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Research Article

Cocoa Farmer Field School Graduate Farmers Perceived Benefits of FFS Training in Ondo State, Nigeria

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Abstract: The study assessed the perceived benefits of Farmer Field School graduate farmers as a result of their participation in FFS training. The specific objectives were to: describe the socio-economic characteristics of the respondents, identify major cocoa farmers' perceived benefit items; determine the level of benefit; compare cocoa FFS farmers performance in terms of benefits/costs with non-FFS cocoa farmers. A multi-stage sampling procedure was used in composing 77 FFS graduate farmers and 76 non-FFS farmers for the study. Data were analysed using various descriptive statistics (frequency counts, percentages, means and standard deviation) and inferential statistics (t-test). The findings of the study indicated that the FFS farmers benefited in terms if improved income, increased yield, reduction of farm costs and other aspects. The t-tests result comparing the FFS Farmers with non-FFS farmers on some benefits/cost items showed that the FFS farmers were better off. It was therefore concluded that FFS training was beneficial to the cocoa farmers and recommended that FFS be extended to other categories of farmers to promote its beneficial effects.

Keywords: Benefit, cocoa farmers, farmer field school, Ondo state

INTRODUCTION

The FFS approach is a direct response to the needs of farming communities. The FFS brings together concepts and methods from agro-ecology, experimental education and community development. All sessions in FFS take ability, knowledge and experience of the participants as their starting point and FFS activities are meant to deepen them.

The FFS should have access to a field throughout the season in which the participants can do observations, analyses and experiments. Farmers work in small work groups of optimally five people to encourage the learning process.

Thus NAERLS/ABU (2008) described FFS as a platform and "school without walls" for improving decision-making capacity of farming communities and stimulating local innovation, which means utilizing Indigenous Technical Knowledge (ITK) for sustainable agriculture.

It is a participatory approach to extension, whereby farmers are given opportunity to make a choice in the methods of production through discovery based approach. The training methodology is centered on learning by doing, through discovery, comparison and a non-hierarchical relationship among the learners and trainers and is carried out almost entirely in the field.

Although FFS was design to promote IPM, empowerment is an essential feature from the beginning. The curriculum of FFS was built on the assumption that farmers could only implement IPM once they had acquired the ability to carry out their own analysis, make their own decisions and organize their own activities. The empowerment process, rather than the adoption of specific IPM technique, is what produces most of the developmental benefits of the FFS (Bartlett, 2004). Thus, the FFS approach is an effective approach to technical education and capacity building. Farmers generate knowledge that is functional and necessary to improve their production and livelihood potential. It helps to empower the farmers because apart from generating knowledge, they are both users of such knowledge as well as the owners (FARM Bulletin, 2003).

Therefore a farmer field school is in the main, a forum where farmers and trainers (facilitators) debate observations, apply their previous experiences and provide new information from outside the community. The results of the meeting are management decisions on what action to take. Thus FFS is practiced and controlled by the farmers to transform their observations to create a more scientific understanding of the crop plant/livestock agro-ecosystem. A field school therefore is a process and not a goal (NAERLS/ABU, 2008).

Farmer Field School (FFSs) were first developed in South East Asia for training rice farmers in Integrated Pest Management (IPM). They were developed by an FAO project as a way for small-scale farmers to investigate and learn for themselves the skills required for and the benefits to be obtained by adopting certain practices in their paddy fields (NAERLS/ABU, 2008).

The first field schools were established in 1989 (NAERLS/ABU, 2008; David *et al*., 2006) in central Java, Indonesia during the pilot phase of the IPM programme in response to a devastating insecticide-induced outbreak of brown plant hoppers (Nilaparvata Lugens) on rice. The devastating insecticide-induced outbreak of the brown plant hopper was estimated to have destroyed 20,000 hectares of rice in Java alone. (NAERLS/ABU, 2008). The government of Indonesia's response was to launch an emergency training project aimed at providing 120,000 farmers with field training in IPM focused mainly on reducing the application of pesticides that were destroying the natural insect predators of the brown plant hoppers.

