

THE EFFECT OF FARMER BUSINESS SCHOOL ON HOUSEHOLD WELFARE: EVIDENCE FROM COCOA FARMERS IN ATWIMA NWABIAGYA NORTH DISTRICT, GHANA

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Abstract: *The purpose of the study is to examine the effect of Farmer Business School (FBS) on household welfare among cocoa farmers in the Atwima Nwabiagya North District of Ghana. FBS is an educational programme aimed at improving the knowledge and skills of farmers in various aspects of agriculture, including financial management and marketing. Data was collected from a sample of 330 cocoa farmers, 200 of whom participated in the FBS programme and 103 who did not. The study employed a range of statistical techniques to investigate the effect of Farmer Business School (FBS) on cocoa farmers, including the perception index, binary probit model, independent samples t-test, and Kendall's Coefficient of Concordance. The results of the study suggest that participation in the FBS programme has a positive and statistically significant effect on household welfare. Cocoa farmers who participated in the programme experienced a significant increase in income and yield, as well as improved overall well-being compared to those who did not participate. The findings of this study provide evidence that FBS programmes can play an important role in improving the welfare of farmers, particularly in developing countries where agricultural livelihoods play a critical role in poverty reduction and economic growth. The study highlights the importance of investing in education and training programmes for farmers to improve their knowledge, skills, and overall well-being.*

INTRODUCTION

There are different concepts and approaches in extension being implemented to provide technical assistance and support to improve smallholder farmers' livelihood and productivity in the agricultural sector (Chilemba and Ragasa, 2018). Extension activities are widely applied to stimulate change in the agricultural sector. For many years, extension was based on the linear top-down transfer of technology, in which technology was developed and validated by researchers, communicated by extension agents, and adopted by farmers (Knook et al., 2018). The linear top-down transfer of technology was subjected to critique, and it did not address the needs of farmers; hence, various alternative extension approaches were designed where farmers play a great central role in the acquisition of knowledge, change of practices, and exchanging of various ideas between farmers and extension agents.

The Farmer Business School is one of the participatory approaches being used in the agricultural sector to assist farmers, such as cocoa farmers in Ghana. Farmer Business School is a comprehensive adult learning participatory mutual approach that targets changing the mindset of smallholder farmers by sensitising them to market opportunities and possibilities to improve productivity, income, nutrition, or farm

commercialization (GIZ, 2012; FAO, 2011). The FBS seeks to empower farmers, enhance trust, and foster collaboration between farmers, value chain actors, and other stakeholders to make lasting contributions to the livelihood and productivity of targeted households (CGIAR, 2022).

The Farmer Business School takes place at the village level and can be started by any number of individuals or agencies, including public sector extension services, farmer associations, cooperatives, and others. Farmers meet at a time of convenience, usually for an entire season, to synchronise their learning with the various stages of a given production cycle. Farmers' capacity for entrepreneurial and management skills is built through a learning-by-doing approach, and farmers can better plan farm operations, follow a more efficient cropping calendar, and, most importantly, realise what they have been missing in making agriculture a profitable business like any other (Verma, 2019). Extension officers and lead farmers are trained as facilitators and organise seasonal training courses, where farmers work in small groups at their own pace using materials that have been specifically designed for the schools (FAO, 2011; Verma, 2019). It is not primarily about lecturing, but the exchanging of information and knowledge is facilitated through the meetings, with observations, dialogues, and discussions. Some of the key characteristics of Farmer Busi-

ness School (FBS) include a focus on content, not the training facility, experiential learning (learning by doing), farmer-to-farmer learning, and matching the farm season (FAO, 2011).

Capacity building among farmers and a learning framework where they may learn from their own and others' experiences are required for the efficient handling of complex farm management possibilities and challenges in production and marketing (Verma, 2019). This is where Farmer Business School also sets in, where farmers are empowered to establish the linkages between production and market, thus enabling farmers to better evaluate their farm business enterprises through a participatory learning approach or learning forum. The Farmer Business School has helped to empower farmers, enhance farmers' trust, and improve collaboration between farmers and actors as well as other stakeholders within the value chain, thereby making significant contributions to the livelihood and productivity of targeted households (CGIAR, 2022).

