices of agricultural non-tradable, which in turn may cause a fall in the production of agricultural exportables and vice versa. Higher wages could reduce competitiveness of agricultural exportables. Higher prices for agricultural non-tradables could induce a shifting of sector specific agricultural resources from production of exportables to the production of agricultural non-tradables, and vice versa.

Minimum urban wage could affect the wage rate in the agricultural sector on which it is binding and enforced. It has been shown in Nigeria, Malawi, Tanzania and South Africa that adjustments of the minimum wage convey important information for wage setting in all sectors of the economy (Enwere, 1998; Lopez, 1991). The aggregate real expenditure is also affected by both policy and external variable. An increase of fiscal expenditure could cause a rise in total domestic expenditures, which in turn may lead to higher prices of non-tradeables and to wage increase. This could reduce supply of tradable crops. On the other hand, capital expenditure in the form of public investment contributes to output growth by making available the basic infrastructures that are crucial for direct productive activity. This category of public spending complements private investment and thus produces a positive effect on output growth (Lopez, 1991). A significant proportion of government recurrent expenditure goes to various categories of income earners in form of subsidies and transfers. Therefore, transfers that aid the development and maintenance of public goods such as infrastructures are fundamental to productive activity. In contrast, transfers and subsidies that lead to distortion of prices in the economy will tend to have a negative effect on growth of direct productive activity. Consistent with this, the function for domestic expenditure is expressed as follows:

$$E = f(P^{AX}, q, w_M, E^g, t) \tag{10}$$

where q is the external term of trade of the country, and E^g is government expenditure on agriculture normalized by P^{AM}.

From the foregoing, the system of simultaneous equation model for the empirical analysis of supply of cashew is articulated and consists of six behavioral equations. These can be explicitly expressed as follows:

(i) $Q^{AX} = \alpha_1 + \alpha_2 P^{AX} + \alpha_3 P^{AN} + \alpha_4 P^M + \alpha_5 Z_t + \alpha_6 D^d + \alpha_7 L_t + \alpha_8 w + \alpha_9 k + \alpha_{10} h + \alpha_{11} t$

(ii) $P^{AX} = \alpha_1 + \alpha_2 Z_t + \alpha_3 W + \alpha_4 Q^{AX}$

(iii) $P^{AN} = \beta_1 + \beta_2 P^{AX} + \beta_3 P^N + \beta_4 W + \beta_5 E + \beta_6 K + \beta_7 h + \beta_8 t$

(iv) $P^N = \lambda_1 + \lambda_2 P^{AN} + \lambda_3 P^{AX} + \lambda_4 W + \lambda_5 E + \lambda_6 t$

(v) $W = \delta_1 + \delta_2 P^{AN} + \delta_3 P^{AX} + \delta_4 P^N + \delta_5 W_M + \delta_6 t$

(vi) $E_t = \gamma_1 + \gamma_2 P^{AX} + \gamma_3 q + \gamma_4 WM_t + \gamma_5 E^g + \gamma_6 t$

It is noteworthy that all variables in the model are as earlier defined.

Nature and sources of data

Largely, the study was based on secondary data. In terms of scope, time series data extended from 1970 to 2012. The sources of data included various issues of Central Banks of Nigeria's (CBN) Annual Report and Statement of Accounts, Statistical Bulletin as well as National Bureau of Statistics' (NBS) Annual Abstracts of Statistics. Other sources of data were International Financial Statistics, the United Nations Trade Year Book, FAOSTAT and relevant studies. The data included output quantity (Q^{AX}) and price of cashew (P^{AX}). Price of agricultural non-tradable (P^{AN}) was proxied by the price of yam because yam is mostly produced and consumed domestically. Data on indicators of macroeconomic policies included macro-prices such as real exchange rate (RER), interest rate (IRA), and rural wage rate (W) as well as government expenditure in agriculture (E^g). Price of non-agricultural goods was represented by other services component of the consumer price index, while total domestic expenditure was estimated as the sum of private and public consumption and investment expenditures.

