

Operational Habits and Health Hazards Associated With Pesticide Usage by Cocoa Farmers in Nigeria: Lessons for Extension Work

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KEYWORDS Pesticides. Operational Habits. Extension. Health Hazards. Cocoa.

ABSTRACT This study was conducted to examine the operational habits and health hazards associated with pesticide usage by cocoa farmers. Specifically, the farmers' socio-economic characteristics were identified with their choice of pesticide and also, their preventive/control measure and methods of disposing the pesticide containers were identified. One hundred and twenty (120) cocoa farmers were randomly selected and interviewed through the use of a structured interview schedule. Frequency counts and percentages were used in describing the data collected, while Pearson's correlation co-efficient (r) was used to determine the relationship between the number of operational habits of the cocoa farmers and; the number of health hazards experienced and some selected characteristics. Prominent operational habits revealed in the study include: scooping or stirring pesticides with bare hand; chewing kolanut or something else when spraying. Also, farmers experienced redness of eyes and body pain whenever they apply pesticides. Moreso, the study revealed positive and significant relationship between the number of operational habits of the cocoa farmers and age ($r = 0.2557$) and period of farming ($r = 0.2433$), while the level of education has a negative, but significant relationship ($r = -0.3727$). There was no significant relationship between the number of operational habits of the cocoa farmers and the number of health hazards experienced. However, the major lessons drawn for improving extension work is that training on pesticides usage must be integrated into extension practice and such training must be based on farmers' age, farming experience and level of education.

INTRODUCTION

Nigeria as a developing country was rated the second largest world producer of cocoa in the 1960's (Adegbola and Abe, 1983) and, for a long time the crop has been generating substantial foreign exchange earnings for the country. The production of this important cash crop for export has suffered a reduction in recent years in the country owing to a number of factors. Villalobos (1989) identified some of these factors as: low yield, ageing of trees, inconsistent production pattern, disease incidence, pest attack and use of simple farm tools.

However, at the 7th International Cocoa Research Conference, the Nigerian delegates reiterated the main problem confronting cocoa production in Nigeria as very low yield due to pests and diseases, which are capable of destroying more than half of the little production (Anony-

mous, 1979). As the need to control these agents of fruit loss became imperative, Lodeman (1988) then observed the prominence in the use of technology in the application of pesticides to effectively control pests and diseases with various types of knapsack sprayers.

Pesticides as an agricultural input are composed of active ingredients and inert materials, which are used in their formulation to control pests and diseases. Atu (1990) noted that most of the pesticides are dangerous, toxic and can cause serious health hazards to human being. This explains why Idowu (1996) recommended some precautionary measures in the application of the chemicals either as sprays or dust, viz: wearing of nose shield to avoid inhalation; putting on protective clothing; rubber gloves and boots; refraining from smoking, eating and drinking; covering food and water to avoid contamination. Also during application, chemicals must not be spilled or sprayed on skin. The post-application safety measures include washing of hands and face and changing to clean

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clothes after spraying. Also, contaminated clothing must be washed thoroughly, chemicals must be stored in the original container and kept out of the reach of children.

These precautionary measures are usually contained on the chemical container or label for the users or the farmers to note, and most unfortunately, majority of Nigerian farmers are illiterates (Alao, 1980; Torimiro et al., 1999). It is further assumed that most of the farmers would have been engaging in some operational habits that may make them vulnerable to some health hazards associated with the pesticides usage.

Against this background, this study examined the operational habits and health hazards associated with pesticide usage by the cocoa farmers. Specifically, it identified the socio-economic characteristics of the farmers, their choice of pesticides, operational habits on the farms, occurrence of health hazards and, preventive/control measure and methods of disposing pesticide containers. Relationship between the number of operational habits and the number of health hazards experienced and some selected characteristics were determined. Also, lessons were drawn for improving extension work.

MATERIALS AND METHODS

The study was purposively conducted in Ago-Iwoye area of Ogun State, one of the 36 States in Nigeria and a true representative of South-Western Nigeria, where cocoa is largely cultivated (Adesegun, 1981). The people of Ago-Iwoye are mostly farmers who engaged in cultivation of both cash and food crops, together with hunting for animals. Eight satellite villages were randomly selected from the checklist of cocoa growing villages in Ago-Iwoye area.

Fifteen (15) cocoa farmers were randomly selected from the checklist of cocoa farmers under the extension coverage in each selected village, hence a total of one hundred and twenty (120) respondents were interviewed for the study.

A structured interview schedule was used to elicit information from the cocoa farmers under the following sections: Socio-economic characteristics; level of pesticides usage; sources of the pesticides used; operational habits of the farmers when applying pesticides on their farms; health hazards associated with pesticides usage and; preventive and control measures of health hazards. Test-retest method was used to ensure

reliability of the data instrument. The interview was conducted in October/November, 1999 with the assistance of trained enumerators.

Descriptive statistics such as frequency counts and percentages were used in describing the data collected, while, Pearson's correlation coefficient (r) analysis was used to determine the relationship between the number of operational habits and the number of health hazards experienced and some selected characteristics.

