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Assessment of the Farmer Field Schools Activities as Strategy to Enhance Capacity Building of Smallholder Rural Cocoa Farmers in Kwara State, Nigeria

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Abstract. The study assessed the Farmer Field Schools (FFS) activities as a strategy to enhance capacity building of rural smallholder cocoa farmers in Kwara State, Nigeria. A descriptive survey to enhance the capacity to conduct the research. A purposive sampling procedure was used to select 160 smallholder rural cocoa farmers who participated in the FFS activities in Kwara State. A structured interview schedule was used to collect the data from the respondents. Data were gathered on the socio-economic characteristics of smallholder cocoa farmers and the skills provided by FFS to smallholder cocoa farmers. Data was analyzed using mean, frequency counts, percentages, and chi-square at 0.05 level of significance. The result revealed that 91.3% were male, while 8.7% were female. The result showed that all the skills needed were provided by FFS. The results showed that FFS activities had a significant relationship with the FFS skills provided and the training needs of the rural smallholder cocoa farmers with a p-value of 0.001 being < 0.05. The findings concluded that farmer field school activities had a positive relationship between the skills provided and the training needs of cocoa farmers and this is because the skills provided by FFS are in line with the training needs of cocoa farmers. The study recommends that the Kwara State Ministry of Agriculture through the FFS should continue to serve as a training base that involves more farmers in the program and encourage extension service delivery to encourage capacity building and increase productivity.

Keywords: capacity building, farmer field schools, rural farmers, skill acquisition

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1. Introduction

Agricultural extension stands out as a crucial global tool for bolstering production and addressing food security challenges. Each year witnesses advancements in agricultural processes, necessitating the creation of more tools to keep farmers informed of such changes [1]. In Nigeria, there has been a shift towards participatory/down-top extension approaches/systems, largely in response to criticisms of previous systems [2]. Among the participatory/down-top approaches experimented with in Nigeria is the farmer field schools (FFS). These programs aim to integrate participants' knowledge, experiences, and needs, rather than relying on top-down knowledge

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transfer [3]. This approach has replaced earlier agricultural extension initiatives, where farmers were expected to adhere to broad guidance from external specialists [4].

The farmer field school serves as a platform or a "school without walls," where farmers learn collectively by experimenting with new ideas in the agricultural fields using indigenous technical knowledge. This strengthens the decision-making capacity of farming communities and promotes local innovation for sustainable agriculture [5]. Farmers take on the role of trainers, engaging in discussions, drawing from past experiences, and sharing fresh information from beyond the community [5]. The extensionist acts as a catalyst and facilitator, aiding communities in achieving the stated and perceived goals [5]. Godrick *et al.* [6] outline the common objectives of FFS interventions, including improving productivity for food security, reducing rural poverty, enhancing individual and collective agency for livelihood, and building resilience against recurring hazards such as droughts, floods, and pests and diseases. Through FFS, farmers learn from mistakes by conducting field experiments, making observations, and assessing results throughout the season [7].

The Farmer Field School has been lauded as a novel technique for aiding farmers in honing farm management skills to boost farm yield, income, and living standards. According to [8], FFS sparks a range of local activities, relationships, and policies concerning improved agro-ecosystem management by promoting continuous learning and enhancing social and political capabilities. The specific objectives of FFS include empowering farmers with knowledge and skills tailored to their contexts, providing platforms for collaborative testing and adaptation of options with local conditions, facilitating the learning of new problem-solving methods and adaptation to change by farming communities, enhancing farmers' decision-making abilities to bolster their resilience, aiding in community organization, and fostering resilience and reducing vulnerability to disasters in farmers' livelihoods. The FFS approach necessitates a group of 20 – 30 farmers to convene regularly on a designated farm, where farmers conduct field observations, relate them to the ecosystem, and utilize prior experiences alongside new information to make crop management decisions under the guidance of a facilitator. Among the crops discussed in the training sessions is cocoa (Theobroma cacao).