Method of analysis

The initial step in the estimation procedure involved identification of each equation of the specified model. Tracing identification of each equation of the model indicated that the model was over-identified. This prompted the choice of two-stage least squares estimation technique among simultaneous equations techniques. The estimation procedure also consists of an approach designed to capture the long run relationship between the dependent and the independent variables, while avoiding spurious inferences. This is the cointegration and error correction technique, which has received prominent attention in the literatures (Adams, 1992; Engle and Granger, 1987; Tambi, 1999). Working throughout in logarithms, the first attempt involved

determination of the order of integration of the time series data. The augmented Dickey Fuller unit root test was used in testing for stationarity of variables. The next procedure was a test for cointegration between the explained and the explanatory variables. The Johansen cointegration test was applied. The final step was the estimation of the error correction representation for the regression. The estimation of error correction model was based on existence of cointegration between the dependent variable and the independent variables. For the error correction model, an over-parameterized regression was first run for the system of equations of the model before the parsimonious one was gotten. The parsimonious regression was based on the t-value and theoretical expectations of the variables. The effect of each economic policy variables on the supply of cashew was determined by the sizes and signs of elasticity coefficients with respect to each variable. A double logarithm form of the model was estimated.

EMPIRICAL RESULTS

Key variables determining supply of cashew

A summary of the regression results for cashew is shown in Table 1. The Table indicates that five variables are significant determinants of cashew supply. These are price of cashew, price of agricultural non-tradeable (yam price), wage rate, government capital expenditure in agriculture, and interest rate on agricultural loans. Estimated coefficient of the price of cashew was positive and significant at five percent. The magnitude, 0.25, showed that a ten percent increase in price of cashew will bring about an increase of 2.5% in supply of cashew. An attractive price would induce profit and investment in production of the crops, which would result in increased supply. The estimated coefficient of yam price is positive and the magnitude of the coefficient is 0.97. The magnitude implies that a ten percent increase in yam price will result in 9.7% increase in cashew supply indicating that cashew and yam are complements. It reflects a mixed cropping pattern commonly practiced by the smallholder farmers.

The coefficient of wage rate was negative and significant at five percent level. The magnitude of -0.38 implies that a ten percent increase in rural wage rate will lead to 3.8% decrease in supply of cashew and vice versa. The negative sign indicates that higher wages would lead to higher cost of production which ultimately could lead to a fall in the supply of cashew. The coefficient of government capital expenditure in agriculture was positive and significant at five percent level. The magnitude, which was 0.06, implies that a ten percent increase in capital expenditure in agriculture would lead to 0.6 percent increase in supply of cashew. This response is very negligible. The coefficient of interest rate on agricultural loans was negative as

expected. It was significant at five percent. The magnitude of 0.44 implies that a ten percent increase in interest rate would lead to 4.4% decline in cashew supply and vice versa. The negative sign is indicative of the fact that high interest rates would restrict access to credit by farmers and thereby would add to the harmful effects on investments in cashew cultivation. R^2 figure of 0.71 indicates that the independent variables explain 71% of variations in cashew supply.

Effects of policy variables on cashew supply

The estimated elasticities of supply of cashew with respect to policy instruments are shown by the results in Table 2. The table reveals that the elasticity coefficients are generally low. Nevertheless, one can gain some insight into the effect of the policy instruments on supply of the cashew, and draw important inferences. The elasticity of supply of cashew with respect to changes in capital expenditure on agriculture (CEAR) is significant and has positive sign. The positive sign implies that government capital investment in agriculture would induce positive effect on the supply of cashew but the effect is very weak. Weaknesses in government expenditure policy as reflected by the observed instability in the policy instruments as demonstrated in Table 3 would seriously constrain supply of commodities by the farmers. For instance, it can he observed in Table 3 that only a small proportion of public sector investment spending goes to agriculture. The relatively small share has the potential to create serious bias against agriculture in the provision of basic social and economic infrastructures that are required in the rural areas. This would constrain direct productive activities, reduce profit and discourage investment. When direct productive activities are constrained and new investment are discouraged it would result into low response of commodity supply to the policy instrument.

Public sector investment in agriculture could also be rendered ineffective by long action lags and long delay in release of funds. Similarly, leakages of agricultural funds, arising from diversion to unintended targets could render capital expenditure on agriculture ineffective, and thus would not translate to agricultural capital good within the budget year. A substantial amount of financial resources had been earmarked for agriculture on paper in Nigeria within the last two decades. The important issue is the extent to which these actually go for what they are meant. The leakages in the sector could be very high. This may contribute to low response of farmer's supply of cashew and other agricultural products to capital expenditure in agriculture by the government.

