Competitiveness of Cashew Production in Nigeria

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ABSTRACT

The study investigated the competitiveness of cashew production in the study area. The project was carried out among cashew farmers in Kogi, Oyo and Osun States of Nigeria. Simple random sampling technique was used to collect data from the farmers. Data were collected from the respondents with the aid of structured questionnaire and the data obtained from the questionnaire were analysed using Descriptive analysis, Private Profitability, Private Cost Ratio, Social Profitability, Domestic Resource Cost, Nominal Protection Coefficient and Effective Protection Coefficient. Most (69.63%) of the respondents are of age 60 years and below while majority (60.00%) of the farmers are having formal education. However, 69.20% of the farmers are having farm size 5 hectares and below. The result of Private Profitability was positive in all the three production systems while the Private Cost Ratio (PCR) was less than one in all the production systems considered. The result of Social Profitability was positive while that of Domestic Resource Cost (DRC) was less than one in all the production systems. The study concluded that cashew production is highly competitive in the study area.

Keywords: *Cashew, production, competitiveness, comparative advantage, policy analysis matrix*

INTRODUCTION

Cashew is a tree (*Anacardiumoccidentale*) indigenous to Brazil that was formerly grown to prevent soil erosion in coastal areas because of its extensive root system. In the 15th and 16th century, it was taken to West Africa, East Africa and India by the Portuguese. It widely spread naturally because it is undemanding, tolerating poor soils and low rainfall. What is known as cashew nut actually is the seed of the tree. The tree bears fruits, more precisely drupes that consist of a double shell and the seed. This fruits are often confused with the accessory fruit or false fruit, also called cashew apple. This is the large, coloured extension of the drupe. Both the seeds and the cashew apples are edible. The cashew apple can be eaten raw, but more frequently it is processed to pulp or juice. The seed or cashew nut can be eaten raw as well, but is also sold in fried and sometimes salted or sweetened form. Furthermore, oil can be obtained from the shell of the seed. This Cashew Nut Shell Liquid (CNSL) is a by product of the roasting process and is used for industrial or medical purposes (ITC, 2011).

Cashews are grown in Africa, Latin America and South East Asia. The leading producing countries of these regions are Viet Nam, India, Brazil and Indonesia. Increasingly, Africa is gaining importance in raw cashew nut production. Here, the main producing countries are Nigeria, Côte d'lvoire, Tanzania, Mozambique, and Guinea Bissau, while countries such as Ghana, Burkina Faso and Benin a recurrently expanding area under cultivation. Agriculture Statistics of the Food and Agricultural Organization of the United Nations (FAO) show that in 2009, 30 countries produced Cashew nuts with shell, among them ten ECOWAS countries. In 2009, they made up for 30% of worldwide cashew nut production. According to estimates from the World Bank, around 97% of the world cashew production comes from wild growth and small farms while the remaining 3% come from planned plantations (ITC, 2011).

Nigeria's interest in cashew nut production began in the early 1950's when the plantations were Introduced in Kogi, Anambra, Imo, Enugu, Oyo and Osun states. Commercial exploitation of cashew were not known until recently because the cocoa was more prominent and received much attention in the south west and palm oil in the south east Nigeria is one of the top ten cashew producers in the world. The

production of cashew is estimated to about 100,000 tons of raw nuts per annum. About 60 to 70% of the local production is commercialized of which about 90% is exported in the form of raw nuts. It is a high potential export- oriented agricultural crop and represents 7 to 8% of non-oil export earnings (ITC, 2011).

The continuous increase in cashew production will depend on the international competitiveness and the effects of policy intervention (Kaplinsky, 2004). The removal of all forms of tariffs will change the structure of economic incentives. This, in turn, will cause major adjustments in the pattern of production, allocation of resources and trade flows. The analysis of competitiveness and comparative advantage will provide an indication of the effects of policy (Oluyole, 2015). Comparative advantage of a country in a commodity usually results from relative superiority in resource endowments required by the commodity. It puts the country in a vantage position to specialize in the production of the commodity. Competitive advantage is created through appropriate combination of knowledge and other critical resources to gain significant share of the world market for a particular commodity. Competitive environment and the capability of firms in the industry to innovate and improve their technologies contribute to the achievement of competitive advantage. The use of comparative advantage analysis covers not only the on-farm production but incorporates downstream collection, processing and wholesaling activities as they relate to a particular commodity (Oluyole, 2015).

