

## Indigenous Control Practices of Pests and Diseases of Cocoa by Farmers in Osun and Ekiti States of Nigeria

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**Abstract:** The present young generation is accustomed to the modern technology and in view of the values of indigenous knowledge to the sustainable development, it is necessary to collect, document and preserve it. The objective of the study is to assess the indigenous control practices for pests and diseases of cocoa by farmers in Osun and Ekiti state, Nigeria. A purposive random sampling was used to select 120 cocoa farmers. Information was elicited using interview schedule and data were analysed using frequencies, percentages and Pearson correlation. The findings showed that majority (88.3%) of the cocoa farmers was males and high percentages (92.5%) were above 40 years of age. Very high percentages (97.5%) of them were married and more than half of them (60.0%) were Muslim, 39.2% were Christians while a very low percentage (0.8%) were traditional workers. It was also found out that majority (95.8%) of the cocoa farmers are without formal education and a high percentage (85.8%) was with farming experience of not less than fifteen years. There exists significant relationship between the use of indigenous control method and age ( $r = 0.6950$ ,  $p = 0.05$ ) and farming experience ( $r = 0.1079$ ,  $p = 0.05$ ). The results further show that retaining of over shade trees and use of local deities are the indigenous control methods used in controlling capsid disease of cocoa. Use of shade trees, cutting out the affected trees and hand picking the mealy bugs are used to control swollen shoot virus disease. Weeding, pruning, harvesting the affected pods and opening the pods outside the plantation are the control methods used in controlling black pod disease. Harvesting of cocoa pods immediately when ripe is mainly the indigenous control method of Warty pod disease. Use of dry touch light batteries, "fufu" (food item) and vibration are used in controlling termites. Use of pineapple leaves, raw fruits of pawpaw, wood ash, trapping and cleaning of cocoa plantation are the methods used in controlling rodents. An overwhelming number of the farmers attested that the indigenous control methods used are effective but very low percentage often use it and a good number of them obtained information about it from their grand parents, parents and friends. It is recommended that indigenous crop protection measures should be oriented to fit agricultural process by blending it with modern agriculture to achieve a sustainable agriculture. Also, there should be immediate steps to collect, document and preserve the indigenous control methods.

**Key words:** Pests, diseases, control, indigenous methods, cocoa

### INTRODUCTION

In the West African sub-region, cocoa is an important export crop in Nigeria, Ghana, Cote d'Ivoire, Cameroun, Togo and Sierra Leone. In 1992, 59.9 % of the world's cocoa was produced by Africa, 25.5% by Latin America and the Caribbean and the remaining 14.6% by Asia and Oceania (Mossu, 1992). General and more localized studies have identified several factors which have contributed to the dwindling cocoa production levels in Nigeria, Ghana and other West Africa countries

(Padi *et al.*, 2003; Ollenu *et al.*, 1989; Anon, 1990; Osei, 1993; Anon, 1995; Freud *et al.*, 1996). Paramount among these are the ravages caused by pests and diseases with estimated loss of 30-40% of global cocoa production (Keane, 1995). Examples of these pests are Mirids or Capsids, termites, rodents, the Cocoa Pod Borer (CPB) or Cocoa Moth, Mealy-bugs, the Xyleborus beetle and diseases such as swollen shoot caused by cocoa swollen shoot virus and black pod caused by the fungi *Phytophthora palmivora* and *P. megakarya*. Over many years, indigenous people and farmers have developed

various ways to diagnose and treat plants, human and animals diseases and methods to fertilise soil. They also have names for many different kinds of plants. This knowledge which they accrued over many years is critical and a substantial part of the culture and technology of any society. This sum of knowledge and experience of a given ethnic group forms the basis for decision making in the face of familiar problems and challenges. Indigenous knowledge has been institutionalized, built upon and passed down from one generation to the next orally. Warren (1985) defined indigenous knowledge as the local knowledge unique to a given culture or society. Prior to the introduction of modern chemical pesticides, cocoa farmers used a wide range of traditional pest control methods. They used various botanical pest control methods developed by their ancestors. They were aware of a wide range of plant species with pesticide effects and animal species which controlled harmful insects. They were also aware of various materials and devices which could be used to trap, chase or destroy the pests or keep the pests away from their crops (Sengooba, 1991).