Cocoa stands as one of Nigeria's initial agricultural export crops and the second most crucial export commodity, trailing only petroleum [9]. As per [10], cocoa cultivation primarily occurs in fourteen states out of the thirty-six states in Nigeria. These cocoa-producing states include Kwara, Ondo, Ogun, Osun, Oyo, Ekiti, Cross River, Edo, Abia, Kogi, Adamawa, Akwa Ibom, Taraba, and Delta States. Cocoa serves as a significant source of raw materials and revenue for the governments of these producing states [11]. The Food and Agricultural Organization [12] notes a decline in cocoa production and exportation in Nigeria. One hypothesis suggests that to counteract this downward trend, there is a need for capacity building among cocoa farmers. Identifying the

training needs of cocoa farmers is crucial to enhance capacity building, as outlined by [13]. These needs include nursery establishment techniques, plantation establishment, training in agrochemical application, pruning techniques, fertilizer application, cocoa bean storage/fermentation, cocoa bean processing, cocoa bean marketing, control of black pod disease, control of swollen-shoot virus, and pest control.

The cocoa production index in Nigeria indicates that farmers generally operate below their production capacity. For example, Nigeria produced 270,000 metric tons in 2019 and 250,000 metric tons in 2020 [14], reflecting a decline rather than the expected increase. Despite various government initiatives aimed at maximizing cocoa farmers' productivity, challenges such as climate change, pests, and diseases have adversely affected cocoa production in Nigeria, particularly in Kwara State [15]. These challenges have led to reduced cocoa yields and production losses, highlighting a disparity between developed cocoa technologies and farmers' actual practices. To bridge this gap, the Farmer Field Schools (FFS) program has been introduced, focusing on empowering cocoa farmers to adopt new technologies, improve livelihoods, and mitigate the impact of pests and diseases on cocoa yields in Kwara State. However, the effectiveness of FFS activities in enhancing the capacity building of smallholder rural cocoa farmers in Kwara State needs to be evaluated to provide essential baseline information for future program planning.

The main objective of the study is to assess the Farmer Field Schools Activities as a Strategy to Enhance the Capacity Building of Smallholder Rural Cocoa Farmers in Kwara State, Nigeria. Specific objectives include describing the socio-economic characteristics of smallholder rural cocoa farmers in Kwara State and identifying the skills provided by FFS to these farmers. The formulated hypothesis, "There is no significant relationship between the skills provided by FFS and the training needs of smallholder cocoa farmers in Kwara State, Nigeria," serves to guide the study in determining whether the skills imparted by FFS align with the specific training needs of cocoa farmers in the region. This hypothesis is essential as it helps in evaluating the efficacy of FFS activities in addressing the identified training gaps and ensuring that the program adequately meets the needs of smallholder cocoa farmers in Kwara State. Conducting the entire study is crucial to gather empirical evidence and insights necessary for refining and optimizing the FFS program to better serve the farmers and enhance cocoa production in the region.

2. Methods

This study was conducted in Kwara State, Nigeria, which comprises sixteen (16) local government areas, with five (5) of them hosting Farmer Field Schools (FFS): Isin, Oyun, Offa, Ifelodun, and Irepodun. Specifically, there are two FFS in Irepodun, bringing the total number of FFS in Kwara State to six (6). The study population consisted of 180 smallholder cocoa farmers who participated in FFS activities in Kwara State. Of these, 20 farmers were included in a pilot

study, while the remaining 160 farmers were selected as respondents. A purposive sampling technique was employed to select the 160 respondents from the five Local Government Areas within the study area. Data was collected using a structured questionnaire, and the pilot study yielded a Guttman Split-Half reliability coefficient of 0.73. Descriptive statistics, including mean, frequency counts, and percentages, were utilized to address the research questions. The null hypothesis was tested using Chi-square analysis at a significance level of 0.05.

3. Results and Discussion

Table 1 shows the socio-economic of the respondents. The result revealed that 91.3% were male, while 8.7% were female. This showed that the majority of cocoa farmers who participated in FFS were male. This is supported by [16] who stated that more males are involved in cocoa farming, and this also agreed with the findings of [17] who stated that the majority of the farmers who participated in the FFS program were male.