The objectives of the FFS according to David *et al*. (2006) are to:

- Provide an environment in which farmers acquire the knowledge and skills to be able to make sound management decisions
- Sharpen farmers' ability to make critical and informed decisions that make their farming activities more profitable and sustainable
- Improve farmers' problem solving abilities
- Show farmers the benefits of working in groups and encourage group activities
- Empower farmers to become "experts" on their own farms and to be more confident in solving their own problems

The broad problem which FFS was designed to address was a lack of knowledge among the Asian farmers relating to agro-ecology, particularly the relationship between insect pests and beneficial insects (Gallagher, 2005).

Apart from Indonesia, the approach has been applied in several countries and replicated in a variety of settings beyond rice IPM (David *et al*., 2006; NAERLS/ABU, 2008; Van de Fliert and Braun, 2005). The approach has been applied to Integrated Crop Management (ICM), natural resources management (soil, fertility, water management) livestock, forestry and social issues like food security, nutrition, health, HIV/AIDS, literacy training etc (David *et al*., 2006).

FFS programme in Africa commenced by the effort of the FAO global IPM facility. The first ToT for IPM FFS was held in Ghana in 1995. Mali established FFS in 1999 through a national IPM programme. Similar programmes were established in Kenya and Zimbabwe (David *et al*., 2006). FFS is relatively new in Nigeria and was introduced to Ondo State in 2003 through the Sustainable Tree Crop Programme (STCP) working on cocoa, a project financed by the United States Agency for International Development (Ajayi and Okafor, 2006).

Röling (1995) asserted that Farmer Field School has proven to lead to farmers' enthusiasm, self confidence and a considerable reduction in insecticide use. This is so because FFS focuses on building farmers' capacities to make well informed crop management decisions through increase knowledge and understanding of the agro-ecosystem. In spite of this, studies assessing the benefits of FFS extension approach to farmers in Nigeria in general and Ondo state in particular have not been carried out. The following research questions thus arise: what are the socio-economic characteristics of farmers involved in FFS in Ondo state? Since the introduction of FFS extension to Ondo state have farmers benefitted at all? If they had benefitted, in what ways and to what extent?

The general objective of the study is to assess cocoa farmers' perceived benefits from FFS Training in Ondo state. Specific objectives were to: identify major cocoa farmers' perceived benefit items; determine the level of benefit; compare cocoa FFS farmers performance with non-FFS cocoa farmers. The study tested the following hypothesis stated in the null form: there is no significant difference between FFS farmers and non-FFS farmers on some benefit items

LITERATURE REVIEW

The major costs involved in implementing FFS are: facilitator training, facilitators' stipends and transport, materials, supervision and graduation (David *et al*., 2006).

Röling (1995) asserted that Farmer Field School has proven to lead to farmers' enthusiasm, self confidence and a considerable reduction in insecticide use. This is so because FFS focuses on building farmers' capacities to make well informed crop management decisions through increase knowledge and understanding of the agro-ecosystem.

According to Wikipedia (2008) and Van den Berg (2004), there are two major reasons why it is difficult to make generalizations about the cost and benefits of ICPM field school. First, there is lack of agreement about what factors should be taken into account on both sides of the cost-benefit equation. Regarding benefit, should we limit ourselves to measuring yields and pesticide (chemical) savings, or should we also take account of improvements in public health and the consequences of farmers becoming better organized. Regarding costs, should we limit ourselves to expenses incurred in running field schools, or should we also take account of wider cost of training extension staffs and managing ICPM programmes? (Wikipedia, 2008). Secondly there is a high degree of variation in the value of individual factors. The cost of conducting a season-long field school for 25 farmers have ranged from $150 to $1000 depending on the country and the organization. In some cases, the graduates of FFS have saved $40 per hectare per season by eliminating pesticides without any loss of yield. In other cases,

graduates did not experience any savings because they were not previously using any chemicals but yield increased by as much as 25% as a result of adopting other practices learnt during the FFS such as improved varieties, improved health care, better water management and enhanced plant nutrition (Wikipedia, 2008).