Supply response of cashew to interest rate (IRA) is significant and the coefficient has negative sign. The negative sign implies negative effect of interest rate. The negative effect could be attributed to the fact that high rate of interest rates make cost of borrowing very high

Table 1. Regression results for cashew (variables in natural logarithms).

Dependant variable	Constant	PSCWRt -1	PCAR t-1	PRBR t-1	PAN t-1	VCSW EXR t-1	W	CEAR	IRA	RER	DU	QCSWA t-1	VQCSWR
VQCSWR	0.004 (0.09)	0.25* (2.34)	-0.37 (-0.94)	-0.25 (-0.74)	0.97* (2.00)	0.04 (0.40)	-0.38* (-2.16)	0.06* (2.11)	-0.44* (-2.01)		0.37 (0.61)		
PCSWR	-0.02 (-0.09)				0.24 (0.98)			0.21* (2.86)				-0.13 (-0.83)	0.60 (1.53)
VCSW EXR	-0.09 (-0.73)						-1.19** (-3.40)	0.46** (2.65)	-0.30 (0.59)	1.37* (4.58)			2.0** (4.36)
PAN	0.04 (0.41)	0.30 (1.01)	0.78* (-2.11)	0.34 (1.48)			0.28 (0.80)			-0.07 (-0.64)			
PN	0.009 (0.07)	-0.01 (-0.03)			0.17 (0.51)		0.03 (0.09)						
W	0.04 (0.34)	-0.24 (0.47)			-0.10 (-0.41)								
ER	0.004 (0.08)	-0.22** (-2.61)		0.06 (0.66)									

Dependant variable	Q	H	YTRADI	PN t-1	PPKNR t-1	WMR	PSCR	EGR	PCTONR	ECM t-1	Adj R^2	DW
VQCSWR										0.73* (1.87)	0.71	1.81
PCSWR		-1.02* (-2.64)								-1.15* (-1.79)	058	1.76
VCSW EXR	0.22 (1.13)		0.75 (1.09)							-0.70* (-4.58)	0.77	1.63
PAN				0.71 (1.07)	0.26 (1.14)					-1.43* (-1.89)	0.67	1.62
PN	0.13 (0.55)				0.29 (1.20)		0.71 (1.23)			0.91* (1.91)	0.46	1.67
W				-0.71 (-1.14)	-0.11 (-0.71)	0.51* (2.59)				-0.76* (-2.17)	0.47	1.81
ER						0.06 (0.57)		0.13* (2.26)	0.06 (1.32)	-1.29* (-320)	0.49	2.15

Note: The variables in parentheses are t-statistics. ** means significant at 1%; * means significant at 5%. DW: Durbin-Watson statistics. Adj R^2 = Adjusted R2.
Source: Author's Estimate.

Table 2. Elasticities of cashew supply with respect to policy variables.

Policy variable	Elasticity of cashew supply
CEAR	0.06*
IRA	0.44*
W	-0.38*
DU	0.37
Own price	0.25*

* Significant at 5% level.
Source: Derived from Table 1.

and unattractive to farmers. The supply response of the commodity to wage rate is significant and the coefficient has negative sign meaning that the higher the wage rate the higher would be the cost of production which would induce a fall in supply of the commodity. Regarding dummy variable that represented structural adjustment policy, the estimated coefficient had expected positive sign but it is insignificant.

Supply elasticity of cashew with respect to changes in its own price as depicted by Table 2 is less than unity. The magnitude of 0.25 shows that a unit change in price of cashew will result into less than a proportionate change in supply of cashew. Thus for cashew it can be inferred that an attractive price would induce increased production and supply of the commodity, but would result in negligible increase in supply of the commodity. The instability in policies, high and rising prices of inputs and the near collapse of infrastructure in the rural areas creates the environment that tend to confound responses of the commodity to favorable prices.

Trends of major macroeconomic policy indicators

The results in Table 3 revealed a widening differential between urban and rural wage rate over time. This could result into influx of labour from rural to urban areas which could reduce the amount of labour available in the agricultural sector. This way, rural wage rate would rise, which would ultimately cause a reduction in production of cashew. The reduction in the production of the commodity will eventually lead to reduction in availability and diversification of the commodity as raw materials to agro-industry. Evidently, unstable pattern and high level of interest rates on loans had emerged from liberalization of financial market as demonstrated by Table 3. This would tend to discourage investment in the primary sector of the economy while encouraging tertiary sector activities. It should be noted that distributive operators who deal mainly in imported finished goods dominate the tertiary sector. They have a short turnaround time, which often does not exceed three months. For primary sector operator, which is dominated by farmers, average turnaround time could be much higher if the other constraints to primary sector operations were taken into account. The implication is that the effective lending rate

will be more affordable by traders in the tertiary sector compared to the smallholder farmers and processors who dominate the primary agricultural sector.