RESULTS AND DISCUSSION

The data in Table 1 shows that 44.17% and 31.67 % of the farmers were between the age group of 51-70 and 30-50 years, respectively. An indication that majority of people in cocoa production business are fairly old people. Seventy-nine percent were married and 72.50 % were males. About 52% were not educated at all, while 35% had primary education. Majority (75.83%) was in control of 1-2 hectares of land, 11.67 % had 3-4 hectares and 1.67% had over 4 hectares of land. Seventy-eight percent have been in the business for over 10 years, 18.33 % have spent between 6 and 10 years and 3.33 % have spent between 1 and 5 years on farming business. Over 70.00 % acquired their farmland through inheritance and 25 % were using leasehold land. Sixty-four percent claimed that they realized between ₦ 10,000.00 and ₦ 50,000.00 income per annum; 98.33 % indicated that they have no access to credit facilities; 68.33 % own radio, while 86.67 % did not belong to any cooperative organization.

Almost all (100 % and 99.17%, respectively) indicated a high level of usage of Gammalin 20 and Perenox. Few (17.50%) only indicated the usage of Cocobre-sandoz (see Table 2). This further shows that farmers were not familiar with the usage of other pesticides such as Basudin 600 EC, Uden 20 EC, and Aldrex 40 EC.

The data in Table 3 reveals some of the habits the cocoa farmers normally put whenever they were applying pesticides on their farms. Majority (between 77.00% and 100.00%) indicated that they scoop or stir pesticides with bare hand, chew kolanut or something else when spraying, sing, receive visitors, talk when spraying pesticides and wash their hands after application of pesticides.

About 82 % and 95.00 % of the farmers indicated that they normally experienced redness of eyes and body pain respectively, whenever they

Table 1: Socio-economic characteristics of cocoa farmers

S. No.	Characteristics	Frequency	Percentage
1.	Age (years):		
	Below 30	12	10.00
	30 – 50	38	31.67
	51 – 70	53	44.17
	Above 70	17	14.17
	Total	120	100.00
2.	Marital Status:		
	Single	11	9.17
	Married	95	79.17
	Widowed	14	11.67
	Total	120	100.00
3.	Sex:		
	Female	33	27.50
	Male	87	72.50
	Total	120	100.00
4.	Level of Education:		
	No Formal Education	62	51.67
	Primary School Education	42	35.00
	Secondary School Education	16	13.33
	Total	120	100.00
5.	Farm Size (Ha):		
	Below 1	13	10.83
	1 - 2	91	75.83
	3 – 4	14	11.67
	Above 4	02	1.67
	Total	120	100.00
6.	Period of Farming (Years):		
	1 - 5	04	3.33
	6 - 10	22	18.33
	Above 10	94	78.33
	Total	120	100.00
7.	Methods of Farm-Land Acquisition:		
	Inheritance	85	70.83
	Leasehold	30	25.00
	Purchased	01	0.83
	Gift	03	2.50
	Rent	01	0.83
	Total	120	100.00
8.	Level of Income/Annum (₦):		
	Below 10,000.00	38	31.67
	10,000.00 – 50,000.00	77	64.17
	Above 50,000.00	05	4.17
	Total	120	100.00
9.	Access to Credit Facilities:		
	Access	02	1.67
	No Access	118	98.33
	Total	120	100.00
10.	Radio Ownership:		
	Own radio	82	68.33
	Do not own Radio	38	31.67
	Total	120	100.00
11.	Membership of Cooperative Organisation:		
	Member	16	13.33
	Non-Member	104	86.67
	Total	120	100.00

Note: One dollar = ₦ 138.00

Table 2: Distribution of farmers by choice of pesticides

Choice of pesticides	Frequency**	Percentage
Gammalin 20*	120	100.00
Perenox*	119	99.17
Cocobre-sandoz	21	17.50
Basudin 600 EC	-	-
Unden 20 EC	-	-
Aldrex 40 EC	-	-
Bordeaux Mixture	-	-
Ridomil 72 WP	-	-
Grammozone	-	-

* = Frequently and regularly used by majority of the farmers

** = Multiple responses were recorded.

Table 3: Distribution of farmers by operational habits on the farm.

Operational habits	Frequency**	Percentage
Washing hands after application	120	100.00
Talking	118	98.33
Receiving Visitors	116	96.67
Singing	114	95.00
Chewing	113	94.17
Scooping/Stirring with bare hands	93	77.50
Drinking	67	55.83
Whistling	50	41.67
Smoking	30	25.00
Eating	19	15.83
Snuffing	13	10.83

** = Multiple responses were recorded.

Table 4: Distribution of farmers by occurrence of health hazards' effect

Health hazards' effect	Frequency of affected farmers** (N = 120)	Occurrence of health hazards		
		Mild	Acute	Chronic
Redness of eyes	98 (81.67)	87 (88.79)	06 (6.12)	05 (5.10)
Headache	71 (59.17)	69 (97.18)	02 (2.82)	00 (0.00)
Sneezing	32 (26.67)	30 (93.75)	02 (6.25)	00 (0.00)
Breathing difficulty	03 (2.50)	03 (100.00)	00 (0.00)	00 (0.00)
Body pain	114 (95.00)	83 (72.37)	29 (25.44)	02 (1.75)
Excessive Sweating	43 (35.83)	35 (81.40)	07 (16.28)	01 (2.33)

**Multiple responses were recorded; () Percentages are in the parentheses; N = Total number of farmers sampled

apply pesticides. Although, they all claimed that the occurrence was usually mild (see Table 4).