The conceptual and methodological problems associated with assessing the impact of FFS have resulted in disagreement among experts about the advantages of this intervention. One widely circulated paper written by World Bank Economists has questioned the benefit of sending farmers back to school (Feder *et al*., 2004). By contrast, a Meta-analysis of 25 impact studies commissioned by FAO concluded that the majority of studies reported sustained and consistent reduction in pesticides use attributable to be the effect of training in the number of cases; there was a convincing increase in yield due to training. A number of studies described broader, developmental impacts of training results demonstrated remarkable widespread and lasting developmental impacts. It was also found that the FFS stimulated continued learning and that it strengthened social and political skills, which apparently prompted a range of local activities, relationship and policies related to improved agro-ecosystem management (Van den Berg 2004).

Due to differences in motivation, scope of analysis and methodology, it is unlikely that experts from the World Bank and FAO will reach agreement on the advantages and disadvantages of ICPM field school in the near future. Despite the arguments among economists and policy makers, there has been widespread enthusiasm among practitioners in a number of countries.

RESEARCH METHODOLOGY

The study area: The study was conducted in Ondo State of Nigeria. Ondo state was created on 3rd February, 1976 from the former western state of Nigeria. It included the present Ekiti State until 1996 when Ekiti State was split off. The state consists of eighteen local government areas, the major ones being Akoko, Akure, Okitipupa, Ondo and Owo. Ondo state covers the land area of 14,606 square kilometers and lies between latitudes 5º45′ and 7º52′ N and longitudes 4º20′ and 6º05′ E with a population of 4,011,407 (NPC, 2006). Ondo State is bounded on the East by Edo and Delta States, on the West by Ogun and Osun States, on the North by Ekiti and Kogi States and to the South by the bight of Benin and the Atlantic Ocean.

The majority of the state's citizens live in urban centers. The ethnic composition of Ondo state is largely from the Yoruba sub groups of Akoko, Akure, Ikare, Ilaje, Ondo and Owo. Ijaw minority populations inhabit the coastal areas.

Ondo 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 in the coastal area of the state to nearly 1200 mm in the northern extreme. During the raining season, the mean monthly temperature range is 18ºC to 35ºC and 30ºC to 35ºC during the dry season.

The climate experienced in the state is favourable to agriculture which is the dominant occupation of people of Ondo 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 of the state.

Sampling procedure and sample size: The population of the study comprises of all cocoa farmers that have been involved in farmers' field school (FFS graduates) and registered cocoa farmers who have not attended FFS in Ondo State of Nigeria. Ondo State was purposively selected because it has long been involved in FFS training. The lists of these farmers were obtained from the STCP offices and the ADP offices in the state.

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

Stage 1: Out of the three agro-ecological zones in Ondo State, one agricultural zone was purposely selected based on where cocoa farmers were involved in FFS coupled with the fact that of these farmers have not been exposed to FFS training. The agricultural zones in Ondo State are Ondo North, Ondo Central and Ondo South. Ondo Central zone was purposely selected based on the information that this zone is almost exclusively the zone that had implemented farmer field school on cocoa.

Stage 2: Three local government areas from this zone were purposely selected based on the concentration of cocoa FFS in the area. The following local government areas were selected: Idanre, Ondo East and Ondo West in Ondo State. The number of registered FFS farmers and non FFS farmers as obtained from the STCP office and Ministry of Agriculture are as shown in Table 1.

Stage 3: The farmers whose names were in the list obtained from STCP and Ministry of Agriculture offices were randomly selected. Ten percent of the farmers were selected. Thus a total of three hundred farmers (82 FFS farmers and 77 non FFS farmers) were supposed to be selected for the study. The actual numbers of farmers obtained were 77 FFS farmers and 76 non FFS farmers due to the fact that some copies of questionnaires were improperly filled and others were

Table 1: Procedure of sample size selection

State	Agricultural zone	Selected zone	Selected L.G.A	Reg. FFS farmers	Reg. non FFS farmers	Expected sample size		Actual sample size	
						FFSF	N.FFSF	FFSF	N.FFSF
Ondo	Ondo north	Ondo central	Idanre	383	286	38	29	36	28
	Ondo central		Ondo East	221	184	22	18	20	18
	Ondo south		Ondo West	222	301	22	30	21	30
			Total	826	771	82	77	77	76

Expected sample size = 159; Actual Sample Size = 153; FFSF = FFS Farmers N.FFSF = Non FFS Farmers

not returned. Therefore, a total of 153 respondents were used for the study. Table 1 shows the procedure of the sample size selection.