Moreover, a rising lending rate as observed in the table would make locally produced cashew less competitive in the market. Bearing in mind that the Nigerian primary sector is dominated by agriculture, which is basically the small scale subsistent type and given the low literacy rate in the rural areas, as well as bureaucratic lending procedure of banks, smallholder cashew farmers and processors would face formidable problem in patronizing the formal financial institutions for loans. The high interest rate charges has almost permanently shut the door against farm loans as the returns to farm enterprises could hardly cover the cost of such loans. The farmers also have to contend with a longer gestation period.

Furthermore, the exchange rate had fluctuated and depreciated over time. This had raised the cost of production which like high bank lending rate had made locally produced products less competitive in the market, compared to imports from other producing countries. Depreciating exchange rate may crowd out marginal investment proposals on account of high investment costs in a high hank lending rate regime. High exchange rate combined with a high hank lending rate may create enabling environment for importation and distribution of finished products of cashew while creating a disabling environment for existing domestic producers and processors and thus could discourage investors in the production, processing, and export of cashew and its products.

Poor network of rural feeder roads in Nigeria has resulted into large farm-gate-retail price spreads, inflated farm-gate prices of farm inputs. This would greatly distort the structure, conduct, and performance of rural markets. The network of rural feeder roads to service and feed the national road remains in a primitive state, with only about 30.9% being paved in 2004 and only 10% of total rural feeder roads remained all-season roads. As a result, transportation costs and input prices remain high on account of high time costs, and road user charges, especially vehicle operating cost. The consequence would be ineffective evacuation of cashew from the farm to the agro-industry located in the urban centers resulting into heavy post-harvest losses. This would eventually lead to inadequate supply of raw materials to agro-industry and hence low value addition. Also, poor rural transportation facilities would encourage spatial production inefficiencies, as they would hamper the emergence of specialized cashew production patterns. Similarly, the poor nature of primary roads would lead to ineffective market linkages. This would render the implied elasticities of supply of cashew with respect to policy variables low. Marketable surpluses would be bought up by middlemen at a discount because of poor rural roads with the consequence that the benefits of increased prices would flow to the middlemen who tend to exploit the farmers by offering low farm gate prices while taking advantage of

Table 3. Trends of major macroeconomic policy indicators and prices of major farm inputs in Nigeria, 1970-2007.

Macro-economics policy indicators	1986-1990		1991-1995		1996-2000		2001-2005		2006-2012	
	Mean	C.V %	Mean	C.V %	Mean	C.V %	Mean	C.V%	Mean	C.V %
Interest rate: Lending (%)	11.60	9.22	20.22	30.35	22.42	22.43	22.85	11.37	24.58	19.01
Exchange rate (₦ to $)	0.73	14.46	5.20	47.87	30.70	95.40	96.70	27.17	116	3.45
Monthly urban wage	155	10.0	226.65	28.86	1165.25	39.62	4524.63	65.62	7500	10.0
Monthly rural wage	121.44	45.10	177.04	31.13	874.83	26.55	3000.63	43.78	3960	50.10
Expenditure in agriculture (Million Naira)	616.26	48.65	1082.36	67.40	2605.84	43.88	9837.16	31.57	41930.97	58.61
Share of agriculture in total expenditure	4.70	62.69	3.03	30.32	1.77	18.01	1.90	21.65	4.03	63.42
Share of agriculture in total capital expenditure	12.55	-	10.83	-	7.67	-	5.05	-	8.93	-

Sources: Underlying data obtained from Central Bank of Nigeria, National Bureau of Statistics, Abuja and CBN's Statistical Bulletin (various issues).

scarcity of commodities in the urban market place. Therefore, the response of farmers to favourable prices would be low because they are being shielded from receiving appropriate signals.

One inference that can be drawn from the results presented in Table 3 is that policy instability results in undesirable effects. It is clear from the low responses of crops that policy effectiveness in Nigeria had been hampered by inconsistencies, instability and lack of will to follow through in a determined manner to propel growth and development in production of agricultural commodities including cashew. Uncertainties associated with implementation of policies tend to dampen supply response of cashew thus limiting investment, production and availability of the commodity for agro-processing.

