Status and the determinants of organic Cocoa production in Nigeria

Adedeji, A.R. and *Oluyole, K.A.

Cocoa Research Institute of Nigeria, PMB 5244, Idi- Ayunre, Ibadan, Nigeria.
*Corresponding author's E-mail: kayodeoluyole@yahoo.com
Received: February 13, 2017 Accepted: April 16, 2017 Published: June 27, 2017

ABSTRACT

Records have shown worldwide that the use of chemical in cocoa production is predominant. This practice has disastrous effects on both the environment and human's life. As a result of the side effects, efforts are being made to shift attention from the use of chemicals to the use of organic materials to grow cocoa so as to avert the side effects being created by the use of chemicals. In Nigeria, there has been an information gap regarding the status of organic cocoa production. It is the gap that this study intends to fill, that is, to determine the status of organic cocoa production in Nigeria. Multi-stage random sampling technique was used to select 102 cocoa farmers in the study area. Information was collected from the respondents with the aid of structured questionnaire and the data from the information were analysed using descriptive statistics as well as logit model. The result of the analysis shows that 76.47% of the respondents are age 50 years and below while 70.59% of the respondents are having formal education. Majority (92.08%) of the respondents used chemical to control insects while 1.98% used bio-control method. Also, 90.10% of the respondents used chemical to control disease while 1.98% used bio-control. The result of the logit analysis shows that age of farmers, educational level of farmers and association membership of farmers positively and significantly determined organic cocoa production in the study area. The study recommends that efforts should be put in place to encourage cocoa farmers to use bio-control as it is safer to both the environment and farmers.

Key words: Status, organic cocoa, production, logit model.

Cocoa (*Theobroma cacao*) came into the West African sub-region from Brazil, and was specifically introduced into Nigeria from Fernando Po (present day Equatorial Guinea) by Chief Squiss Ibannigo in 1874 (Ayorinde, 1966). Other sources of introduction include trade agents, Ministries of Agriculture and Research Institutes (Opeke, 1987). Government of Nigeria developed an interest in the cultivation of cocoa since 1887 when cocoa seedlings from the old Botanic Garden at Ebute-Metta (Lagos) were sent to Ibadan for trial. This explains how cocoa cultivation gained its first and earliest impetus around Ibadan, Oyo State of Nigeria which produced the bulk of Nigerian cocoa up to the early twentieth century. Cocoa cultivation later spread to various parts of Western Nigeria. At present, cocoa is grown in most parts of Southern Nigeria extending from areas having 1,100mm annual rainfall towards the North to areas having 2,500mm annual rainfall towards the coast (Sanusi, 2006). Estimation put Nigerian cocoa acreage at 10,000 acres (4,000 hectares) in 1912 and this increased to over 300,000 acres (120,000 hectares) by 1930 (Olayemi, 1974). Planting continued at a high rate from 1930 to 1945 by which time about 1,000,000 acres (400,000 hectares) had been planted (Adesimi and Ladipo, 1979) with the acreage of the main cocoa-producing region (that is, the former Western Region) reaching a peak of 56,000 acres (22,400 hectares) in 1936 alone (Olayemi, 1974). It remained at this level until the late fifties when further planting and black pod and pest control led to further and rapid increase in its cultivation (Olayemi, 1974). Climatic compatibility of cocoa with the Nigerian environment coupled with successful combination of cocoa with arable crops by peasant farmers equally promoted the thriving of cocoa in Nigeria (Adegeye, 1977). By the early 1970s, Nigeria became the second largest cocoa producer in the world with an annual output of about 270,000 tons (Aigbekaen 2004, Sanusi and Oluyole, 2005). However, with the advent of the oil boom of the 1970s, activities in the cocoa sub-sector