Data collection instrument: The objectives of the study guided the development of questionnaire which was the main instrument used for data collection. The use of questionnaire has been demonstrated to be effective for evaluation of respondents' perceptions. A questionnaire was therefore developed and used for data collection. The questionnaire comprised both open and closed ended questions which measured the key variables of the study.

For the effectiveness of the primary data collection, 4 well-trained enumerators (able to communicate in English Language and the local dialects of the respective selected 30 communities/villages) were engaged in data collection. Secondary data were collected from published and unpublished research works, books and academic journals. Also relevant documents were obtained from Ministries of Agriculture and Natural Resources at the various levels of government and government agencies and the Sustainable Tree Crops Programme (STCP) office.

Validation of instrument: The instrument of data collection was subjected to both face and content validity. Face validity was carried out with the assistance of experts in the field of agricultural extension, agronomy and rural sociology. This was achieved by seeking the opinions of these experts on the representativeness and adequateness of items designed to measure the various variables of the study. This procedure assist in developing items that covered all objectives and that capture the content that was assessed in the study.

Measurement of variables:

Socio- economic characteristics:

Age: respondents were asked to state their chronological age measured in years. The data generated were simplified by classifying respondent into a class interval of six: Less than 21 years, 21-30 years, 31-40 years, 41-50 years, 51-60 years and above 60 years. Frequency count and percentages were then used to interpret the data generated.

Gender: respondents were asked to indicate whether they were male or female. Frequencies count and percentages were then used to interpret the data generated

Marital status: This was determined by asking respondents to indicate whether they were Never Married, Married, Divorced, Separated, or Widowed.

Educational level: Respondents were asked to indicate their level of educational attainment from a list of six options that was provided.

Farming experience: This was measured in number of years the respondent has spent in farming. Respondents were categorized into different classes.
Frequency count and percentages were then used to interpret the data generated.

Farm size: This was measured in hectares and respondents were categorized into different classes based on their farm sizes. Frequency and percentages were then used to interpret the data generated.

Benefits: Eight benefit items were provided. These include: improved income; increase yield; reduction in farm cost through reduction in use of agro-chemicals; improved agro-ecosystem management; improved competence in management of farms; safe and responsible labour practices; strengthened social and political skills; and broader and lasting developmental impart and each of these items was measured on a five point Likert scale with values: 1 = strongly disagree; 2 = disagree; 3 = I don't know; 4 = agree and 5 = strongly agree was provided for respondents to indicate their benefit level. From 3.00 was regarded as very beneficial and below 3.00 was regarded as non beneficial as used by Akwiwu *et al*. (2000).

Methods of data analyses: Both descriptive and inferential 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. inferential statistical tool (t-test) is used in testing the null hypothesis stated thus:

Ho_1: There is no significant difference between FFS farmers and non-FFS farmers on some benefit items

RESULTS AND DISCUSSION

Socio economic characteristic of respondents: Table 2 shows the socio-economic characteristics of both FFS and non FFS farmers in the study area.

Age: Age of farmers range from 31-70 years for FFS Farmers and from 31-72 for Non FFS Farmers. 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. Rahman *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 farmers (53.8% FFS farmers and 58.9% Non FFS farmers) were above the age of 50 years. The mean age for FFS farmers was 52 years while that of non FFS farmers was 53 years. This finding was corroborated by Aniedu *et al*. (2007) who asserted that most small scale farmers are mainly 50 years and above. The means ages indicated that majority of the cocoa farmers will be able to imbibe the adult learning principles.

Gender: Majority of the respondents were males. About 78.6% of the FFS farmers were males while 79.4% of the Non FFS farmers were males the result shows that more males are involved in cocoa farming. 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.