Since its introduction, farmer business schools in Africa have witnessed rapid expansion through adaptation to a wide range of crops such as cotton, rice, sesame, horticultural products, cocoa, and cashews, among others (Verma, 2019). The farmer business school (FBS) concept was first developed for smallholder farmers producing cocoa in Nigeria, Ghana, Ivory Coast, and Cameroon by the GIZ Sustainable Cocoa Business Project in 2010, and later in 2012, the Ghana Cocoa Board partnered with GIZ to further introduce it in the cocoa sector (Tham-Agyekum et al., 2021; GIZ, 2012). Since its inception, over 1,300,000 smallholder farmers in various countries have been trained in the FBS approach (GIZ, 2015).

Three theories can be advanced to support the idea of the FBS. The theory of learning examines the observable impacts on behaviour and how people establish habits in a systematic way (Goldhaber, 2000). Pavlov (1960) demonstrated that behaviour may be learned, adjusted, and suppressed by changing the circumstances (including immediate stimuli) in which it happens. Once a behaviour is linked to a reward or punishment, the chance of the action continuing changes. As a result, learning theories suggest that business literacy may be learned, which supports the concept of Farmers' Business School programmes. This theory was chosen because it connects how people may learn to be financially sound and how they can improve their living conditions. The exchange theory proposed by Robson and Ladner (2006) claims that procedural, interactional, interpersonal, and informational variables play a role in learning. According to this theory, the manner of knowledge exchange, the degree of contact, the nature of the information, and the methods used to obtain it all affect people's financial literacy levels. The theory of planned behaviour is a belief-behaviour linkage theory. An individual's behavioural intents and behaviours are shaped by their attitude towards conduct, subjective norms, and perceived behavioural control (Ajzen, 1985; Maton and Martin, 2010).

Studies already advanced in the area of the farmer business school are numerous. For instance, Chilemba and Ragasa (2018) investigated the influence of farmer business schools (FBS) on smallholder farmers' crop revenues in central Ma-

lawi's Dedza area. Crop revenues from two groups of farmers were assessed using propensity score matching and difference-in-difference techniques: FBS participants and non-participants, as well as FBS graduates and dropouts. The study discovered that FBS participation had a minor but favourable influence on crop income and production (US \$20 per year on average) and that there was no significant difference in crop income and production between farmers who graduated from FBS and those who dropped out.

Boer (2013) researched to determine the condition of entrepreneurial orientation (BO) and market orientation (MO) among Rwandan potato farmers, as well as the inadequacies that a farmer's business school strategy could address. Farmers' attitudes towards entrepreneurship were overwhelmingly positive. Kahi (2016) conducted a descriptive study on the effect of farmers' education on livestock productivity. The study found a high link between livestock productivity, socioeconomic status, farmer knowledge of livestock rearing, and Farmer Field School (FFS). Jones (2008) measured the correlation between productivity and education using the Cobb-Douglas relationship. For weekly earnings, he used ordinary least squares (OLS). In his findings, he discovered a link between production and education.

In Ghana, Tham-Agyekum et al. (2021) studied how to enhance the market orientation of cocoa farmers in Ghana through the FBS and found that participants in the FBS were more competitor-oriented, customer-oriented, and had more inter-functional coordination than non-participants. Bannor et al. (2022) examined cocoa farmers' participation in Farmer Business Schools (FBS) in Ghana, the impacts of livelihood outcomes (human, physical, financial, and social capital) on participation, and the implications of participation on productivity and per capita expenditure. They found that participation in FBS had a positive impact and a heterogeneous effect on cocoa farmers' productivity and per capita expenditure. Tham-Agyekum et al. (2022b) argued that participation in the Farmer Business School indeed gives cocoa farmers three key advantages: market orientation, entrepreneurial proclivity, and livelihood outcomes.

The discussions so far prove that the FBS model can churn out great outcomes. This assertion is also supported by studies conducted by MOFA (2013), FAO (2011), Chilemba and Ragasa (2018), and GIZ (2015), who showed that the FBS can help to increase farmers' productivity in a manner that enhances their competitiveness. Nonetheless, there is an empirical gap because few studies on the FBS in Ghana have looked at its relations with household welfare. It is against these premises that this study is being conducted to examine the effect of Farmer Business School on the production of cocoa farmers in the Atwima Nwabiagya North District, Ghana. Specifically, the study sought to: 1. analyse cocoa farmers' perceptions of Farmer Business School 2. Assess the factors influencing cocoa farmers' participation in Farmer Business School. 3. examine the effect of cocoa farmers' participation in Farmer Business School on their household welfare. 4. Examine the challenges cocoa farmers encounter during Farmer Business School.