The data in Table 5 reveal that some

respondents (between 20.83% and 28.33 %) indicated the use of overall/protective clothing, jungle boot and handkerchief among others. None

of them had ever made use of respirator and 23.33 percent indicated that they had never used any preventive / control measure of pesticide hazards during application.

Table 5: Distribution of farmers by use of preventive / control measures.

<i>Preventive / Control measures</i>	<i>Frequency**</i>	<i>Percentage</i>
Handkerchief	34	28.33
Jungle Boots	26	21.67
Overall/Protective Wears	25	20.83
Sunshade Glasses	04	3.33
Hand Gloves	01	0.00
Respirator	00	0.00
Not at all	28	23.33

** Multiple responses were recorded

However, Table 6 further shows that 99.83 % did not dispose the pesticide containers after use; but rather they kept them for storing palm oil or kerosene or for any other household use. Fifty-six percent preferred to keep them for future purchase of chemicals.

Table 6: Distribution of farmers by methods of disposing pesticide containers.

<i>Methods of disposal</i>	<i>Frequency**</i>	<i>Percentage</i>
Buried	02	1.67
Thrown to dung	04	3.33
Used to store agricultural materials	16	13.33
Used as water container	21	17.50
Kept for future purchase of chemicals	67	55.83
Used as oil container	119	99.83

** Multiple responses were recorded.

The data in Table 7 show that there is significant and positive relationship between the number of the operational habits put up by the cocoa farmers when they are using pesticides on their farms and their age ($r = 0.2557$) and period of farming ($r = 0.2433$). This implies that the older the age of the farmer and the longer the period of farming, the more the number of the operational habit he puts up when applying pesticides on his farms. This is not unexpected, as the experience gained in a particular skill will naturally relate with the period of involvement in practicing the skill. In retrospect, the cocoa farmers who are characteristically old in the business may not see anything hazardous in using pesticides, even when they are overwhelmingly

Table 7: Pearson's co-efficient of correlation analysis between number of operational habits of cocoa farmers and number of health hazards experienced and some selected socio-economic characteristics.

<i>X – variables</i>	<i>Correlation co-efficient (r)</i>	<i>Co-efficient of determination (r²)</i>
Number of health hazards	0.0646	0.0042
Age (Years)	0.2557*	0.0654
Farm Size (Ha)	0.0000	0.0000
Level of Education	-0.3727*	0.1389
Period of Farming (Years)	0.2433*	0.0592

No. of x-variables	=	05
No. of Respondents	=	120
Degree of freedom	=	118
Level of Significance	=	0.05

* Significant at 0.05 level.

Critical value of 'r' at 0.05 level = 0.1940

involved in the operational habits. There is also a significant and negative relationship between the number of operational habits and level of education ($r = -0.3727$). This implies that low level of education will constitute a major influence in perpetuating the habits. This is not unexpected, as 51.67% of the farmers had no formal education. However, co-efficient of determination (r^2) reveals 13.89 percent contribution of education level to the relationship.

Other variables, namely, farm-size and number of health hazards had positive but non-significant relationship with $r = 0.000$ and $r = 0.064$, respectively. This shows that the number of health hazards experienced had nothing to do with the number of operational habits put up.

CONCLUSION AND RECOMMENDATIONS FOR EXTENSION SERVICE

This study has established that cocobresandoz, perenox and gammalin 20 are the only pesticides popularly used by cocoa farmers in this cocoa cropping area. Moreso, these cocoa farmers were prominently indulged in the habits of chewing kolanut, singing, receiving visitors and talking when using these pesticides on their farms. Also, very low percentages indicated some preventive or control measures against health hazards that are associated with these pesticides.

The agricultural extension is based in the various States' Agricultural Development Projects across in South-western Nigeria and the cocoa farmers in this area have similar socio-

economic background, hence, the following recommendations for improving extension work in the area are very germane:

- There is need for intensifying awareness on the use of all relevant pesticides meant for cocoa production in order to popularize the acceptability and use of others which are not yet patronize.
- The States' Agricultural Development Projects (A.D.Ps.) through their village Extension Agents (V.E.As.) must intensify their contact with the cocoa farmers with packages on safe usage of the pesticides.
- The cocoa farmers must be educated on repercussion of the health hazards associated with the various operational habits they perpetuate when applying pesticides on their farms.
- The cocoa farmers must be duly trained on how to employ the various preventive and control measures against any possible health hazard that may result from the pesticides application.
- Adequate ways of disposing empty containers of pesticides must be emphatically taught to the farmers.
- Farmers' age, period of farming and level of education must be considered when drawing training programmes for the cocoa farmers on the application of pesticides.

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