Table 2: Socio economic characteristics of respondents

	FFS farmers (N = 77)		NON FFS farmer (N = 76)	
Variables	Frequency	Percentage	Frequency	Percentage
Age (Years)				
21-30	Nil	0.0	Nil	0.0
31-40	12	15.6	10	13.2
41-50	25	32.5	22	28.9
51-60	26	33.8	27	35.5
Above 60	14	18.2	17	22.4
Mean	51.9		52.6	
Actual range	31 -70		31 -72	
Gender				
Male	61	79.2	55	72.4
Female	16	20.8	21	27.6
Marital Status				
Never married	7	9.1	8	10.5
Married	57	74.0	56	73.7
Divorce	2	2.6	Nil	0.0
Separated	2	2.6	4	5.3
Widow/widower	9	11.7	8	10.5
Educational level				
No formal education	10	13.0	21	27.6
Primary education	29	37.7	25	32.9
Secondary education	27	35.1	22	28.9
OND/NCE	4	5.2	7	9.2
HND/first degree	5	6.5	1	1.3
Post Graduate	1	1.3	Nil	0.0
Farming experience (years)				
Less than 11	5	6.5	7	9.2
11-20	19	24.7	17	22.4
21-30	21	27.3	19	25.0
31-40	17	22.1	14	18.4
More than 40	15	19.5	19	25.0
Farm size (hectare)				
5 and below	59	76.6	69	90.8
6-10	17	22.1	5	6.6
More than 10	1	1.3	2	2.6
Household size				
1-5	35	45.5	39	51.3
6 -10	38	49.4	34	44.7
More than 10	4	5.2	3	3.9
Mean	5.8		5.6	
Actual range	1-12		1-15	

Survey data 2010

Marital status: 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 and 75.2% of non 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.

Educational level: The result shows that 88.2% of FFS farmers and 73% of Non FFS farmers have one form of formal education or the other. 36.6% of the FFS farmers and 34.7% of the non FFS famers had primary education, while 35.2% peasant of FFS famers and 27.0% of non FFS farmers had secondary education. Only about 6.9% of FFS farmers and 1.4% of non FFS farmers had higher education. This shows that majority of the respondents were not highly 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. Omoregbee (1996) and Van den Ban and Hawkins (1996) had similar observation.

Farming experience: Majority of both FFS and Non FFS farmers have a lot of experience in farming. Only about 6.2% FFS farmers and 9.2% non FFS farmers had farming experiences less than 11 years. Rahman *et al*. (2002) indicated that length of time of farming business can be linked to the age of farmers, across 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: Farm size refers to the total land area (in Hectares) that the farmers cultivated. According to Alamu and Rahman (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 both FFS and non 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, Okulola and Adekunle (2000) asserted that 53% of Nigerian farmers have less than 4 ha 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 ha in Ondo State. The implication of this finding is that majority of the cocoa farmers operate small holdings.

Household size: The household sizes for both FFS farmers and Non FFS farmers were large. Majority of the farmers have between 1-10 household members. According to Solomon (2008), Banmeke (2003) and Olaniyan and Jibowo (1997) farmers have between 4-6 children who assist on farm and other household activities. From the knowledge assessment of the respondents, it was obvious that the FFS farmers were aware of the dangers of hazardous child labour. This implies that the FFS farmers would engage their children in non hazardous task like breaking of cocoa pods with sticks. On the other hand, since most non FFS farmers are not sensitize to issues on child labour, their children maybe engaged in hazardous tasks like carrying of heavy loads. This finding was supported by David *et al*. (2006) who asserted that farmers who are not sensitized to farmer field school training are more likely to involve their children in hazardous tasks. 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.

RESPONDENTS' PERCEIVED BENEFITS OF FFS

The result in Table 3 shows the respondents' perceived benefits from FFS training. Improved income ($\bar{X}$ = 4.87) was ranked by the respondents as the most important benefit to them as a result of their involvement in FFS training. This was followed by increased yield ($\bar{X}$ = 4.85). The other benefit items to the respondents were reduction in farm cost ($\bar{X}$ = 4.84), improved agro-ecosystem management ($\bar{X}$ = 4.78), improved competence in farm management ($\bar{X}$ = 4.70), safe and responsible labour practices ($\bar{X}$ = 4.64), strengthened social and political skills ($\bar{X}$ = 4.58) and broader and lasting development ($\bar{X}$ = 4.51). The result

Table 3: Mean distribution of respondents' perceived benefits of FFS extension approach