experienced a decline. Particularly, cocoa acreage actually declined for most part of the 1980s when some cocoa farms were abandoned (ICCO, 1999). Investigations have attributed the travails of the Nigerian cocoa industry to the price paid to farmers, scattered small holdings in different locations and the old age of the existing cocoa trees (Olayemi, 1974 and Oduwole, 2000). Adegeye, (2000) observed that most of the cocoa farms were established over 40 years ago and as such the trees were ageing. Obviously, cocoa production is hampered by various problems that range from biological to environmental, socio-economic to institutional. This includes land tenure, ageing cocoa trees, low/poor yielding varieties, unavailability of inputs and chemical, persistent increase in the cost of production, lack of adoption of new technologies, political instability/inconsistencies in government policies (Fashina, 1999, Oduwole, 2004, Oduwole 2000). Having realized this, Nigerian government decided to put some institutional efforts in place, such efforts include cocoa trade liberalization, cocoa rehabilitation programme and distribution of improved cocoa varieties to farmers at subsidized rate. With these efforts, some abandoned plots were rehabilitated and a few new plantings were carried out from mid-1980s to most part of the 1990s thus increases cocoa hectarage. Estimation put the current cocoa hectarage at about 600,000 to 700,000 hectares (Fashina, 1999 and Aigbekaen, 2004).

According to Vingerhoets (1997), the world cocoa production was just over one million tonnes in 1960 and as at 2008 it was approaching three million tonnes. However, the growth in cocoa production was not evenly spread over the cocoa growing regions. Presently, Africa is the world's leading cocoa growing region, producing 65% of world output, with the remaining 35% almost equally shared between Asia and the Americas.

However, the high productive performance of cocoa farmers is drastically hampered by the effect of agro-chemicals on their body system. According to ILO (1997), agricultural mortality rates have remained consistently high throughout the world in the last decade in contrast to other dangerous occupation. This is because farm workers are at a very high risk of occupational diseases due to exposure to pesticides. This situation is more predominant in developing countries. Developing countries are known to account for about 70% of the total cases of acute poisoning due to exposure to agro-chemicals (US EPA, 2000). To avert all these complications arising from the use of agro-chemicals, there is need to shift attention to organic crop production in which case, there would be no need of using agrochemicals for growing crop. It is in line with this that this study is carried out to know the status and the determinants of organic cocoa production in the study area.

MATERIALS AND METHODS

The study was carried out among cocoa farmers in Nigeria. Multi-stage random sampling technique was used to select respondents from the study area. The first stage was the random selection of three cocoa producing States in Nigeria. These include Oyo, Ondo and Cross-River. Ondo and Cross-River States are categorized as high cocoa producing States while Oyo State is categorized as medium cocoa producing State (NCDC, 2006). The second stage involves the random sampling of one cocoa producing Local Government Area (LGA) from each of the selected State. These include Ido LGA in Oyo State, Ondo East LGA in Ondo State and Etung LGA in Cross-River State. The third stage involves the random selection of one cocoa producing community from each LGA while the fourth stage involves the random selection of 102 cocoa farmers form the selected communities in all the States. Structured questionnaire was used to collect information from the respondents and the data retrieved from the information supplied were analysed using descriptive statistics as well as logit model. Descriptive statistics was used to analyse the socio-economic variables of the respondent farmers as well as to analyse the pest control methods used by the farmers in controlling pests on their farms. Logit model was used to analyse the determinants of organic cocoa production in Nigeria. The model is specified as:

$$Y = \beta_0 + \beta iX$$

Where:

Y = Vector of endogenous variable (Y = 1; Farmers adopt the use of bio-control to control pests on their farm, Y = 0; Farmers do not adopt the use of bio-control to control pests on their farm);

βs = Parameter estimates;

X = Vector of exogenous variable.

The exogenous variables included in the model are:

X_1 = Age of the respondent;

X_2 = Gender of the respondent (Male = 1; Female = 2);

X_3 = Educational level of the respondent (No formal education = 1,

Primary education = 2, Secondary education = 3, Tertiary education = 4);

X_4 = Marital status (Single = 1, Married = 2);

X_5 = Household size;

X_6 = Association membership (Member = 1, Non-member = 2);

X_7 = Farm size;

X_8 = Age of farm;

X_9 = Nature of ownership of farm (Inherited = 1, Purchased = 2, Rented = 3);

X_{10} = Knowledge about organic cocoa production (Knowledgeable = 1; Non-knowledgeable = 2)