Potentials of Nigeria in cashew production
In recent times, Nigeria's annual cashew nut production has witnessed a steady growth. It increased by 11.92% from 580,761 tonnes in 2009 to 650,000 tonnes in 2010, rising further by 25.08% from the 2010 level to 813,023 tonnes in

2011. It climbed further by 2.89% from the 2011 level to 836,500 tonnes in 2012. On the average, the commodity has witnessed annual growth rate of 13.30% between 2009 and 2012. The production figure of 2012 for Nigeria is equivalent to 44% and 20% of cashew nuts produced in Africa and the entire world, respectively (FAOSTAT, 2013; Tables 4 and 5). On the average, Nigeria contributed about 51% and 20% of cashew nuts produced in Africa and in the entire world respectively between the period of 2000 and 2012. Africa contributed about 45% of an estimate of 4,152,315 tonnes of the global cashew production in 2012. On the average, Africa contributed about 40% of the global cashew production between 2000 and 2012 (Tables 4 and 5). Other major cashew producing countries in Africa are Cote d'Ivoire, Tanzania, Mozambique and Guinea Bissau. There are evidences that Nigeria has led Africa in cashew nut production in the past decade with about half the African production (Table 4). The data in Table 6 revealed that Nigeria ranked second in the World in 2010, 2011 and 2012 with estimated nut production of

682,524 tonnes, 813,023 tonnes and 836,500 tonnes respectively. For the three years, Vietnam has maintained a leading position in the world production of cashew nuts (Table 6).

In terms of cashew nut yield, cashew tree yield of 1.5 to 4 kg of nuts per tree have been reported for Africa (Adeigbe et al., 2015; FAOSTAT, 2013), and 7 to 11 kg of nut per tree for South Africa. In Nigeria, mature cashew tree yields of 1 to 20 kg of nuts are obtained. Nut yields in the range of 7.82 to 14.04 kg per tree were also observed in some Nigerian cashew varieties (Adeigbe et al., 2015).

In India, yield of 10 to 13 kg of nuts per tree have been observed. In Nigeria, variability in tree yield is observed not only in different fields but also within particular farms and plantations. The wide margin in nut yield per tree is dependent on the genetic source of the materials (FAOSTAT, 2013). Contribution of environment, especially soil fertility and plant population may be very significant. Differences in nut yield could also be attributed to agro climatic conditions, age, genetic make-up of the genotype or cultivar and the interaction of both the environment. Cashew yield

Table 4. Cashew production across countries in metric tonnes and percentage of Nigeria's production in Africa and the world and percentage of Africa's production in the world for the period of 2000 to 2012.

Country	2012	2011	2010	2009	2008	2006	2004	2002	2000
Nigeria	836,500	813,023	650,000	580,761	727,603	636,000	555,000	514,000	466,000
Angola	2,000	2,085	1,750	1,667	2,088	1,590	1,307	1,139	800
Benin	170,000	70,000	69,700	49,487	62,000	55,000	45,000	46,771	40,000
Burkina Faso	5,750	5,876	4,800	3,168	3,969	6,141	4,904	4,364	3,732
Cote d'Ivoire	450,000	452,656	380,000	246,383	308,680	235,000	140,636	104,985	63,380
Ghana	36,500	35,736	28,400	35,647	44,660	34,000	25,000	9,000	7,697
Guinea-B	130,000	128,684	91,100	64,653	81,000	95,000	96,649	86,000	72,725
Kenya	29,026	20,927	8,600	8,381	10,500	11,349	9,332	10,031	12,500
Madagascar	700	6,677	6,200	6,072	7,607	6,700	7,289	6,349	6,500
Mozambique	64,731	72,263	67,200	67,846	85,000	62,821	42,988	50,177	57,894
Senegal	6,660	6,996	5,700	4,031	5,050	6,332	5,057	4,500	7,000
Tanzania	122,272	75,000	80,000	79,100	99,100	77,400	92,810	55,000	121,200
Togo	6,800	970	790	559	700	700	550	230	320
Africa Total	1,882,131	1,702,951	1,399,140	1,151,888	1,443,557	1,235,657	1,032,655	897,746	862,998
World Total	4,152,315	4,201,010	2,757,598	3,350,929	3,982,640	3,502,184	2,900,969	2,239,194	1,932,142
NPA	44.44	47.74	46.46	50.42	50.4	51.47	53.74	57.25	53.99
NPW	20.15	19.35	23.57	17.33	18.27	18.16	19.13	22.95	24.12
APW	45.33	40.54	50.74	34.38	36.25	35.28	35.59	40.09	44.67

