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The Role of Farmer Field School Training in Improving Farmers' Knowledge of Selected Cocoa Cultivation Practices in Edo state, Nigeria

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Abstract
The study assessed the contribution of farmer field school training to the knowledge of Cocoa farmers on selected farm practices in Edo State. The specific objectives were to: describe the socioeconomic characteristics of the respondents, identify the practices where FFS has enhanced farmers' knowledge, ascertain the level of contribution of FFS training to their knowledge of cocoa cultivation practices and determine the percentage of farmers who have benefited from FFS training in terms of improved knowledge. A multi-stage sampling procedure was used to compose a sample size of 68 respondents. Various descriptive statistics such as means, percentages and frequency counts were used for data analysis. Respondents were also grouped into different categories based on the effect of FFS training on their knowledge. The results show that FFS has contributed immensely in improving the knowledge of cocoa farmers in the study area. It was therefore recommended that FFS training should be sustained in the area and extended to other states that have not implemented it as well as to other crop enterprises besides cocoa.
Keywords: Farmer Field School, Knowledge, Cocoa Cultivation Practices, Edo State

1. Introduction

Farmer field school is a participatory training approach that can be considered both as an extension tool and a form of adult education (David et al, 2006). It can be described as a platform and "school without walls" for improving decision-making capacity of farming communities and stimulating local innovation for sustainable agriculture (NAERLS/ABU, 2008; Gallagher,2005).

The first field schools were established in 1989 in central Java, Indonesia, during the pilot phase of the integrated pest management (IPM) program. Since then the approach has been replicated in a variety of settings beyond IPM. African countries implementing the approach are among others, Kenya, Uganda, Tanzania, Zimbabwe, Malawi, Ethiopia, Ghana, Nigeria, Egypt, Cameroon, Lesotho, Swaziland and Mozambique..

In cocoa producing countries, institutions specializing in cocoa have typically been responsible for cocoa extension. With the decline of many of these institutions, cocoa extension has been turned over to natural extension systems that are overburdened with providing extension services for a wide range of crops. The result is that cocoa extension is inadequate (David et al 2006). The FFS approach is poised to ameliorate extension problems in cocoa production.

A basic assumption of the FFS approach is that farmers need knowledge of biological processes and agro-ecosystem analysis to be able to make sound management decisions. (van de Fliert and Braun, 2005; David et al 2006). In addition to getting practical advice to earn more for their crop, FFS helps farmers to lean about appropriate versus inappropriate tasks for children helping out on the family farm, the importance of sending children to school and responsible labour practices (World Cocoa Foundation, 2007). Thousands of cocoa farmers had participated in farm field schools in Cameroon, Cote d'Ivoire (Ivory Coast), Ghana, Liberia and Nigeria. The following research questions arise: What contribution have FFS made in terms of improving cocoa farmers knowledge on improved cultivation practices? Which areas has FFS contributed in improving cocoa farmers' knowledge of the crop?
What is the percentage of beneficiaries that have gained knowledge from this extension approach?
The broad objective of the study is cocoa farmers assessment of contribution of FFS to their knowledge of the crop. Specific objectives were to:

(i) identify the practices where FFS has enhanced farmers knowledge.
(ii) ascertain the level of contribution of FFS training to respondents knowledge of cocoa cultivation procedure.
(iii) determine the percentage of farmers who have benefited from FFS training .

2. Literature review

Participatory extension approaches to agricultural development have been advocated as a means of supporting sustainable resource use (Agbamu, 2006; David, 2005). Nigerian cocoa farmers experienced considerable crop loss

due to diseases and other factors (World cocoa foundation, 2007). Farming practices that incorporates recent breakthroughs, such as natural means of pest control, and diversifying production to include other crops have great potential for increasing family income of cocoa farmers. The farmer field school extension approach is one of the best ways of exposing farmers to these new farming practices (Ebewore, 2012).

Farmer field schools help farmers increase their family income by educating them on better growing techniques, crop diversification, and other productivity enhancing practices (van de Fliert and Braun,2005; Ebewore,2011;David,2005). The field schools also raise awareness of safe pest management and responsible labour practices. Thus the contributory role of this extension approach in improving the knowledge of farmers on cocoa cultivation practices need to be assessed.

A field school is a Group Based extension approach based on adult education methods (Ajayi and Okafor,2006; van de Fliert and Braun ,2005). It is a school without walls that teaches basic agro-ecology and management skills that make farmers experts in their own farms. The training methodology is based on learning by doing, through discovery, comparisons and a non-hierarchical relationship among the learners and trainers and is carried out almost entirely in the field (NAERLS/ABU,2008).

