

Assessment of Insect Pest and Disease Control by Cocoa Farmers in Relation to Their Income in Kwara State, Nigeria

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Abstract: One of the major reasons for the poor yield of cocoa has been traced to insect pests and diseases which has been estimated to cause 20-30% crop losses. This study focused on the assessment of the measures adopted by farmers to control these insects and diseases infestation in Kwara state. Sixty farmers were randomly selected from four villages in Irepodun and Isin LGA in Kwara state. The result shows that most (56.7%) of the respondents were between the age of 41 and 60 years. Most (96.7%) of the farmers are males, 75.0% of the respondents had formal education, mostly primary (32.5%) while 25.0% had no formal education which indicates that most of the respondents are educated. Majority (46.7%) of the respondents had between 1 and 10 years farming experience. Many (50.0%) of the respondents earned between N1,000 and N10, 000 in 2008 from their sales which is very low income for farmers to be able to control pest infestation. Majority of the respondents (73.3%) frequently used pesticides. Method of pests control is significantly related to revenue from cocoa yield ($r=0.305$, $P<0.05$). The farmers mostly use pesticides measure for controlling insect pests and diseases. The revenue generated from most of their farms is very low. Hence there is need for government to bring up policies that would provide credit to small scale farmers in order to enhance their control of pests and increase their production level.

Key words: Assessment • Control • Insect pests and diseases • Income • Nigeria

INTRODUCTION

Nigeria produced around 160,000 tonnes of cocoa in the 2006-2007 season, but current output is one-quarter lower than it was 30 years ago [1]. One of the major reasons for the poor yield is effect of diseases and insect pests, which have been estimated to cause 20-30% crop losses [2]. Among other factors responsible for the declining production of cocoa in Nigeria is the vacuum created by the abolition of the Nigerian cocoa marketing board, old age of the farmers, massive migration from rural areas, scarcity and high cost of agricultural labour, infestation of insect pests and diseases, lack of credit facilities to cocoa farmers and indiscriminate bush burning that affect cocoa plantation. Worldwide, pre-harvest and post-harvest losses to insects, weeds and plant pathogens are estimated at 45 percent [3].

Black pod disease caused by *Phytophthora pamivora* and *Phytophthora megarkaya* is a major constraint to the cocoa production in West Africa countries including Nigeria [4]. Losses can reach up to 100% of the cocoa production in smallholders' plantations

when no control measures are taken [5]. Capsids or Mirids cause a lot of loss in cocoa farms and the most important species of capsids in Nigeria are *Distantiella theobroma* (Distant), *Sahlbergella singularis* (Haglund) and *Helopeltis* sp. [6, 7]. One of the major control measures adopted by farmers is the use of pesticides even those ones that are bound. See appendix 1 for recommended pesticides.

Integrated pest management (IPM) has been a response to the need for improving pest management and reducing the environmental impacts of chemical pesticides. Integrated pest management (IPM) is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, use of resistant varieties, habitat manipulation and modification of cultural practices. Pesticides are used only after monitoring indicates they are needed according to established guidelines and pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non target organisms and the environment [8].

Cook, [9] reported that high crop yields can be achieved with sustainable agriculture if plants are protected from diseases and pests. This will make plants to grow well, take up nutrients, compete with weeds and yield to the limit of their environment. This study focuses on the assessment of the measures adopted by farmers towards controlling these insects and diseases infestation in Kwara state.

Objectives:

- Ascertain the personal characteristics of the respondents in the study area.
- Examine the farmers' methods of controlling insect pests and diseases.
- Investigate the revenue from cocoa bean yield of the respondents in the study area.

Methodology: A total of 120 sampled cocoa farmers were interviewed individually in two Local Government Areas (Irepodun and Isin) in Kwara state. In the LGAs, four villages (Olowonijere, kajola, Oke-onigbin and Igbowa) were randomly selected while 30 farmers were sampled from each village giving a total of 120 farmers. Data collected include, socio-economic characteristics, Farmers' pest control methods and revenue generated from farmers' cocoa farms. Frequencies, percentages, charts and Chi-Square (X^2) were used for presentation and analysis of the data collected.