NPA = Nigerian Percentage in the Total African Production, NPW = Nigerian Percentage in the Total World Production, APW = African Percentage in the Total World Production.
NPA Average = 50.66; NPW Average = 20.34; APW Average = 40.32.
Source: FAOTAT (2013).

in Nigeria and Tanzania showed that about 30% of the tree population in a hectare produced 80% of the nut yield, while 20% of the yield comes from the remaining 70% of the tree (Adeigbe et al., 2015). This is a reflection of low productive capacity of most cashew plantations in Nigeria. Old age of tree is implicated as another factor that contributes to low and variable yield. Available evidence showed that about 60% of Nigeria cashew plantations host very old cashew trees which have outlived their productive years with age above 30 years (Oluyinka, 2012).

Cashew was made a greening factor for reproducing bare hills and vacant land, which lead to rapid expansion of total area of cashew trees in Nigeria. Moreover, high yielding varieties cover an area of 305,791 ha in Vietnam, recording higher yields per hectare compared to other producer countries (Table 7). Daramola et al. (2005) and Adeigbe et al. (2015) reported that only 48% of cultivable land area is actually being cultivated out of the total Nigerian land area of 98.3 million hectares. This implies that there are prospect for future expansion of cashew production in Nigeria. Nigeria has the potential of becoming the World's leading cashew nuts producer with more land available for cultivating high yielding variety of cashew.

Available data showed that Nigeria has occupied a preeminent position in the total cashew production in the world. This clearly indicates that there is a need to upgrade existing processing technology and develop cost effective

Table 5. Growth in cashew production across countries.

Country	2010	2011	2012	Average
Nigeria	11.92	25.08	2.89	13.30
Angola	4.98	19.14	-4.08	6.68
Benin	40.85	0.43	142.86	61.38
Burkina Faso	51.52	22.42	-2.14	23.93
Cote d'Ivoire	54.23	19.12	-0.59	24.25
Ghana	-20.33	25.83	2.14	2.55
Guinea-B	40.91	41.26	1.02	27.73
Kenya	2.61	143.34	38.70	61.55
Madagascar	2.11	7.69	-89.52	-26.57
Mozambique	-0.95	7.53	-10.42	-1.28
Senegal	41.40	22.74	-4.80	19.78
Tanzania	1.14	-6.25	63.03	19.31
Togo	41.32	22.78	601.03	221.71
Africa Total	21.46	21.71	10.52	17.90
World Total	-17.71	52.34	-1.16	11.16

Source: FAOTAT (2013).

Table 6. Production figures in the ten top world cashew nut producers, 2010-2012.

Country	2010	2011	2012
India	613,000	647,600	680,000
Cote d'Ivoire	380,000	452,656	450,000
Vietnam	1,242,000	1,272,000	1,190,900
Brazil	104,342	230,785	80,630
Guinea-Bissau	91,100	128,687	130,000
Tanzania	80,000	75,000	122,274
Nigeria	682,524	813,023	836,500
Benin	69,700	70,000	170,000
Mozambique	67,200	72,263	64,731
Indonesia	145,082	122,100	117,400

Source: FAOTAT (2013).

method to keep processors stocked with their raw inputs throughout the year. This is an indication that the cashew processing industry has the potential to generate high employment given the necessary boost such as availability of raw cashew throughout the year, availability of constant electricity supply, water and roads at locations of cashew supply and cashew-based processing industry. This would attract and retain investors especially the young and energetic working population to the cashew-based processing industry. In this way, enhanced value addition in cashew supply chain would be encouraged. This would ultimately, boost increased export of high valued products of cashew instead of exporting the commodity to other countries in raw form.

Potentials for employment generation

Changes in consumption patterns for cashew nuts have been propelled by such drivers as health concerns. High valued products of cashew have opened the door to cashew producers, processors, financiers, and exporters who have the financial capability to exploit opportunities afforded by cashew market that is growing steadily at 5% annum (Chemonics International, 2008). Nigerian stakeholders in cashew industry can share in a long-term potential investment in exportation of cashew based products that can generate about $74 million. More importantly, diversification of cashew to cashew-based processing industry in Nigeria can generate almost threefold increase in employment level in the industry. This was estimated for the period between 2003 and 2012 as displayed in Table 7.