**Problem statement:** Nigeria was formerly known to be one of the world leading producers and exporters of cocoa in the mid 60s and 70s but now, she has gradually lost her leading position. At present about two dozen arthropod pests, both introduced and native, are recognized as one of the major constraints to agricultural production and productivity in Africa (Abate *et al.*, 2000). Economic and social constraints have kept pesticide use in Africa the lowest among all the world regions and because of this, majority of African farmers still rely on indigenous pest management approaches (which is cheaper) to manage pests and diseases problems. It is in the view of this, to control pests and diseases, that this study is being undertaken. In view of the above background this study will attempt to answer the following questions:

- What are the demographic characteristics of cocoa farmers in the study area?
- What is the frequency of usage of indigenous control methods?
- How effective are these control methods?
- What are the sources of information on the control methods?

**Objectives of the study:** The general objective of the study is to investigate the various indigenous methods used in controlling pests and diseases of cocoa among farmers in Osun and Ekiti states, Nigeria. The specific objectives of the study are to:

- Determine demographic characteristics of the cocoa farmers in the study area.
- Investigate the effectiveness of the indigenous control methods.
- Assess how often the cocoa farmers are using these control methods.
- Determine the source of information on pests and disease control methods.

### **Hypothesis**

**Null hypothesis:** There is no significant relationship between indigenous control methods and some selected demographic characteristics.

**Alternate hypothesis:** There is significant relationship between indigenous control methods and some selected demographic characteristics.

## **MATERIALS AND METHODS**

The study was carried out in Irewole and Ifelodun Local Government Area of Osun and Ekiti States, respectively. Data for the study were collected using interview schedule. Three villages were randomly selected out of the villages prominent in cocoa production from each of the two local government areas. These villages are Igrigiri, Iworoko and Afao with population size of 300, 275 and 205 cocoa farmers respectively in Ekiti state and Odo, Bamidele and Odeyikan with 295,145 and 104 cocoa farmers respectively in Osun state. Then from the list of cocoa farmers for each of villages, 20 respondents from each of the six villages were purposively sampled making a total number of 120 respondents' altogether. The sample cut across a fairly old age group. This is due to the belief that aged people are good sources of sufficient information on indigenous control practices because of their knowledge based due to their long years of involvement and experience in farming practices and agricultural production. Before the survey started, the interview schedule was pre-tested in one village each outside the study areas.

## **RESULTS AND DISCUSSION**

**Demographic characteristics of the respondents:** Result in Table 1 shows that majority (92.5%) of the respondents are above 40 years. This was as a result of the older people who were purposively selected for this study. Thus, a large proportion of the farming population are adult, old enough to have a good indigenous base and hence relevance to the study. The Table 1 further reveals

**Table 1: Selected demographic characteristics of the respondents**

Demographic Characteristics	Frequency	%
Age (years)		
< 30	-	-
31-40	9	7.5
41-50	13	10.8
51-60	92	76.7
Above 60	6	5.0
Total	120	100.0
Gender		
Male	106	88.3
Female	14	11.7
Total	120	100.0
Marital status		
Married	117	97.5
Single	-	-
Separated	-	-
Widowed	3	2.5
Total	120	100.0
Levels of Education		
No formal education	115	95.8
Primary School	5	4.2
Secondary School	-	-
Tertiary education	-	-
Total	120	100.0
Religion		
Islamic	72	60.0
Christianity	47	39.2
Traditional	1	0.8
Total	120	100.0
Farming experience (years)		
Less than 5	-	-
5-10	6	5.0
10-15	11	9.2
>15	103	85.8
Total	120	100.0