Table 1. Descriptive Analysis of Socio-economic Variables of Cocoa Farmers in Kwara State, Nigeria

Variables	Frequency	Percentage	Mean
Gender			
Male	146	91.2	
Female	14	8.8	
Age			
Less than 45-year-old	39	24.4	**mean** = 51.50, SD = 9.506
45 - 60 years	96	60.0	
Above 60 years old	25	15.6	
Farm size			
1 hectare	38	23.8	**Mean** = 2.01, SD =.696
2 hectares	83	51.9	
3 hectares	39	24.4	
Education			
No formal Education	15	9.4	
Quranic Education	11	6.9	
Primary Education	63	39.4	
Secondary Education	47	29.4	
Tertiary Education	14	8.8	
Adult Education	10	6.3	
Farming experience			
Less than 10 years	28	17.5	**mean** = 17.93, SD = 6.333
10 - 20 years	79	49.4	
Above 20 years old	53	33.1	
Household size			
Less than 5	3	1.9	**mean** = 9, SD = 2.578
5-9	85	53.1	
9 and above	72	45.0	

Note: SD = standard deviation

The result showed further that (24.4%) of the respondents were less than 45 years old, 15.6% were above 60 years, and the majority (60%) were 45–60 years old with an average mean of 51.50. This indicated that the majority of the cocoa farmers were adults. The result further identified that 51.9% of cocoa farmers had two hectares of land while (23.7%) and (24.4%) of cocoa farmers had one and three hectares respectively with an average mean of 2.01. This showed that the majority of cocoa farmers who participated in FFS have two hectares of farm size. The finding contradicts that of [13], who found that the farm size of Farmer Field School Cocoa farmers was 4.5 hectares. The finding is also similar to that of [18] who stated that the majority of smallholder cocoa farmers had a farm size of 2.5 hectares.

The result showed that 39.4% had primary education, 29.4% had secondary education, 8.6% had tertiary education and 6.3% had adult education. This shows that all of the farmers had received some type of education and the majority of the farmers had primary school education. This result is similar to [16] who opined that 88.2% of FFS farmers had some type of education. Going further, the study discovered that the majority of the FFS farmers had primary school education. This finding agreed with that of [19] who discovered that most of FFS participants received some form of education and the finding also tallies with that of [20] who stated that the majority of farmers who participated in FFS had primary education. The result also revealed that 49.4% of the farmers had 10–20 years of farming experience. This shows that the majority of the cocoa farmers had 10 to 20 years of farming experience. This result conforms to the findings of [7] who stated that FFS farmers had farming experience of 11-20 years. The result further indicated that 53.1% of cocoa farmers had 5 to 9 households. This showed that the majority of cocoa farmers had 5 to 9 household size. This negates the finding of [21] who stated that farmers have a family size range between 7 and 9 household size.

Table 2. Descriptive Analysis of the Training Needs and Skills Provided by FFS to Smallholder Rural Cocoa Farmers in Kwara State, Nigeria

S/N	Items	Yes	No
I	Site selection for cocoa farm	159(99.4)	1(0.6)
Ii	Land preparation for the planting of cocoa	159(99.4)	1(0.6)
Iii	Soil testing to determine the fertility of the soil on the cocoa farm	159(99.4)	1(0.6)
Iv	Nursery preparation for the planting of cocoa seedlings	159(99.4)	1(0.6%)
V	Selection of appropriate varieties of cocoa seedlings	158(98.8)	2(1.3)
Vi	Identification of healthy seeds of cocoa for planting	159(99.4)	1(0.6)
Vii	Appropriate and recommendation of planting space of cocoa on the field	158(98.8)	2(1.3)
Viii	Determining the depth of planting of cocoa seeds	158(98.8)	2(1.3)
Ix	Provision of shade for young cocoa seedlings	158(98.8)	2(1.3)
X	Pruning techniques	160(100)	0 (0)
Xi	Determine the fertilizer type to be applied to the cocoa plant	160(100)	0(0)
Xii	Appropriate methods of fertilizer application	158(98.8)	2(1.3)
Xiii	Pest and disease control of cocoa plant	160(100)	0(0)
Xiv	Mixing and spraying of agrochemicals on the cocoa farm	160(100)	0(0)
Xv	Recognizing matured and ripe cocoa pods	159(99.4)	1(0.6)
Xvi	Harvesting using Appropriate techniques	159(99.4)	1(0.6)
Xvii	Cocoa bean processing techniques	159(99.4)	1(0.6)
Xviii	Cocoa bean storage	159(99.4)	1(0.6)
Xix	Cocoa bean marketing strategies	159(99.4)	1(0.6)