METHODOLOGY

The present study was undertaken in the Atwima Nwabiagya North District in the Ashanti region of Ghana. The Atwima Nwabiagya North District is one of the forty-three districts in the Ashanti Region, Ghana. It was formally part of the then-larger Atwima Nwabiagya District until the northern part of the district was split off to create Atwima Nwabiagya North District on March 15, 2018, while the remaining part was renamed Atwima Nwabiagya Municipal District when it was elevated to municipal district assembly status that same year. The Atwima Nwabiagya North District is located in the western part of the Ashanti Region and has Berekese as its capital town.

A research design refers to the plan, structure, and strategy for doing research that is structured to address research questions and manage variance, as well as the glue that holds the study together. It forms the framework within which a study is conducted. The research design provides an overview of how the research topics will be addressed. A study design also encompasses the researcher's objectives, the sources from which he or she plans to obtain information, and inescapable restrictions like data access, time, location, and money, as well as ethical concerns (Saunders et al., 2007).

In this study, a cross-sectional survey design was used. A survey design, according to Tanny (2018), is defined as a method for collecting data from a sample or a target population of persons using questionnaires to explain a group's views, beliefs, actions, or traits. A critical part of any research is the timeline for completion. The choice of the cross-sectional design was because respondents were contacted only once throughout the data collection process. This study made use of a quantitative approach, where numerical data were gathered and analysed quantitatively. This enabled the researcher to gather measurable information about the target audience for statistical inference through data analysis.

The population can be defined as all the units of interest from which a sample is chosen. In this present study, the population covered all registered cocoa farmers in the Atwima Nwabiagya North District who have participated in the Farmer Business School in the past two years. Sample size refers to the actual number of respondents chosen from within the target population. The sample size for this study was calculated from a total of 1,250 registered cocoa farmers in the Atwima Nwabiagya North District who have participated in FBS in the past two years. Since the sample frame is known (that is, 1250), the Yamane formula was used to calculate the sample size. Out of the 1250 registered, 200 participants (i.e., the treatment group) of the FBS were selected, while a control group of 103 cocoa farmers in the district were selected. Therefore, the study focused on 303 respondents (cocoa farmers).

The sampling technique in this study involved a multi-stage process; thus, in the first stage, a purposive sampling technique was used to select the three operational areas in the district. In the second stage, a simple random sampling technique was used to select two cocoa communities in each of the three operational areas in the district, making a total of six cocoa-growing communities. In the third stage, a simple random

sampling technique was also used to select the respondents in the selected communities. The study gathered data from two main sources, namely, both primary and secondary sources. The primary data were obtained through the use of a structured questionnaire focusing on research objectives, while the secondary data were obtained from the Cocoa Health and Extension Division (CHED) office in the district as well as the review of relevant literature such as journal articles and the internet, among others.

The questionnaire was self-administered to enhance participants' privacy. The researcher collected data through the use of structured questionnaires. The questionnaires were the most appropriate method for this research since they allowed respondents to understand and respond to the questions at their own pace.

To make meaning out of the data collected, the data was entered into the Statistical Package for Social Sciences (SPSS) software. The entered data was further cleaned to ensure uniformity, among other things. Different analytical tools were used to analyse the various specific objectives of the study.

In analysing cocoa farmers' perceptions towards Farmer Business School, the perception index was used. This involved presenting statements to the farmers to be rated on a three-point Likert scale (1=disagree, 2=neutral, and 3=agree). The mean scores of these statements were determined by multiplying the frequencies of each response by the corresponding numerical value on the scale and dividing by the number of respondents. The overall perception index was calculated by summing up the mean scores of each statement and dividing by the total number of statements. The overall perception index was calculated using the formula:

$$P = (\Sigma (F_i \times M_i)) / N$$

Where: P = Perception index, Σ = Summation of all the mean scores, F_i = Frequency of the i th statement, M_i = Numerical value assigned to the i th statement on the three-point Likert scale, N = Total number of statements. By calculating the perception index, the study was able to determine the overall perception of the farmers towards the Farmer Business School and whether their perception was positive, neutral, or negative. The higher the perception index, the more positive the farmers' perception towards the FBS, and vice versa.