S/N	Benefits of FFS	Mean	S.D	Rank
1	Improved income	4.87	0.57	1st
2	Increased yield	4.85	0.55	2nd
3	Reduction in farm cost	4.84	0.56	3rd
4	Improved agro-ecosystem management	4.78	0.50	4th
5	Improved competence in farm management	4.70	0.62	5th
6	Safe and Responsible Labour Practice	4.64	0.67	6th
7	Strengthened Social and Political Skills	4.58	0.63	7th
8	Broader and lasting Development	4.51	0.59	8th

Field survey 2010

thus showed that respondents had a positive assessment of all the benefit items provided. This finding was supported by the findings of Ajayi and Okafor (2006) and Van den Berg (2004) that FFS farmers usually derive much benefit from FFS training which lead to the improvement of their welfare.

Likert scale: 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = Agree, 5 = strongly Agree

EFFECTS OF FFS ON PERCEIVED BENEFITS OF FARMERS

Table 4 shows the result of perceived benefit of FFS farmers before and after their exposure to FFS and those of farmers who did not participate in FFS. From Table 4 it was obvious that only 16.88% FFS farmers earn an average income of above ₦100,000 per annum before exposure to FFS training, whereas after exposure to FFS the percentage rose to 94.81%. Before exposure to FFS training, 79.23% of the FFS farmers spent over ₦100, 000 per annum on agro-chemicals but after training, only 10.39% of them spent over ₦100,000 on agro-chemicals. In the same vein, the yield of the FFS farmers increased dramatically in the sense that before exposure to FFS training only 3 (3.90%) FFS farmers obtained yields of between 400kg to 700kg per hectare annually; however, after exposure to FFS training 42 (54.54%) farmers witnessed yields of 400 kg and above. World Cocoa Foundation (2007) reported experiences of farmers who witnessed high income, improved yield, reduced used of agrochemical and responsible labour practices. Furthermore, when the cost/benefit of FFS farmers and that of non FFS farmers was compared, the FFS farmers were found to have benefited more than non FFS farmers. This finding is in conformity with the finding of Onemolease (2005), Osuntogun *et al*. (1984) and Owens *et al*. (2001) that effective agricultural extension approach will usually improve the welfare of beneficiaries. Röling (1995) asserted that FFS contributes to a considerable reduction in insecticide use. Similarly, supporting this result, Van den Berg (2004) also reported that some benefits of FFS to farmers include: sustained reduction in pesticide use, a convincing increase in yield, broader development impact of training demonstrated by remarkable and lasting development impact, stimulated

Table 4: Distribution of respondents according to perceived benefit FFS

Variable	FFS Farmers (n = 77)				Non FFS Farmers (n = 76)	
	Benefit/cost Before FFS training		Benefit/cost After FFS training		Benefit/cost	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Income (N)'000						
0-50	56	72.73	Nil	0.00	60	78.95
51-100	8	10.39	4	5.19	12	15.79
101-150	8	10.39	17	20.08	3	3.95
151-200	5	6.49	40	51.95	1	1.32
Above 200	0	0.00	16	20.78	Nil	0.00
Cost of Agro-chemical (N)'000						
0-50	1	1.30	46	59.74	40	52.63
51-100	5	6.49	23	29.87	22	28.95
101-150	34	44.16	8	10.39	14	18.42
151-200	26	33.77	nil	0.00	Nil	0.00
Above 200	1	1.30	nil	0.00	Nil	0.00
Cost of Labour (N)'000						
0-50	2	2.60	52	67.53	49	64.47
51-100	10	12.99	12	15.58	13	17.11
101-150	10	12.99	9	11.69	8	10.53
151-200	24	31.17	2	2.60	6	7.89
Above 200	31	40.26	Nil	0.00	Nil	0.00
Yield (kg/ha)						
100-199	42	54.55	Nil	0.00	63	82.89
200-299	16	20.78	Nil	0,00	13	17.11
300-399	4	5.19	35	45.45	Nil	0.00
400-499	2	2.60	20	25.97	Nil	0.00
500-599	1	1.30	21	27.27	Nil	0.00
600 and above	Nil	0.00	1	1.30	Nil	0.00

Author's computation

Table 5: Comparison of FFS graduate cocoa farmers and non FFS cocoa farmers in terms of benefit/cost item from their farming activities

	FFS farmers		Non FFS Farmers		
Variable	X	S	S	X	t-value
Income (N)	184667	20483	98766	15233	21.768*
Cost of labour (N)	52426	3551	51489	3214	1.474
Cost of agrochemical (N)	32415	1988	39977	2312	1.983*
Yield (Kg/Ha)	450	34	246	42	13.651*

Author's computation; *: significant at $p<0.05$

continued learning and strengthened social and political skill which apparently prompted a range of local activities, relationship and policies related to improved agro-ecosystem management.