Note: figures in parenthesis are percentages

Table 2 shows the training needs and the ones provided by FFS to smallholder cocoa farmers. It revealed that all the skills highlighted in the table are provided to smallholder cocoa farmers. The skills included but were not limited to pruning techniques, determining fertilizer type to be applied to the cocoa plant, pest and disease control of cocoa plants, and mixing and spraying of agrochemicals on the cocoa farm as affirmed by the respondents. Other responses to the skills are site selection for cocoa farms, and land preparation for planting of cocoa. Nursery preparation for the planting of cocoa seedlings, selection of appropriate varieties of cocoa seedlings, and identification of healthy seeds of cocoa for planting, recognizing matured and ripe cocoa pods, Cocoa bean harvesting using appropriate techniques, cocoa bean processing techniques, cocoa bean storage, and cocoa bean marketing strategies were affirmed by all except one respondent. This result showed that all the skills were provided.

Table 3. Chi-square Analysis of the Relationship Between the Skills Provided by FFS and Training Needs of Smallholder Rural Cocoa Farmers in Kwara State, Nigeria

	Value	**df**	**Asymptotic Significance (2-sided)**
Pearson Chi-Square	100.033[a]	48	.001
Likelihood Ratio	30.738	48	.975
Linear-by-Linear Association	6.193	1	.013
N of Valid Cases	160		

Source: Field Work, 2022
$\alpha \leq 0.05$, NS: Not Significant

The results presented in Table 3 display the Chi-square analysis assessing the relationship between the skills provided by Farmer Field Schools (FFS) and the training needs of smallholder cocoa farmers in Kwara State, Nigeria. The analysis revealed a p-value of 0.001, which is significantly lower than the alpha value of 0.05. This indicates the rejection of the null hypothesis, which posited that "there is no significant relationship between the skills provided by FFS and the training needs of smallholder cocoa farmers in Kwara State, Nigeria." Consequently, it can be inferred that there exists a positive relationship between the skills imparted by FFS and the training needs of smallholder cocoa farmers in Kwara State, Nigeria. This finding is consistent with the study by [17], which also identified a significant relationship between the skills provided and the farmers' production levels. Moreover, it underscores the potential benefits derived from participating in FFS activities, as farmers can leverage the acquired skills to enhance their production levels.

4. Conclusion and Recommendation

The study concludes that a predominant majority of cocoa farmers were male, and the majority fell within the adult age category. Additionally, it was observed that farmers were exposed to the

skills provided by Farmer Field Schools (FFS), and there exists a positive relationship between these skills and the training needs of smallholder cocoa farmers.

Based on the findings from this study, the following recommendations are proposed: a. Inclusion of More Females: Efforts should be made to increase female participation in FFS activities through extension service delivery. This can help promote gender equity and ensure that both male and female farmers benefit from the training and capacity-building opportunities offered by FFS. b. Expansion and Enhancement of FFS: FFS should continue to function as a pivotal training platform, engaging more farmers in the program. Extension service delivery should be actively encouraged to facilitate capacity building and enhance cocoa productivity among smallholder farmers. Implementing these recommendations can contribute to fostering inclusivity, enhancing agricultural productivity, and ultimately improving livelihoods among cocoa farming communities in Kwara State, Nigeria.

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