In assessing the factors influencing cocoa farmers' participation in Farmer Business School, the binary probit model was used. The binary probit model is a statistical model that is used to analyse binary outcome data, such as the participation or non-participation of farmers in the Farmer's Business School (FBS). The model assumes that the outcome of interest (participation or non-participation) is caused by a set of independent variables that are related to the latent variable in a straight line. The latent variable is not seen and has a normal distribution. The relationship between the independent variables and the latent variable can be represented mathematically as follows:

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \varepsilon$$

where y is the latent variable, $\beta_0, \beta_1, \beta_2, \dots, \beta_k$ are the coefficients of the independent variables X_1, X_2, \dots, X_k , and ϵ is the error term. The error term is assumed to be normally distributed with a mean of 0 and a constant variance.

The latent variable y is then transformed into a binary outcome (participation or non-participation) using the cumulative normal distribution function, which gives the probability of the latent variable being less than or equal to a certain value:

$$\Pr(y \leq 0) = \Phi(-(\beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \beta_kX_k))$$

where $\Phi(\cdot)$ is the cumulative normal distribution function. The value of $y \leq 0$ represents the threshold between participation and non-participation. If $\Pr(y \leq 0)$ is greater than 0.5, the farmer is predicted to not participate in the FBS, and if it is less than 0.5, the farmer is predicted to participate in the FBS.

The coefficients of the independent variables can be estimated using maximum likelihood estimation, which involves finding the values of the coefficients that maximise the likelihood of observing the data given the model. The estimates of the coefficients can then be used to make predictions about the probability of participation in the FBS based on the values of the independent variables.

In conclusion, the binary probit model is a useful tool for analysing binary outcome data, such as the participation or non-participation of farmers in the FBS. By considering the effect of various independent variables on the likelihood of participation, the binary probit model can help researchers and policymakers better understand the factors that influence farmer participation in the FBS and how to improve the design and implementation of programmes like the FBS to support the sustainable development of rural communities and improve the lives of farmers.

Table 1: Variable Measurement in the Binary Probit Model

Independent variables	Measurement	Aprior. Exp
Sex	Sex (1=Male and 0=Female)	+/-
Age	Age (years)	+
Education	Years of formal education	+
Household size	Number of people in household	+
Farm size	Size of farm (acres)	+/-
Farming Experience	Years of experience in cocoa farming	+
Access to credit	Access to credit (1=Yes and 0=No)	+/-
Marital status	Marital status (1=Married and 0= Others)	+/-
Religion	Religion (1=Christian and 0=Others)	+/-
Land Tenure System	Land tenure (1=Owner and 0=Others)	+/-
Membership in cooperative society	Membership in cooperative society (1=Yes and 0=No)	+/-

The independent samples t-test was used to analyse the effect of FBS participation on household welfare outcomes (yield and income). A comparison was made between participants and non-participants of the Farmer Business School. This style was adopted by Tham-Agyekum et al., (2022a). In examining the challenges cocoa farmers encountered during Farmer Business School, Kendall's Coefficient of Concordance was used. The Kendall's Coefficient of Concordance is given as:

$$W = \frac{12(\sum D^2)}{m^2(N)(N^2-1)}$$

where $D = R - A$

N = total number of challenges being ranked

M = total number of respondents

R = sum of ranks given to a particular challenge

$$A = \frac{\sum R}{n}$$

RESULTS AND DISCUSSION

Socio-demographic Profile of the Respondents

Table 2: Profile of Respondents (Discrete Variables)

Participation	Sex of the Respondent		Total
	Female	Male	
Non-participants	33	70	103
Participants	66	134	200
Marital status of the Respondent			
	Others	Married	
Non-participants	45	58	103
Participants	81	119	200
Religion of the Respondent			
	Others	Christianity	
Non-participants	20	83	103
Participants	41	159	200
Land Tenure System			
	Others	Owner	
Non-participants	90	13	103
Participants	173	27	200
Access to credit facilities			
	No	Yes	
Non-participants	71	32	103
Participants	136	64	200
Membership in cooperative society			
	No	Yes	
Non-participants	19	84	103
Participants	33	167	200