Source: Field survey 2005

that overwhelming percentage (88.3%) of the respondents is male while 11.7% are female. This implies that farming activities are mainly carried out by the males. This might be due to involvement of females in harvesting and processing of farm produce and also in petty trading activities. It can also be seen from the table that very high percentage (97.5%) of the respondents are married and very few numbers (2.5%) of them are widowed. This might be due to the cultural beliefs that men should marry as soon as they reach the puberty age. Also, wives and children will assist in the farm work and this will constitute the family labour. Vast majority (95.8%) of the respondents are without formal education while 4.2% have primary education. High percentage (85.8%) of the respondents is with farming experience of not less than fifteen years and 14.2% with farming experience of not less than 5 years.

**Indigenous control methods**

**Cocoa swollen shoot virus**

**Shade trees:** The respondent indicated the use of shade tree in controlling swollen shoot disease. They make use of permanent shade tree like *Eritrea* sp. and *Cola Nitida*

because these trees are alternative host plants for mealy bug which is the vector of cocoa swollen shoot virus. Majority of them use *Cola nitida* to shade cocoa because of the additional income, which they derive from the sale of cola nuts.

**The cutting and handpicking:** The respondents cut out the affected trees and use hand to pick the mealy bug whenever they come across them on their farms.

**Warty pod disease:** Harvesting of cocoa pods immediately when ripe is mainly the indigenous control method of warty pod disease.

**Termites**

**Dry torchlight batteries:** Farmers use dry torchlight batteries for controlling termites. The content of the dry touch light is spread around the base of cocoa trees where signs of termites are observed.

**Fufu:** This food item prepared from cassava for human consumption is buried in lumps at places on the farm to the depth of about six inches to repel termites. This food item is cheap and easily available.

**Sound or vibration:** Sound or vibration is also use to drive away termites. This is because termites are always scared of sound and this measure is effective to drive them away.

**Rodents:** Many species of rodents which include rats and squirrels are controlled by the following methods:

**Pineapple leaves:** Pineapple leaves are kept around the field. The farmers believe that the rats see the pineapple leaves as snakes which feed on rats and therefore, they refrain from entering the farm.

**Raw fruits of pawpaw:** Rats are also controlled by the use of raw fruits of pawpaw (*Carica papaya*). The fruits are chopped and pieces are spread on the cocoa farm. The farmers indicated that it is believed that the raw pawpaw has a chemical substance which causes mouth tissue damage when rat eat.

**Wood ash:** Wood ash is also a popular method, which has been widely used by indigenous farmers to control pests. Ash is put into a cloth bag and it is tied to the end of a long stick. Then the bag is held over the cocoa tree ash is sprinkled on the cocoa tree by beating the stick with another.

**Traps and cleaning:** Traps are set for rodents in order to control them. Also, the farmers indicated cleaning of the

Table 2: Frequency distribution of effectiveness of control measure

Effectiveness	Frequency	%
Not effective	15	12.5
Not so effective	26	21.7
Effective	79	65.8
<b>Total</b>	<b>120</b>	<b>100.0</b>

Source: Field survey 2006

Table 3: Frequency of performance of the indigenous control methods

Performance	Frequency	%
Often	3	2.5
Rarely	89	74.2
Occasionally	28	23.3
<b>Total</b>	<b>120</b>	<b>100.0</b>

Source: Field survey 2006

plantations, separating the plantations from the foremost by roads, frequent inspections and organizing hints as methods of controlling rodents.

**Black pod disease**

**Weeding and pruning:** The farmers indicate weeding of cocoa plantation regularly and prune their cocoa trees due to the fact that pruning will reduce shade and ambient humidity by improving the aeration and adjusting the shading which could make the condition non-favorable for the black pod disease. Also, weeding will bring unlimited air movement and this also will reduce the humidity and there will not be a moist condition.