RESULTS AND DISCUSSION

Socio-economic variables of the respondents

Socio-economic variables of the farmers shows that 76.47% of the farmer are aged 50 years and below indicating that the substantial proportion of the respondents are still in the active age. Hence they are still strong and can withstand the strenuous nature of farm work and this automatically improves cocoa production efficiency among the respondents. The result of socio-economic analysis also shows that 85.29% of the respondents are males. The dominance of the males over the females may be attributed to the fact that male children are considered in the inheritance of farm land in the study area. Females are involved in the off-farm activities such as buying and selling of farm produce, storage of crops and packing of farm produce while their male counterparts are highly involved in tree crop production most especially cocoa in the study area. This is in consonance with Adamu *et al* (2006), who stated that majority of the rural women engaged in off-farm activities such as packing of farm produce, buying and selling of farm produce, storage of crops among others. Also cocoa production requires routine management practices that are considered too strenuous for the female to cope with. Majority (70.59%) of the respondents had formal education. This shows that most of the farmers had formal education. Education is a form of human capital; hence it could impact positively on household ability to take good and well informed production. Majority (78.43%) of the respondents are married. The large percentage of the married connotes that marriage is highly cherished by the people in the study area and this could lead to an increase in household size. This is a good pointer towards family labour supply thus easing the problem of labour scarcity in the area. 75.49% of the respondents are having farm size of five hectares and below indicating that majority of the farmers in the study area are small scale farmers. Table 2 shows the pest control methods used by cocoa farmers in the study area The table shows that 90.10% of the respondents used chemical to control disease while 1.98% used bio-control. Majority (92.08%) of the respondents used chemical to control insects while 1.98% used bio-control. As for the control of weed, 52.94% of the respondents used cultural method while 4.90% used bio-control. The result shows that the use of chemicals for the control of insects and diseases are highly pronounced in the study area while only small proportion of the respondents used bio-control to control pests on their farms.

Determinants of organic cocoa production

The result of the analysis of the determinants of organic cocoa production in the study area (Table 3). The table shows that out of the ten variables selected for the analysis, only three of them significantly affected organic cocoa production in the study area. The variables are age of the farmers, level of education of the farmers and the association membership of the farmers. Age of farmers significantly affected organic cocoa production at 5% significant level ($p<0.05$). The significancy might be due to the fact that as the age of the farmer increases, the experience of the farmer increases and hence his ability to be more efficient in organic cocoa production also increases. Level of education of the farmer also significantly determined organic cocoa production ($p<0.05$). Educational level determines the extent at which a farmer can adopt any technology related to organic cocoa production, thus determines his ability to be more efficient in organic cocoa production. Organic cocoa production in the study area is also determined by the association membership of the respondents ($p<0.05$). This might be due to the fact that association membership of any farmer encourages his interaction with the association members. However, interaction among the members encourages the sharing of knowledge among the members and consequently improves the knowledge of organic cocoa production among the members. Apart from this, the association may organize workshops for

themselves where they can acquire the knowledge of organic cocoa production thus increases their efficiency in organic cocoa production. Considering the apriori expectation of the selected variables, age of the farmer, level of education of the farmer as well as the association membership of the farmer positively determined organic cocoa production. This means that as the gravity of these variables increases, the ability to produce organic cocoa also increases. Other variables such as gender of the farmer, marital status of farmer, household size of farmer, farm size, age of farm, nature of ownership of farm as well as the knowledge about organic cocoa production negatively affected organic cocoa production in the study area. Hence, as the gravity of these variables increases, the ability to produce organic cocoa decreases**.**

Table 1. Socio-economic characteristics of the farmers

Variables	Frequency	Percentage
	Age (years)	
≤ 25	7	6.86
26-50	71	69.61
>50	24	23.53
Total	102	100.00
	Gender	
Male	87	85.29
Female	15	14.71
Total	102	100.00
	Educational level	
No formal education	28	27.45
Primary education	25	24.51
Secondary education	39	38.24
Tertiary education	10	9.80
Total	102	100.00
	Marital status	
Single	14	13.73
Married	80	78.43
Widow/widower	5	4.90
Divorced	3	2.94
Total	102	100.00
	Farm size (hectares)	
≤ 5	58	75.49
5.1-10	15	14.79
>10	29	9.72
Total	102	100.00

Source: Field survey, 2013

Table 2. Analysis of pest control methods

Pest	Chemicals	Bio-control	Cultural method	No response
Disease	90.10	1.98	-	7.92
Insects	92.08	-	1.98	5.94
Animals	56.44	1.98	31.68	7.92
Weeds	52.94	4.90	42.16	-