Policy Analysis Matrix (PAM) is an accounting identity used to reflect the private and social cost and prices of a representative business entity. PAM framework uses detailed information from a production budget as well as other processing affiliated costs related to the production and marketing of commodities (Keyser, 2006; Mejabi, 2012). PAM is a product of two accounting identities, profitability, defined as the difference between revenue and cost while the other measure the effect of the divergencies (distorting policies and market failures) as the difference between observed parameters and parameters that would exist if the divergence were removed (Monke and Pearson, 1989). The PAM is a framework for presenting the effect of policy and policy changes on incentives applied to production or marketing alternatives (Shapiro and Staal, 1995). PAM is also used to measure input use

efficiency, comparative advantage as well as competitiveness of production system given current technology, prices of input and output and policy (Nelson and Panggabean, 1991).

One fundamental issue is the approach to the understanding of how different farm management systems have implications on cashew production. For this reason and other reasons, the theory of competitiveness has been utilised to analyse cashew production management systems especially in this study.

The objective of this paper therefore is to assess the competitiveness and comparative advantage of cashew production management systems in Nigeria. This is quite imperative in order to provide the indices that would be required to formulate cashew policies that would be used to guide cashew.

METHODOLOGY

The project was carried out among cashew farmers in Kogi, Osun and Oyo States which incidentally fall within the Southwest and North central part of Nigeria. One Local Government Area (LGA) was randomly selected from each State, thus making a total of three LGAs selected for the study. In Kogi State, Kabba-bunu LGA was selected for the study; in Osun State, the chosen Local Government Areas was Ejigbo while in Oyo State, Ibarapa East LGA was chosen. A total of twelve communities were randomly selected for the study, these were Okebukun, Kabba-bunu, Aherin-Ayede-bunu, Assah-Ayede-bunu and Araromi-Wata in Kogi State; Isundunrin, Ika, Igbon, Ejigbo and Ilawo in Osun State while Temidire and Eruwa in Oyo State. Simple random sampling technique was used to collect data from a total of 160 farmers randomly selected from the twelve communities. Data were collected from the respondents with the aid of structured questionnaire and the data obtained from the questionnaire were analysed using Descriptive analysis as well as Policy Analysis Matrix (PAM).

Policy Analysis Matrix (PAM) a product of two accounting identities. One defines profitability as the difference between revenue and costs while the other measures the effect of the divergences (distorting policies and market failures) as the difference between observed parameters and parameters that would exist if the divergence were removed (Monke and Pearson, 1989). The PAM is a framework for presenting the effects of policies and policy

changes on incentives applied to production or marketing alternatives (Shapiro and Staal, 1995). It provides a methodology for assessing the incentives for economic actors in a commodity chain at micro economic level. Central to these incentives are competitive advantages in costs and revenues and how these shift with policy. The PAM also examines relative social profitability of alternative economic activities, the efficiency of resource use in the pursuit of maximising national income (Shapiro and Staal, 1995). The basis of

PAM is a set of profit and loss identities. The PAM, as an empirical framework, provides measures of economic efficiency and of transfer effects of policy on particular commodities, technologies and region. The PAM results, thus, serve as an information baseline for monitoring and evaluating the effects of policy and for identifying policy-relevant research needs (Camara *et al*, 2001). Following from Monke and Pearson (1989), the basic PAM matrix format is presented as in Table 1.

Table1. *Basic Policy Analysis Matrix Format*

	Revenues	Costs		Profits
		Tradable Inputs	**Domestic factors**	
Private values	A	B	C	D[1]
Social values	E	F	G	H[2]
Effect of divergence and policy	I[3]	J[4]	K[5]	L[6]

Source: *Monke E and S R Pearson*

1. Private profits (D) = A-(B+C), 2. Social profits (H) = E – (F+G), 3. Output transfers (I) =A-E, 4. Input transfers (J) = B-F, 5. Factors transfers (K) = C-G, 6. Net transfers (L) = D-H = I- (J+K)

The constituents of PAM that were used in this study are Private Profitability, Private Cost Ratio, Nominal Protection Coefficient, Effective Protection Coefficient, Social Profitability and Domestic Resource Cost. Private Profitability and Private Cost Ratio were used to determine the competitiveness of cashew production in the study area; Nominal Protection Coefficient (NPC) and Effective Protection Coefficient (EPC) were used to determine the effects of government policies on cashew production in

the study area while Social Profitability and Domestic Resource Cost were used to determine the comparative advantage of cashew production in the study area.