2.1 Conceptual framework

The objectives of FFS (David, *et al*,2006; van de Fliert and Braun,2005; NAERLS/ABU,2008) are to:

1.provide an environment in which farmers acquire the knowledge and skills to be able to make sound management decisions;

2. sharpen farmers ability to make critical and informed decisions that make their farming activities more profitable and sustainable;

3. improve farmers problem solving skills;

4.show farmers the benefits of working in groups and encourage group activities; and

5. empower farmers to become experts on their own farms and to be more confident in solving their own problems.

Adult learn best by hands-on experience and when the subject matter they are studying is related to their every day experiences and activities (NAERLS/ABU,2008; Dilts,2001; Pontius,Dilts and Bartlett,2002). In a field school, adults are encouraged to discover for themselves. This invariably improves their retenti***on. Retention rates in adults are*** as below: 20% when they hear; 40% when they see; 80% when they discover; and 90% when they discover and is explained to them (NAERLS/ABU, 2008; David et al, 2006). Thus the FFS training is poised to greatly enhanced farmers knowledge since it is based on discovery learning (also experiential learning). Adult learning is also known as the experiential process, learning in this process is seen as a four-stage cycle. Concrete experience, reflective observation, drawing conclusions, and putting what is learnt into practices. (David et al 2006) (see figure 1)

One of the principles in adult learning is self-responsibility. Based on the experiential learning cycle, there are four requirements for a learner to achieve the best results:

1. Involve him/herself fully, openly and without bias in new experiences (experience)
2. Reflect on and observe these experiences from many perspectives (reflection)
3. Create concepts that integrate his/her observations into logically sound theories (draw conclusion).
4. Be able to use these theories to make decisions and solve problems (practice) (David et al, 2006).

Experience has it that when you hear you forget, when you see you remember and when you discover you own it for life. The conceptual framework of this study is based on all the aforementioned principles.

The conceptual framework shows the relationship between the attainment of FFS objectives and improvement of farmers' knowledge of some cultivation practices on cocoa.

The achievement of these FFS objective will lead to the improvement of farmers' knowledge on these practices. However, this knowledge gain is affected by interviewing variables like government policies, physical environment of farmers like land, climatic forces and other factors, socio-economic characteristics of the farmers, and facilitation.

3. Methodology

3.1The Study Area

The study was conducted in Edo State of Nigeria. Edo state was created on August 27, 1991. Until then Edo State with Delta State formed what was formerly Bendel State. The population of the entire state is approximately four million (National Population Commission, 2006).

Edo State has a land mass of 19,749 square kilometers, lying on 05° 44' N and 07° 34' N latitudes and 05° 4' E and 06° longitudes. Edo State is low lying except towards the North axis where the Northern and Esan plateaus range from 183 meters of the Kukuruku hills to 672 meters of the Somorika hills. Edo state is so located that it forms the nucleus of the Niger Delta region. It is bordered by Kogi state to the North and Delta State to the East and South, Ekiti

and Ondo states to the west. The climate is typically with two distinct seasons - the wet (rainiy) and the dry seasons. The wet season lasts from April to November and the dry season December to March.

Edo State lies within the equatorial hot wet climatic belt except for the Northern part of the state where the derived savanna climate is experienced. The rainfall is high; the mean annual rainfall varies from 2600mm to nearly 1200mm in the northern extreme. During the raining season, the mean monthly temperature range is 18^0C to 35^0C and 30^0C to 35^0C during the dry season.

The climate experienced in the state is favourable to agriculture which is the dominant occupation of people of Edo State. The high rainfall is favourable for the cultivation of tree crops like cocoa, oil palm, kola nut and rubber. Other crops grown include cocoyam, yam, cassava, plantain/banana and pineapple. Fishing activities are also prevalent in the coastal areas.

3.2 Sampling Procedure and Sample Size

The population of the study comprise of all cocoa farmers that have been involved in farmers' field school (FFS graduates). Edo State was purposively selected because it has long been involved in FFS training. The lists of these farmers were obtained from the STCP office and the ADP office of the state.

A multi-stage sampling technique was used in selecting the respondents for the study.

Stage 1: Out of the three agro-ecological zones in Edo State, one agricultural zone was purposively selected based on where cocoa farmers were involved in FFS. The agricultural zones in Edo State are Edo North, Edo Central and Edo South. Edo North was purposively selected based on the information that these zone was almost exclusively the zone that has implemented farmer field school on cocoa.