Comparison of farmer field school graduate farmers and other cocoa farmers in terms of perceived benefit/cost of their farming activities: Table 5 shows the mean comparisons between Farmer Field School Graduate farmers and other cocoa farmers. The result of the t-test shows that there were significant differences between the FFS graduate farmers and non FFS farmers on all the test items except cost of labour where there was no significant difference between them. Generally speaking, it could be deduced from Table 5 that the FFS farmers were better off. This difference may be due to the fact that the FFS farmers are involved in discovery learning process which enhances their competence in management of their farms

CONCLUSION AND RECOMMENDATIONS

From the findings of the study, it was concluded that FFS extension approach is effective and beneficial to cocoa farmers in the study area. The FFS approach had improved the welfare of the farmers. However the following recommendations are made:

Farmer Field School extension approach should complement other agricultural extension systems already existing in the state.

Farmer Field School training should be extended to other cocoa farmers; they should be encouraged to participate in a field school.

Besides cocoa there should be farmer field school for other crops.

REFERENCES

Ajayi, M.T. and C. Okafor, 2006. Extension Agents' perception of participatory agricultural extension approaches adopted by Agricultural Development Program (ADP) in Ondo State, Nigeria. Int. J. Agric. Biol. Sci., 4(1): 20-25.

Akwiwu, C.D., C.U. Nwayiba and F.N. Nnadi, 2000. Effects of commercial banks' distresses on small scale rural livestock's enterprise in Imo State, Nigeria. J. Technol. Educ. Nigeria, 5(1): 12-15.

Alamu, J.F. and S.A. Rahman, 2002. Agricultural supply response evidence from four cereal crops in Nigeria. Nasarawa J. Humanit., 1(1): 198-203.

Aniedu, C., I. Nwachukwu, C.T. Uwakah and R.I.A. Unamma, 2007. Gender factors influencing adoption of yam minisett technique by farmers in Southern Eastern Nigeria: Implications for sustainable yam production. J. Agric. Soc. Res., 7(2): 56-62.

Bartlett, A., 2004. Entry Points for Empowerment Online. Care [6], Retrieved from: http;//www.communityipm.org/does/Bartlett – Entry points – 20 June, 04 Pdf, pp: 17.

Banmeke, T.O.A., 2003. Accessibility and utilization of agricultural information in the economic empowerment of women farmers in South Western Nigeria. Unpublished Ph.D. Thesis, Submitted to the Department of Agricultural Extension and Rural Development, University of Ibadan, Ibadan, pp: 142.

David, S., S. Agordorku, S. Bassanaga, J.Y. Couloud, M.A. Kumi, I. Okuku and D. Wandi, 2006. A guide for conducing farmer field schools on cocoa integrated crop and pest management. Proceeding of Sustainable Tree Crop Pest Program, International Institute of Tropical Agriculture, pp: 102.

Dikito-Watchtmeister, M.S., 2001. Empowering Women in Achieved Food Security. International Food Policy Research Institute, Washington DC, pp: 24.

FARM Bulletin, 2003. Innovatative Approaches. Farmer Field School Approach. Online, Retrieved from: http./www.dbtinda.nic.in/farm/ 3.5.htm.

Feder, G., R. Murgai and J.B. Quizon, 2004. Sending farmers back to school: The impact of Farmer field schools in Indonesia. Rev. Agric. Econ., 26(1): 45-62.

Gallagher, K., 2005. Ecological Basis for Low Toxicity Integrated Pest Management (IPM). In: Jules, P. (Eds.), the Pesticide Detox. Earthscan, London, pp: 18-21.

Koyenikan, J.M., 2002. An assessment farmer's participation in agricultural development programmes: The case of Ondo State Agricultural Development Programme. Ph.D. Thesis, Department of Agricultural Economics and Extension, University of Benin, Benin City, Nigeria, pp: 131.