Source: Field survey, 2013

Table 3. Logit model analysis result

Variables	Coefficient.	P value
Constant	1.220085	0.417
Age	0.8243604	0.046
Gender	-0.3533702	0.614
Level of education	0.8807502	0.041
Marital status	-0.6196179	0.211
Household size	-0.0698101	0.458
Association membership	0.8095626	0.0521
Farm size	-0.0009561	0.811
Age of farm	-0.0054431	0.789
Farm ownership	-0.4122966	0.181
Log likelihood	-81.872722	
Chi square =	6.10	
Pseudo R^2 =	0.4070	

Source: Field survey, 2013

CONCLUSION

It could be deduced from this study that majority of cocoa farmers in the study area are not aware of organic cocoa production. The study also found out that chemical is still predominantly being used to control pests in cocoa farms and this has both immediate and long term effects on the environment and the health of the farmers. Efforts should therefore be put in place to encourage cocoa farmers to use bio-control as it is safer to both the environment and farmers. The study also concluded that age of farmers, educational level of farmers and association membership of farmers positively and significantly determined organic cocoa production in the study area.

REFERENCES

Adegeye A. J. 2000. Nigeria Agriculture: Reaping Where We Do Not Sow. Departmental lecture, Department of Agricultural Economics, University of Ibadan, Ibadan.

Adegeye, A.J. 1977. An Evaluation of Food Crops' Farming Inside Old Cocoa Grooves. *The Nigerian Agricultural Journal,* 14(1): 25-40.

Adesimi, A.A. and O.O. Ladipo. 1979. Cocoa Industry in Nigeria: Some Aspects of Production and Consumption. *In Proceedings of the fifth International Cocoa Research Conference,* CRIN., Ibadan, Nigeria. Pp. 521-529.

Aigbekean, E. O. 2004. Export Potentials of Cocoa in Nigeria. A paper presented at the National Workshop on Re-positioning of Nigerian

Agriculture for Export: Prospect and Challenges. ARMTI, Ilorin, Nigeria.

Ayorinde, J.A. 1966. Historical Notes on the Introduction and Development of Cocoa Industry in Nigeria. *Nigerian Agricultural Journal*, 3(1):21-30.

Fashina, A.B. 1999. Current Status of Nigerian Exportable Agricultural Commodities. Information paper presented at the Lagos Chamber of Commerce and Industry Workshop on Focus on national export products in Nigeria. Lagos, Nigeria.

Internation Labour Organisation. 1997. ILO press release on 'Warnings on Farm Safety' on 22 October, 1997. http://www.ilo.org/global/about.../WCMS_008027. Accessed on 13 June, 2011.

International Cocoa Organization (ICCO) .1999. Quarterly Bulletin of Cocoa Statistics.

Oduwole, O.O. 2000. Sustainable Cocoa Production in Nigeria: Farmers' Perception of Technology Characteristics and Socio-economic Factors in Adoption Decision. In *Proceedings of the 13th International Cocoa Research Conference*, Sabah, Malaysia Pp. 1147 – 1152.

Oduwole, O.O. 2004. Adoption of Improved Agronomic Practices by Cocoa Farmers in Nigeria: A Multivariate Tobit Analysis. Unpublished Ph.D thesis, Department of Agricultural Economics and Extension, Federal University of Technology, Akure, Nigeria.

Olayemi, J.K. 1974. Cost and Returns to Cocoa and Alternative Crops in Western Nigeria. In Kotey *et al* (eds.), The Economics of Cocoa Production and Marketing. *Proceeding of Cocoa Economics Research Conference*. Legon, Ghana. 48 – 59.

Opeke, L.K. 1987. Tropical Tree Crops. Spectrum Book Ltd. Ibadan. Pp. 108 – 120.

Sanusi, R.A. 2006. Demand for Small and Medium Scale Firms' Cocoa Beverages in Urban Areas of Southern and North-Central Nigeria. Unpublished PhD thesis, Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.

Sanusi, R.A. and K.A. Oluyole. 2005. An Analysis of Cocoa Production and Export in Nigeria (1930-2003). *Bulletin of Science Association of Nigeria*, 26: 146-154.

United States Environmental ProtectionAgency (2000). Organophosphate information: overview of malathion risk assessment. http://www.epa.gov/pesticides/op/malathion.htm. Accessed on 25 July, 2005.

Vingerhoets, J.W.A. 1997. International Cocoa Organization. Quarterly bulletin of cocoa statistics.