Stage 2: Three local government areas from this zone were purposively selected based on the concentration of cocoa FFS in the areas. The following local government areas were selected: Owan East, Owan West and Akoko Edo. The number of registered FFS farmers as obtained from the STCP office and Ministry of Agriculture is shown in Table 1.

Stage 3: The farmers whose names were in the list obtained from STCP and Ministry of Agriculture office were randomly selected. Ten percent of the farmers were selected. Thus a total of seventy two (72) farmers were supposed to be selected for the study. The actual numbers of farmers obtained were sixty eight (68) due to the fact that some copies of questionnaires were improperly filled and others were not returned. Table 1 shows the procedure of the sample size selection.

3.2 Data Collection Instrument

The objectives of the study guided the development of an interview schedule which was the main instrument used for data collection. The use of interview schedule has been demonstrated to be effective for data collection. An interview schedule was therefore developed and used for data collection. The interview schedule comprised both open and closed ended questions which measured the key variables of the study.

3.3Methods of Data Analyses

Descriptive statistics were used for the analysis of the data that were generated. Descriptive statistics included frequency counts, means and percentages which were used to describe the distribution of socio-economic characteristics of respondents and to measure other variables of interest in the study.

Based on the contribution of FFS to their knowledge of cocoa cultivation practices, the respondents were categorized into three groups. If the practice is already known to the farmer before attending FFS, the farmers ***belongs to group A***; if FFS substantially improve knowledge of the farmer on the practic***e, the farmer belongs to group B; a farmer belongs to group C*** if the practice is new to him/her.

4. Results and discussion

4.1Socio economic characteristics of respondents

Table 2 shows the socio economics characteristics of FFS farmers in the study area.

Age of farmers ranges from 31 – 70 years. No farmer in the study area was below 31 years. This indicates that youth in the area are not actively involved in cocoa farming. Therefore cocoa production is an activity carried out mainly by adults. Ogungbile et al (2002) and Oloruntoba, (2000) asserted that farmers in this range of age are always active

and this can lead to positive effect on cocoa production. Majority of the respondents were males. About 78.6% of the FFS farmers were males. This may not be unconnected with the perennial nature of tree crops such as cocoa and oil palm which often leads to permanent holding on land which traditionally are owned by men. Solomon (2008) also reported this type of result for oil palm. The result of marital status of cocoa farmers in the study area shows that majority of the respondents were married (74.4% of FFS farmers). This may be an indication that marital status is an important factor in cocoa farming. According to Dikito – Watchtmeister (2001), marital status is a crucial factor in shaping social rural participation and acceptance. Farmers need a large family to reduce the cost of farm labour and maintain a relatively stable life style in the rural area especially for tree crop like cocoa. The result shows that 88.2% of FFS farmers have one form of formal education or the other. This shows that majority of the respondents were literate. This coupled with the fact that most of them are adults implies that the adult learning process of FFS will be useful. However, Njoku (1991) observed that formal education has a positive influence on adoption of innovation. Majority of both FFS the FFS farmers have a lot of experience in farming. Only about 6.2% of the FFS farmers had farming experiences less than 11 years. Ogungbile, Rahman and Tabo (2002) indicated that length of time of farming business can be linked to the age of farmers, acess to capital and experience in farming may explain the tendency to adopt innovations and new technology. Thus, majority of the respondents will be willing to participate in FFS training on cocoa. Farm size refers to the total land area (in Hectares) that the farmers cultivated. According to Alamu *et al* (2002) farmers with more resources including land are more likely to take advantage of a new technology. Farm size in the study area was rather small for FFS farmers, majority of the farmers having farm sizes of between > 0 – 5 hectares as shown in Table 2. Fragmentation due to land tenure systems, nearness to farms and resource endowment of farmers may be responsible. The finding agrees with that of Onemolease (2005) who observed that the average farm size was 1.2 hectares in Edo State, Also, Okunlola and Adekunle (2000) asserted that 53% of Nigerian farmers have less than 4 hectares of land while Koyenikan (2002) observed that the mean farm size for arable and tree crops such as cocoa, kolanuts and oil palm was 1.45 hectares in Ondo State. The implication of this finding is that majority of the cocoa farmers operate small holdings.The household sizes for both FFS farmers and Non FFS farmers were large. Majority of the farmers have between 1 – 10 household members. Rahman *et al* (2002) reported that the adoption index may be other positively or negatively related to the household size depending on the nature of the age structure and the amount of labour contributed among members. Banmeke (2003) further asserted that household size is an important index in any rural development intervention which can affect the outcome of such intervention.