Private Profitability (PP) – This demonstrates the competitiveness of the production system given current technologies, prices of input and output and policy.

$$\prod = P_0 Q_O - P_i Q_i$$

$\prod$ = Private Profit;

$P_o q_o$ = Value of output produced at private prices; $P_i q_i$ = Value of inputs used at private prices.

Private Profit < 0 shows that the product is not competitive given current technologies, prices of inputs and outputs; Private profit = 0, operators are earning normal profit while private profit > 0 implies that the product is competitive given current technologies, prices of inputs and outputs, and policy.

Private Cost Ratio (PCR)- This shows the private efficiency of the production systems and is an indication of how much one can afford to pay domestic factors (including a normal return to capital) and still remain competitive.

$$PCR = \frac{\sum a_{ij} P_k^{\ p}}{Y_i^{\ p} P_i^{\ p} - \sum a_{ij} P_j^{\ p}}$$

$\sum a_{ij} P_k^{\ p}$ = Cost of domestic factors at private prices; $Y_i^{\ p} P_i^{\ p}$ = Revenue at private prices;

$\sum a_{ij} P_j^{\ p}$ = Cost of tradable inputs at private prices.

PCR < 1 indicates that the product is highly competitive; the PCR > 1 implies entrepreneurs are making losses while PCR = 1 indicates the breakeven point.

Social Profitability (SP) – The social profit reflects social opportunity costs and it measures

efficiency and comparative advantage.

$$SP = \sum Y_i^s P_i^s - \left(\sum a_{ij} P_j^s + \sum a_{ij} P_k^s \right)$$

SP = Social profit; $\qquad \Sigma a_{ij} P_j^s$ = Cost of tradable inputs at social price;

$\Sigma Y_i^s P_i^s$ = Revenue at social price; $\qquad \Sigma a_{ij} P_k^s$ = Cost of domestic factors at social price.

A positive social profit indicates that the system uses scarce resources efficiently and contributes to national income (Nelson and Panggabean, 1991; Keyser, 2006), hence, the commodity has a comparative advantage. A negative social profit indicates social inefficiencies and suggests that production at social costs exceeds the costs of import, thus indicating that the sector cannot sustain its current output without government intervention at the margin.

Domestic Resource Cost (DRC) – The DRC indicates how much domestic resources are needed to generate an additional value of export revenue. It is a measure of relative efficiency of domestic production by comparing the opportunity of domestic production to the value generated by the product (Tsakok,1990).

$$DRC = \frac{\sum a_{ij} P_k^s}{\sum Y_i P_i^s - \sum a_{ij} P_j^s}$$

$\Sigma a_{ij} P_k^s$ = Cost of domestic factors at social prices; $\Sigma Y_i P_i^s$ = Revenue at social prices;

$\Sigma a_{ij} P_j^s$ = Cost of tradable inputs at social prices.

DRC of less than unity indicates the efficiency of producing the goods domestically; DRC of more than unity indicates inefficiency in domestic production while a DRC of unity indicates a balance, in which case the country neither gain nor lose foreign exchange through domestic production.

Nominal Protection Coefficient (NPC) - The NPC is a measure of the extent to which domestic price policy protects the domestic producers from the direct input of foreign market (Tsakok, 1990). It is the ratio of domestic price to a comparable world (social) price.

$$NPC_o = \frac{P_o^p}{P_o^s}$$

P_o^p = Private (domestic) price on output; $\qquad P_o^s$ = Social (world/border) price on output.

Nominal Protection Coefficient on output (NPCo) measures the effect of policy intervention on output prices. NPCo less than one indicates that domestic farm gate price is less than the international price for output and that policies were decreasing the market price. Hence, there is negative protection on output and this confirms the presence of taxes or any other policy that is detrimental to the realization of the maximum output while NPC greater than one indicates the presence of subsidies. It shows

that the private price of the goods has been kept higher than the border price. This means that government policies provide incentives to the local producers of the goods thus enabling the producers to realize the maximum output.