A large and growing domestic and regional market exists for cashew kernels, as well as other cashew by-products. West Africa is now the major supplier of cashew as raw materials to the Indian processing factories. Therefore, cooperation between major exporting countries in West Africa will create the potential to improve cashew prices. In addition, several United State Agency for International Development projects in Nigeria, Mozambique, Kenya, Tanzania, and Ghana, are potential opportunities for market linkages for African cashew. Nigerian cashew, therefore, has high potential for penetrating global cashew market to generate increased foreign exchange earnings and employment if the identified critical factors that determine domestic supply are effectively managed to create improved market linkages for expanded supply.

Furthermore, in terms of industrial exploitation, cashew can effectively be expanded and developed in Nigeria through diversification of primary products to emerging cashew based industries to enhance manufacturing of high valued cashew products if the enabling infrastructure conditions can be improved. From historical record, in 2001 alone, about 30% of Nigerian raw cashew nuts are exported to the major processing countries, such as India and Brazil for further value-added processing. Recently, export market has expanded to cover Vietnam. Moreover, about 10% or more were smuggled unrecorded through Lagos port to Cotonou, and Benin Republic, where they received 20% premium. Similarly, in Nigeria only 30 to 40% of raw nuts were processed into kernels.

With present emphasis on developing crops that are highly resistant to the vagaries of climate change such as drought as well as the emphasis of Nigerian government on diversification of sources of export earnings away from petroleum products which is now experiencing global fall in its price, cashew can be used as a springboard to bring about a major turnaround in the non-oil export sector. Therefore, expansion in non-oil export earnings could be achieved through increased trade in high valued cashew products. This will depend on maintaining a conducive

Table 7. Cashew yield and area under cultivation in the world and some cashew producing countries, 2012.

Countries	Production in tonnes	Area in hectares	Yield in Kg/ha
World	4,152,315	5,313,415	781.5
Vietnam	1,190,900	305,791	3,894.5
India	680,000	965,000	704.7
Brazil	80,630	756,847	106.5
Nigeria	836,500	366,000	2,285.5
Cote d'Ivoire	450,000	900,000	500.0
Tanzania	122,274	410,641	297.8
Senegal	6,650	17,000	391.2
Benin	170,000	468,000	363.2
Mozambique	64,731	80,000	809.1
Indonesia	117,400	585,300	200.6

Source: FAOSTAT (2013).

and sustainable policy environment in the country.

POLICY IMPLICATIONS AND CONCLUSION

To achieve expansion in cashew supply, findings of the study have revealed important factors that should be targeted for effective policy implementation and management so as to create incentives to smallholder farmers, small, medium, large scale processors as well as exporters of cashew and its products. In this connection, price of cashew is one of the important incentive factors. To achieve better prices, it will be necessary to ensure high quality of cashew nuts supply. It is imperative to maintain a high standard for well dried cashew. This has implication for an effective educational programme which will be directed towards cashew growers. This could be achieved through training of local buying agents who will in turn train the farmers. High level kernel breakages that is often associated with processing often results in a different end use suitable only for the culinary market as opposed to important markets such as confectionery and food industry. Improved quality through drastic reduction in breakages will create incentive for industrial processors to pay higher prices for well-dried cashew. In this way, absorption of cashew by agro-industry would be encouraged and this would lead to increased processing capacity and transformation of cashew to high valued final products for exporting to new markets instead of exporting raw cashew nuts.

Furthermore, findings of the study have shown a low proportion of annual budget going to agriculture. So far, resources deployed to agriculture have not received the minimum share as specified under international declarations. For instance, in 2003, Maputo declaration required member countries including Nigeria to allocate at least 10 percent of their national budget to agricultural sector. The share of national budget expenditure deployed to agriculture has remained far below the global benchmark. Capital investment is the most important aspect of expenditure share in terms of generating productive activities and growth. This component still remained below the global benchmark with negative implication on infrastructure investment in the rural sector. In this way, possibility of having access to improved technology and requisite infrastructure which are financed by government funds would be constrained. Low government investment in agriculture could constrain demand for agricultural inputs given the fact that poor rural infrastructure such as poor roads network would stimulate high cost of inputs.