4.2 Respondents' perceived contribution of FFS to their knowledge of cocoa cultivation practices

From Table 3, it can be seen that FFS has contributed immensely to the knowledge level of farmers in some areas of cocoa cultivation. For example, 50% of the FFS farmers for the first time were exposed to pruning of chupons, 92.6% to phytosanitary harvest, 77.9% to identification of mirids, 25.0% to causes black pod diseases, 77.9% to identification of beneficial insect, 100% to issues on hazardous child labour, 54.4% to correct tree spacing/density, 73.5% to identification of canker and 42.6% to identification of stem borers. Besides, there was a substantial increase in the respondents' knowledge in the following areas: 25.0% of the respondents improved their knowledge on pruning of mistletoe, 7.4% of respondents on phytosanitary harvest, 51.5% on shade management, 82.4% on nursery production practices, 19.1% on identification of mirids, 32.4% on proper tree spacing/density, 22.1% on identification of canker and 11.7% on weeding.

This finding was supported by David (2005) who asserted that FFS has led to a better understanding of cocoa farmers in areas of sanity harvest, pruning of chupons, removal of epiphytes, issues on child labour, identification of pests and diseases and their management and many other aspects of cocoa cultivation. van de Fliert and Braun (2005) made similar observations. Furthermore, from the number of respondents exposed to improved cultivation practices, it could be deduced that the previous assertions by some researchers (David, 2005; et al 2006 and Van de Fliert and Braun, 2005) that FFS is a discovery learning was also found in this study.

5. Conclusion and recommendation

From the findings of the study, it was concluded that FFS has contributed immensely in that it has helped farmers to improve their knowledge in several areas of cocoa cultivation. The knowledge and skills acquired by farmers from the FFS training can help them make their farm operations more profitable.

It was therefore recommended that FFS training should be extended to their States besides Edo State and that other crops besides Cocoa should have FFS.

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APPENDIX

Table 1 Procedure of Sample size Selection

State	Agricultural Zone	Selected Zone	Selected L.G.A	Reg. FFS Farmers	Expected sample Size	Actual Sample size
					FFSF	FFSF
Edo	Edo North	Edo North	Owan East	321	32	30
	Edo Central		Owan East	226	23	21
	Edo South		Akoko Edo	168	17	17
			Total	715	72	68

FFSF = FFS Farmers

TABLE 2. Socio Economic Characteristics of Respondents

VARIABLES	Frequency	FFS FARMERS (N = 68) Percentage
Age (Years)		
21 – 30	Nil	0.0
31 – 40	9	13.2
41 - 50	15	22.1
51 – 60	24	35.3
Above 60	20	29.4
Mean	51.6	
Actual range	31 -70	
Gender		
Male	57	83.8
Female	11	16.2
Marital Status		
Never Married	6	8.8
Married	49	72.1
Divorce	2	2.9
Separated	4	5.9
Widow/Widower	7	10.3
Educational Level		
No Formal Education	8	11.8
Primary Education	25	36.8
Secondary Education	20	29.4
OND/NCE	9	13.2
HND/First Degree	6	8.8
Post Graduate	0	0.0
Farming Experience (Years)		
Less than 11	4	5.9
11 – 20	15	22.1
21 – 30	20	29.4
31 – 40	14	20.1
More than 40	15	22.1
Farm Size (Hectare)		
5 and Below	55	80.9
6 – 10	13	19.1
More than 10	0	0.0
Household Size		
1 – 5	30	44.1
6 – 10	34	50.0
More than 10	4	5.9
Mean	5.8	
Actual Range	1 – 12	

Source: Survey Data 2010

Table 3. Distribution of Respondents according to the contribution FFS to their knowledge of cocoa cultivation

Areas of cocoa cultivation	FFS Contribution		
	A	B	C
a. Pruning of chupons	14(20.6)	20 (29.4)	34 (50.0)
b. Removal of mistletoe	3 (4.4)	17 (25.0)	48 (70.6)
c. Phytosanitary Harvest	0 (0.0)	5(7.4)	63 (92.6)
d. Shade Management	12 (17.6)	35 (51.5)	21 (30.9)
e. Nursery production practices	10 (14.7)	56 (82.4)	2 (2.9)
f. Identification of Mirids	2 (2.9)	13 (19.1)	53 (77.9)
g. Control of Pests	14 (20.6)	50 (73.5)	4 (5.9)
h. Causes of black pod disease	17 (25.0)	34 (50.0)	17 (25.0)
i. Control of diseases	15(22.1)	25 (36.7)	28 (41.2)
j. Beneficial insects for cocoa farm	5 (7.4)	10 (14.7)	53 (77.9)
k. Hazardous child labour	0 (0.0)	0 (0.0)	68 (100)
l. Callibration and use of sprayers	10 (14.7)	4 (5.9)	54 (79.4)
m. Farm sanitation	12 (17.6)	12 (17.6)	44 (64.7)
n. Rational pesticide use	6 (8.8)	26 (38.2)	36 (52.9)
o. Rehabilitating cocoa farm	2 (2.9)	28 (41.2)	39 (55.9)
p. Proper tree spacing/density	9 (13.2)	22 (32.4)	37 (54.4)
q. Identification of canker	50 (73.5)	15 (22.1)	3 (4.4)
r. Identification of stem borer	18 (26.5)	21 (30.9)	29 (42.6)
s. Weeding	60 (88.2)	8 (11.7)	0(0.0)