Effective Protection Coefficient (EPC) - EPC is the ratio of the difference between the revenue in private price and cost of tradable inputs in private price to the difference between the revenue in social price and the cost of tradable inputs in social price. Hence:

$$EPC = \frac{Y_i^p P_j^p - \sum a_{ij} P_j^p}{Y_i^s P_i^s - \sum a_{ij} P_J^s}$$

$Y_i^p P_i^p$ = Revenue in private price; $\qquad \Sigma a_{ij} P_j^p$ = Cost of tradable inputs in private price;

$Y_i^s P_i^s$ = Revenue in social price; $\qquad \Sigma a_{ij} P_j^s$ = Cost of tradable inputs in social price;

An EPC greater than one suggests that government policies provide positive incentives to producers and hence the production of such goods are encouraged through the introduction of subsidies and reduction or an outright withdrawal of tax while EPC that is less than one implies that producers are not protected through policy intervention, hence producers face high taxation.

RESULTS AND DISCUSSION

The result of the socio-economic characteristics of the farmers is shown in Table 2. The table shows that only 26.25% of the total respondents are of age 40 years and below indicating that the proportion of youths among the respondents is low. Meanwhile, 69.63% of the total respondents are of age 60 years and below. Hence, 69.63% of the farmers are still within the productive age of 60 years and below, though the proportion of youths within the age bracket is very low. The lowness in the proportion of the youths is a bad pointer to cashew production efficiency as younger farmers are more active on farm work than the aged ones. Table 2 also shows that 81.88% of the respondents are males. This is quite obvious in that farm work is a tedious work and is only men that could cope effectively with it. As regards the educational level of the respondents, the result of the analysis shows that 60.00% of the respondents are having formal education. This would improve the efficiency of the farmers in as much that literate farmers would find it easier to adopt new technologies on cashew than the illiterate ones. This finding is in consonance with Oluyole *et al*, (2015) which showed that most cashew farmers in the Southwestern Nigeria were formally educated. Table 2 also shows that 90.00% of the respondents are married. This however contributes significantly to family labour supply thus easing the problem of labour inadequacies for farm work in the area. The analysis on farm size shows that 69.20% of the respondents had farm size of 5 hectares which shows that most of the farmers are small scale farmers.

Table2. *Socio-economic characteristics of the farmers*

Variables	Frequency	Percentage
Gender		
Male	131	81.88
Female	29	18.13
Total	160	100.00
Age of farmer (Years)		
≤ 40	11	26.25
41-60	71	43.38
> 60	78	30.37
Marital status		
Single	16	10.00
Married	144	90.00
Total	160	100.00
Educational Level		
No formal education	64	40.00
Primary education	39	24.38
Secondary education	36	22.50
Tertiary education	21	13.13
Total	160	100.00
Farm size		
≤ 5	110	69.2
6-10	30	18.9
> 10	20	11.9
Total	160	100.0

Source: *Field survey, 2014.*

The result of the competitiveness analysis as shown on table 3 showed that cocoa production is highly competitive in the three cocoa production management systems. This is because the Private Profitability (PP) result is positive and the Private Cost Ratio (PCR) result is less than one in all the three cashew cropping systems. Considering the values of PP, cashew production in the three cropping systems is highly competitive since the values are very high in the three cropping systems. However, cashew production is more competitive in

cashew/arable cropping system because the value of Private Profitability is the highest among the three cropping systems (N362, 828.12). This is followed by cashew/tree cropping system with PP value of N238,133.96 while the least is sole cashew cropping system. The values of Private Cost Ratio showed that cashew production in the three cropping systems is highly competitive, meanwhile, the lower the PCR the higher the competitiveness. Therefore, cashew production in cashew/arable cropping system is the most competitive since it is having the lowest PCR (0.00000765). This is followed

by cashew/tree cropping system with the PCR of 0.0000215 and the least is sole cashew cropping system (0.0000531). Looking at the values of both the PP and PCR together, it clearly showed that cashew production is more competitive in cashew/arable cropping system than the other two cropping systems given current technologies, prices of inputs and outputs, and the prevalent government policy. The result of the study corroborates the findings of Oluyole *et al* (2016) which found out that cashew production in Kogi State of Nigeria is highly profitable.