RESULTS AND DISCUSSION

Findings in Table 1 indicates that most (96.7%) of the farmers are males, while 3.3% are females, this implies that it is mostly men that are actively involved in cocoa production in the study area. This may not be unconnected to the fact that the study area is in the Northern part of the country where it is believed that women are supposed to be permanent house wife, though the female ones have their role to play especially in the processing of cocoa. According to [10], women restricted access to land resources should be investigated. The study revealed that majority (56.7%) of the respondents were in the age range of 41-60 years which indicates that they are still active in cocoa farming and will be able to carry out pest control. [11] found out that age of farmers and age of farms reduce the efficiency level of cocoa farmers. Most (56.7%) of the respondents were between the age of 41 and 60 years while few (20.0%) were between 20 and 40 years.

Education is a major factor that could influence farmers practices, in this survey 75.0% of the respondents had formal education, mostly primary (32.5%), adult education (8.5%) and secondary education (24.2%), tertiary education (10.0%), while 25.0% had no formal education which indicates that most of the respondents are educated and could easily adopt technologies transferred to them which will increase their income for carrying out insect pests and diseases control.

Table 1: Personal characteristics of the respondents

Characteristics	Frequency	Percentage
<i>Sex</i>		
Males	116	96.7
Females	4	3.3
Total	120	100.0
<i>Age</i>		
20-40	24	20.0
41-60	68	56.7
61-80	28	23.3
Total	120	100.0
<i>Educational status</i>		
Adult Education	10	8.3
Primary	39	32.5
Secondary	29	24.2
Tertiary	12	10.0
No formal Education	30	25.0
Total	120	100.0
<i>Farming Experience</i>		
1-10	56	46.7
11-20	46	38.3
21-30	8	6.7
31-40	6	5.0
41 and above	4	3.3
Total	120	100.0

Source: Field survey, 2008

Table 2: Frequency of Control measures for insect pest and diseases practiced by farmers (n=110)

Farmers'	practices		Rarely Frequently		Very frequently	
	Freq	%	Freq	%	Freq	%
Application of pesticides	12	10.0	10	8.3	88	73.3
Removal of diseased pods	76	63.3	38	31.7	24	20.0
Removal of broken pods	85	70.8	14	11.7	16	13.3
Removal of mistletoe	70	58.3	47	35.0	18	15.0
Pruning	84	70.0	32	26.7	20	16.7
Weeding	6	5.0	12	10.0	83	69.2

Source: Field survey, 2008

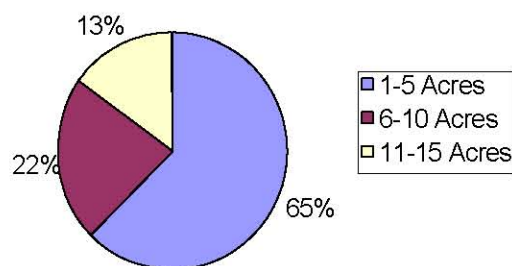


Fig. 1: Size of farms in Acres

Source: Field survey, 2008

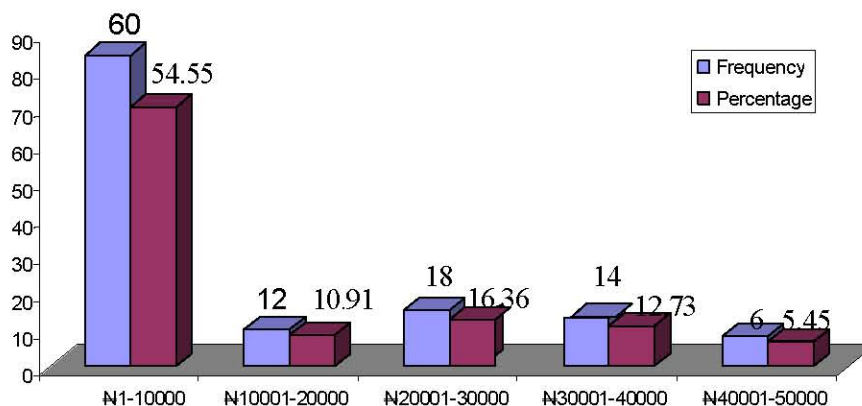


Fig. 2: Revenue of farmers in 2008

Source: Field survey, 2008

This is supported by [12] that education is thought to reduce the amount of complexity perceived in a technology thereby increasing a technology's adoption.