Source: Survey Data, 2010

Already known before attending FFS = A, Substantial increase in knowledge on practice = B, New knowledge, never known before attending FFS = C

Figures in parenthesis are percentages.

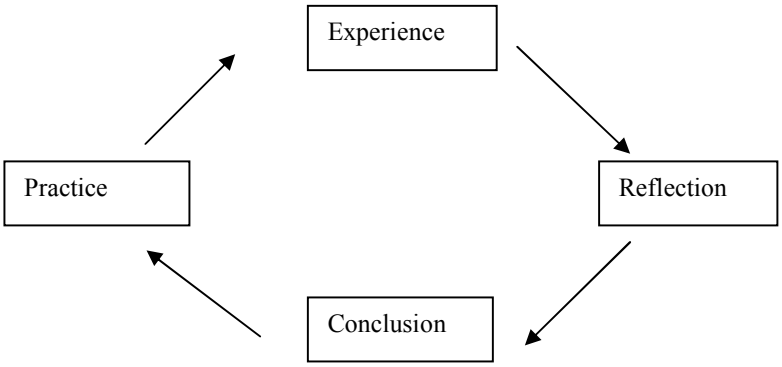

Fig 1: Experiential learning cycle
Source: (David et al 2006)

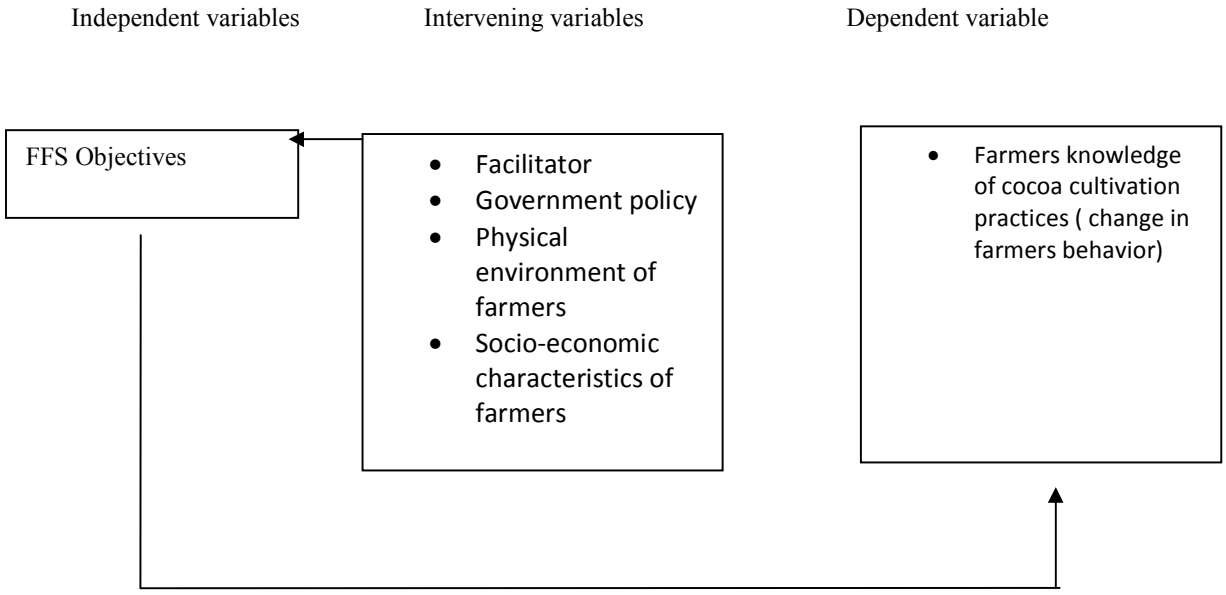

Figure 2*:* Conceptual framework of the study

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