**Another method indicated is harvesting the affected pods immediately they are ripe:** Effectiveness of the control methods

The result in Table 2 indicates that overwhelming number (65.8%) of the farmers attested that the indigenous control methods used are effective. Very low percentages (21.7%) indicate that the method is not so effective and 12.5% agree to non effectiveness of the control methods. Many of them are of the opinion that these indigenous methods are still highly effective. This may be due to the fact the measure is very cheap and yet give a high degree of controlling pests and disease of cocoa.

**Frequency of performance of the indigenous control methods:** The result in Table 3 shows that very low percentage (2.5%) of the respondents uses the indigenous control methods often. An overwhelming percentage (74.2%) indicated that they rarely use it and less than a quarter (23.3%) of them uses it occasionally. This is contrary to their attestation in Table 2 where an overwhelming number of the farmers indicated the indigenous methods as effective. This might be due to the easy availability of chemical and easy applications of

Table 4: Frequency distribution of the source of information

Source of information	Frequency	%
Grand parent + Parents	78	65.0
Friends	15	12.5
Radio	13	10.8
Television	10	8.3
Extension agents	1	0.8
Others	2	1.7
<b>Total</b>	<b>120</b>	<b>100.0</b>

Source: Field survey 2006

Table 5: Correlation result of use of indigenous control methods and some selected demographic characteristics

Variables	r values	Level of significant
Religion	-0.02286	NS
Age	0.6950	0.05
Farming experience	0.50793	0.05

these chemicals. It can also be linked up with the traditional methods being replaced by modern scientific knowledge.

**Sources of information:** The result in Table 4 shows that a good number (65.0%) of the respondents obtained information on indigenous protection methods from their grand parents and parents follow by friends (12.5%). This may be as a result of the close rapport between children and their parents and among the friends in the villages. It also shows that almost one tenth (10.8%) got it from radio while less than one tenth (8.3%) use television. It further shows that very negligible number (0.8 %) obtained information from the extension agents.

**Testing of hypothesis:** Table 5 shows that no significant correlation exists between religion and the use of indigenous control method. The null hypothesis that there is no relationship between religion and the use of indigenous control method is accepted. This means that religion (whether Christianity, Moslem or traditional worker) has nothing to do with the use of indigenous control methods. However, there exists significant relationship between the use of indigenous control methods and age and farming experience; in other word, farmers with high farming experience and old make use of indigenous control methods. Therefore, the null hypothesis that says there is no significant relationship between the use of indigenous control methods and age and farming experience is rejected and the alternate hypothesis which, says that there is significant relationship between the use of indigenous control methods and age and farming experience is accepted.

**CONCLUSION**

The study was carried out to know the indigenous methods of controlling pests and diseases as practised by

the cocoa farmers in Irewole and Ifelodun local government areas of Osun and Ekiti states, respectively. Indigenous control measures of pests and diseases which were widely practiced before and which has been brought down from generation orally is now being neglected by many farmers because it is now replaced by modern scientific knowledge. It is being forgotten as it gives ways to modern education and technology. There exists a significant relationship between the use of indigenous control methods and age and farming experience. The present young generation already accustomed to the modern technology and is not prepared to carry the indigenous knowledge over to the next generation. Despite this, few numbers of local farmers still use this time tested indigenous crop protection measures. This is cheap enough to be avoidable, simple enough to be applicable under particular circumstances, cost effective and sustainable.

#### RECOMMENDATIONS

In view of its value to the sustainable development, immediate steps should be taken to collect, document and preserve the indigenous knowledge practices of controlling pests and diseases. It should be oriented to fit into agricultural production process by blending it with modern agriculture to achieve a sustainable agriculture.

Local participation of farmers in development project should also be encouraged. This is because familiarity with indigenous knowledge can help extension agents understanding and communicate effectively with local people.

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