Many (46.71%) of the respondents had between 1 and 10 years experience in cocoa farming which indicates that cocoa farmers had little experience in the study area while only 3.3% had above 41 years experience. According to [13], long experience of farmers is expected to have positive effect on their knowledge about farm hygiene and the maintenance of cocoa trees. This experience is important for day-to-day running of the farming activities which include insect pest and disease control.

Figure 1 revealed that most of the farmers are smallholders as majority (65%) of the farmers have between 1 and 5 acres. Farm sizes as categorized by STCP Nigeria Baseline Survey in 2001 are; Small 0.4 to 6 acres, Medium 6.1 to 12 acres, Large 12.1 + acres categories.

Table 2 shows the frequency of control measures of insect pest and diseases practiced by farmers. Majority of the respondents (73.3%) frequently used pesticides as their control measures while very few (10.0%) claimed to rarely use pesticides. This implies that most farmers in the study area use other phytosanitary methods rarely but concentrate more on pesticides application.

Table 3: Relationship between method of pests control and income generated by farmers in the study area

Income generated	r	P	r ²	Decision
Method of pests control	0.305	0.018	59	S

According to [14], Black pod spores may be spread through rain splashes by vectors such as ants and by wind, with the newly infected pods (covered with sporangia) acting as infection sources for up to 14 days. Most (63.3%) of the respondents rarely remove diseased pods from their farms which could lead to spread of diseases in the farm. In this study many (58.3%) of the respondents rarely remove mistletoe from their farms which is an indication that they do not practice phytosanitary regularly to reduce insect pests and diseases from their farms. Mistletoes obtain water and nourishment from the host plant [15]. It causes damage of economic significance.

Pruning is an important cultural method of pest management operation and can affect yield as well as affecting the shape and create adequate aeration for the plant. In this study most (70.0%) of the farmers rarely practice pruning. Pruning is an IPM technique and effective IPM requires regular field monitoring of pests conditions to identify the critical periods for application of a pesticide or other control measures [16].

Access to an adequate workforce at critical times during the growing season of cocoa is important and, for most, the family remains the primary labour source. From the findings of this study most (69.2%) of the farmers practice manual weeding which indicates that labour availability is not a problem in the study area.

It has been ascertained that the farmers are small holding farmers which conforms with the revenue generated from their farms. In Figure 2 many (50.0%) of the respondents earned between 1,000 and 10,000 in 2008 from their sales which is very low income for farmers to be able to control pest infestation. Today, cocoa-farming remains a labour intensive and demanding source of income but also one that offers a natural competitive advantage to the regions in which it is grown [17].

In Table 3, the result revealed that method of pests control is significantly related to income generated ($r=0.305$, $P<0.05$), which implies that method of pest control by the respondents affect the income generated by respondents. The r^2 of 0.59 indicates an average strength of the relationship.

Appendix 1: Recommended Pesticides and their properties

Insecticides	Active ingredients
Actara 252 WP	Thiamethoxam
Dursban	Chlorpyrifos
Fungicides	
Funguran-OH	Copper Hydroxide
Ridomil Gold Plus	Metalaxyl(M)+CuO
Champ DP	Copper Hydroxide

Source: Federal Ministry of Agriculture and Water resources (National Cocoa Development Committee-NCDC 2008).

CONCLUSION AND RECOMMENDATIONS

Most of the farmers are males and few are educated with long experience. The farmers are smallholders and have high dependency on pesticides measure for controlling insect pests and diseases and rarely carried out phytosanitary practices. The revenue generated from most of their farms is very low.

Hence there is need for government to bring up policy that would favour women's' access to resources like land and provide credit to small scale farmers in order to enhance their production level. Also, training of cocoa farmers on Integrated Pest Management is necessary to boost their income from cocoa farms.

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