Infrastructural bottlenecks and cost of operations are implicated by observed poor infrastructural capacity in the rural areas. Relieving these constraints should be a priority for government expenditure that will propel development. Processing activities in agricultural sectors including cashew sub-sector is characterized by higher costs because of deficiencies in transport systems. A lack of rural roads leads to large wastage in fruit and vegetable production including cashew after harvesting, and this is true of many other agricultural crops. This deprives agro-industries of cost-effective inputs. Poorly functioning transport systems make distribution costly and inefficient, and retard the agricultural productivity. Deficient infrastructure such as electricity and water supplies in the rural sector will raise costs and thereby discourage investment. Intermittent power cuts will cause heavy damage to industrial machines, and the cost of recoiling engines constitutes a major expenditure.

Main element of instability in policy included high variability in interest rate, exchange rate and widening urban-rural wage rate differential. This has contributed to the high cost of operations. Inadequate access to credit by farmers has been implicated by high and rising interest rate. This would constrain demand for credit by farmers and processors. In the light of these challenges,

the following policy strategies should be given priority attention to enhance increased cashew supply and regular flow into agroindustry in Nigeria.

Improved quality and productivity as an important issue to be addressed

The main constraint to quality and productivity are the poor infrastructure services and related skills thus preventing farmers' access to inputs, limiting processing enterprises access to raw materials, global markets and making it difficult to be integrated into international production and supply chains. The government would therefore need to take necessary step to invest heavily on infrastructural rebuilding to be able to offer competitive, safe, reliable and cost-effective products. Increased budget share for agriculture must be focused effectively on adequate provision of infrastructure so as to improve market opportunities, enhance competitiveness in the market and rate of returns on investment. Better power supplies and effective rural roads network and effective linkages to the urban centers would encourage regular supply of cashew to cashew based industry for investment in manufacturing final and semifinal products of cashew thereby enhancing the prospects of exploiting growth potentials of cashew in Nigeria. Use of local raw materials and product diversification and improvements in marketing logistics will help cashew processing firms survive competitive pressures. Agro-industrial growth and competitiveness will be greatly enhanced by improved infrastructural capacity.

Generation and distribution of genotypes with high productive capacity and replanting of old cashew plantations

Development and distribution to farmers of improved cashew varieties must be the focus of research and extension delivery services. Replanting of old cashew plantations and establishment of new ones with improved varieties is a necessary measure to increase the average cashew nut yield in Nigeria. Planting of new cashew farms with clonal seedling has advantage of producing uniformly yielding trees that reaches fruit bearing in about two years after establishment.

Training assistance

To increase productivity and increase diversification to agro-industry, training assistance to local buying agents and farmers on how to improve on quality of cashew is crucial to eliminate unnecessary technical barriers to trade caused mainly by disparities in standards and related practices. Thus, mutually developed and recognized systems of standardization, testing and quality, are urgently needed to enhance market transparency for manufacturers and purchasers.

Primary commodity markets and input markets should be strengthened by the government

Supply of farm inputs should target smallholder farmers at affordable prices in order to provide opportunities to expand their farms. They may be assisted through provision of adequate market information and effective market linkages so as to prevent exploitation by middlemen.

Increased access to credit through reduction of the high rate of interest on agricultural loans

Farmers, Small and Medium Scale Processors should be assisted by granting them access to increased credit at single digit interest rate. The Nigerian Bank of Agriculture should be strengthened to provide scope for offering agricultural loans to farmers and processors at reduced interest rate and to enhance fast delivery of such loans to meet necessary farm operations.

Stable macroeconomic policies

The drive to achieve a stable macroeconomic policy environment which will manifests largely in price stability should he achieved and sustained to encourage investors and potential investors in cashew industry as well as other sub-sectors of agriculture.

Upgrading of processing technology

There is a need to upgrade existing processing technology and develop cost effective method to keep processors stocked with their raw inputs. This is an indication that the processing industry needs improved storage technology to keep raw cashew available throughout the year. This implies availability of constant electricity supply, water and roads at a particular location of cashew industry are important to attract and retain investors especially the young and energetic population to cashew industry.

Conclusion

In conclusion, findings have revealed that effective management of the major factors affecting cashew supply to the advantages of smallholder farmers, small, medium, and large scale processors as well as exporters of cashew and its products are fundamentals to induce expanded supply of cashew and regular supply to agro-industry in Nigeria.

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