Table3. *Competitiveness of cashew production*

Indices	Sole cashew	Cashew/arable	Cashew/tree crop
Private Profit (PP)	176,203.74	362,828.12	238,133.96
Private Cost Ratio (PCR)	0.0000531	0.00000763	0.0000215

Source: *Field survey, 2014.*

Table 4 shows the result of the analysis on Comparative Advantage of cashew production in the three cashew cropping systems. The results showed that cashew production in Nigeria is having comparative advantage in the three cashew cropping systems. This is because the value of Social Profitability (SP) and Domestic Resource Cost (DRC) is positive and less than unity respectively in the three cropping systems. Considering the value of SP, the table shows that cashew production in Nigeria is having comparative advantage because of the high values of SP. It indicates that each of the cropping system uses scarce resources efficiently and contributes to national income (Nelson and Panggabean, 1991; Keyser, 2006), hence, the commodity has a static comparative advantage in the three cropping systems. However, cashew/tree cropping system has the highest comparative advantage being the one that is having the highest value of SP

(N447,936.90), this is followed by cashew/arables with SP value N110,756.40 while the least is sole cashew cropping systems. The values of DRC on the table (Table 4) showed that cashew production in Nigeria is having high comparative advantage in Nigeria with the values of DCR less than unity. It shows that the value of domestic resources used in cashew production in the three cropping systems is lower than the value added. This implies an efficient use of domestic resources in production and that production is socially profitable. However, cashew production under cashew/tree cropping system had the highest comparative advantage with the DRC value of 0.083 since the lower the value of DRC, the higher the comparative advantage. This is followed by cashew/arable cropping system with the DRC value of 0.287 and the least is that of sole cashew cropping system.

Table4. *Comparative Advantage of Cashew production*

Indices	Sole cashew	Cashew/arable	Cashew/tree crop
Social Profitability (SP)	52,161.51	110,756.40	447,936.90
Domestic Resource Cost (DRC)	0.368	0.287	0.083

Source: *Field survey, 2014.*

Table 5 shows the result of the effects of government policies on cashew production in Nigeria. The result of the Nominal Protection Coefficient (NPC) shows that there is no government protection on cashew output. This is because the value of NPC in the three cropping systems are less than one showing that the world (border) price of cashew output is higher than the domestic price of cashew. Hence,

government policies are decreasing the market price of cashew and therefore there is negative protection on output and this confirms the absence of subsidy in cashew sub-sector or any other policy that is detrimental to the realization of maximum output. Similarly, the result of the Effective Protection Coefficient (EPC) shows that the value of EPC for the three cashew cropping systems is less than one. This also

implies that cashew producers are not protected through policy intervention. Hence, government is not putting some policies in place (such as introduction of subsidy) that would encourage the producers of cashew to improve their efficiency.

Table5. *Effects of Policy on Cashew production*

Indices	Sole cashew	Cashew/arable	Cashew/tree crop
Nominal Protection Coefficient (NPC)	0.386	0.385	0.385
Effective Protection Coefficient (EPC)	0.337	0.343	0.382

Source: *Field survey, 2014.*

CONCLUSION

Most of the respondents are formally educated and this is a good pointer towards high productivity and thus increases the competitiveness in cashew production. Also, most cashew farmers in the study area are small scale producers, this is because most of the farmers are having farm size of five hectares and below. Cashew production in the study area is highly competitive, however, cashew/arable cropping system is the most competitive of the three production cropping systems. Cashew production in the study area is having a high comparative advantage, hence, cashew farmers in the study area uitilize their resources efficiently to produce cashew.

The study concluded that though cashew production does not get enough protection in terms of policy intervention, yet cashew production is highly profitable and its production in Nigeria is having a high comparative advantage.

In as much that cashew production in the study area is highly competitive and is having high comparative advantage, it is hereby recommended that government should give farmers incentives to expand their farms as majority of the farmers are small scale farmers (having less than 5 hectares of land). The incentives may include provision of soft loans as well as subsidized inputs. Also, youths should be encouraged into cashew farming and mixed cropping should be practiced in cashew farming rather than sole cashew farming.

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