NAERLS/ABU, 2008. National Agricultural Extension, Research and Liaison Services of Ahmadu Bello University, Zaria. Training of Nigeria Farmer Field School (FFS) Master Trainers, A Training Manual Sponsored by NPFS/FAO, Abuja.

NPC (National Population Commission), 2006. National Population and Housing Census. N.P.C Abuja.

Njoku, J.E., 1991. Factors Influencing the Adoption of Improved Oil Palm Technologies by Small Holders in Imo State of Nigeria. In Olukosi, J.O., Ogungbile, A.O. and B.A. Kalu (Eds.), Appropriate Agricultural Technologies for Resource Poor Farmers. National Farming System Network, pp: 51-55.

Olaniyan, O.F. and A.A. Jibowo, 1997. Pre-harvesting crop production activities of women farmers in iseyin L.G.A. of Oyo State. In: Olowu, T.A. (Ed.), towards the survival of agricultural extension system in Nigeria. Proceeding of 3rd Annual Conference of AESON, March 1997, ARMTI, Ilorin, pp: 52-55.

Oloruntoba, A., 2000. Evaluation of management training programme on job behaviour of senior agricultural research management on Nigeria. Unpublished Ph.D. Thesis, Department of Agricultural Extension and Rural Development, University of Ibadan, Nigeria, pp: 198.

Omoregbee, F.E., 1996. Communication of Improved farm practice to rural women contact farmers in Benue State, Nigeria. M.Sc. Thesis, Department of Agricultural Extension and Communication, University of Agriculture, Makurdi, Nigeria, pp: 105.

Onemolease, E.A., 2005. Impact of the Agricultural Development Programme (ADP) activities of alleviation of rural poverty in edo state, Nigeria. A. Ph.D. Thesis, Department of Agricultural Economics and Extension Services, University of Benin, Benin City, Nigeria, pp: 94-100.

Okulola, J.O. and O.A. Adekunle, 2000. Indigenous knowledge approach for rice pests and disease control by rice farmers in Nigeria for sustainable environmental management. J. Env. Exten., 1(1): 28-30.

Osuntogun, A.A., A. Oni and O. Oluro, 1984. An Evaluation of the Performance of the Ilorin ADP's Agricultural Project. Monitoring and Evaluation Units (APMEU), Ilorin, pp: 175.

Owens, S.D., D.A. Oakley, K. Marryott, W. Hatchett and R. Walton, 2001. Transmission of visceral leishmaniasis through blood transfusions from infected English foxhounds to anemic dogs. J. Am. Vet. Med. Assoc., 219(8): 1076-7083.

Rahman, S.A., A.O. Ogunbile and R. Tabo, 2002. Factors affecting adoption of ICSV111 and ICSV400 sorghun varieties in guinea and Sudan savanna of Nigeria. J. Crop Res. Agro-Forestry Env., 1(1): 21.

Röling, N., 1995. What to Think of Extension: A Comparison of Three Models of Extension Practice. In: Salama, N. (Ed.), Article for Francophone Issue of AERDD Bulletin. ICPA, Montpellier, pp: 77.

Solomon, O., 2008. Identification of training needs of oil palm (*Elaeis guinensis* jocq) farmers in rainforest Zone of South Western Nigeria. Unpublished Ph.D. Thesis, University of Agriculture, Abeokuta, pp: 124.

Van den Ban, A.W. and H.S. Hawkins, 1996. Agricultural Extension. Blackwell Science Ltd., Oxford, pp: 294, ISBN: 063204053X.

Van den Berg, H., 2004. IPM Farmer Field School. A Synthesis of 25 Impact Evaluations, Wageningen University Online, Retrieved from: http://.fao. Org/006/ad487e ad487e00.htm.

Van de Fliert, E. and A.R. Braun, 2005. Farmer Field School for Integrated Crop Management of Sweet Potato. Field Guide and Technical Manual. International Potato Centre, Indonesia, pp: 265.

Wikipedia, 2008. Farmer Field School. Online, Retrieved from: http://enwikipedia.org/wiki/ farmerfield school, pp: 1-2.