Source: Field Survey, 2022

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Table 3: Profile of Respondents (Continuous Variables)

Variable	Description	Participants (n=200)	Non-Participants (n=103)	Total
Age	Mean	58	61	59
	SD	13.9	10.6	12.7

Years of Formal Education	Mean	6.22	8.88	7.11
	SD	5.04	4.65	4.91
Household size	Mean	4.23	7.21	5.24
	SD	2.56	2.76	2.63
Farm size (acres)	Mean	8.57	7.77	8.3
	SD	3.64	4.08	3.8
Farming Experience (Years)	Mean	18.33	15.50	17.37
	SD	8.89	5.09	7.60
Yield (Bags per acre)	Mean	6.23	2.66	5.01
	SD	2.24	0.79	1.74
Annual Income (GHC)	Mean	5349.55	3945.79	4872.36
	SD	5821.83	3200.04	4930.59

Source: Field Survey, 2022

In Table 3 (three), the average age of the respondents was 59 years old. This means that cocoa farming in the study area is undertaken by elderly people. The implication is that the youth are not interested in cocoa farming. The low participation of the youth is a result of the unattractiveness of the cocoa industry and the scarcity of cocoa farming lands. This is very alarming and tends to support the findings of Baah et al. (2010), who stated that the cocoa industry is populated by the ageing group. Therefore, youth engagement is necessary for agriculture to contribute to farmers' livelihoods and rural development.

The mean or average years of education indicate that farmers level of education is very low, and this can have an impact on how they make decisions and gather and use information because educated people are assumed to be more capable of performing certain tasks and roles with greater competency, as well as gathering and transforming available information and differentiating between favourable and unfavourable investment areas (Bawa et al., 2014).

The average household size for respondents was five (5). The average household size of the non-participants is similar to that of Osarenren et al. (2016), who found an average household size of seven (7) in their study in Edo State, Nigeria. However, an average household size of five is relatively large, and therefore there is a high probability of labour available for farming practices.

The average farm size of the respondents was 8.3 acres. According to the Ghana Statistical Service (2014), small-scale farmers have farms of less than 12 acres (5 hectares). This means that the majority of the farmers are small-scale farmers, although some of the farmers are into large-scale farming. This is due to Ghana's agricultural land tenure structure, which is mostly based on inheritance. As a result, most farmlands are shared equally among family members and passed down from generation to generation. This reduces the amount of acreage that can be cultivated. In addition, families with larger households utilise some of their resources to care for their children and other household needs. As a result, the amount of resources available for expanding farm size or migrating from small to medium or large-scale farming is reduced (Donkor and Owusu, 2014; Kwapong et al., 2021). Also, most smallholder farmers are generally poor and do not have large landholdings, so they tend to cultivate small areas, while some smallholder farmers also cultivate small areas due to limited access to credit for farm expansion (Anang et al., 2019).

The farming experience of the respondents was 17.37 years. The average farming experience among participants and non-participants indicates that farmers have rich experience in the cultivation of cocoa and hence could affect how they do things, make certain decisions, and access information from other sources directly and indirectly (Kwapong et al., 2021). Participants average income (GHC 5349.55) was higher than that of non-participants (GHC 3945.79). This could be attributed to an increase in the average yield per acre of participants (6 bags per acre) and also to the various skills training participants receive during Farmer Business School to enhance their production and improve their income (Banor et al., 2022).

Perception Of Cocoa Farmers (Participants) Towards Farmer Business School

Table 4: Perception of cocoa farmers

Perception Statements	Mean	SD
Farmer Business School facilitates easy access to loan	2.06	0.918
Farmer Business School helps farmers to improve their production	2.11	0.901
Farmer Business School promotes easy access to extension services	2.25	0.881
Farmers Business School helps to provide knowledge and information on how to diversify farmers' cocoa farm	2.46	0.784
Farmer Business School facilitates easy access to fertilizers and agro-chemicals	2.52	0.693
Farmer Business Schools help to teach farmers how to accurately measure their farmlands	2.54	0.830
Farmer Business Schools enlighten farmers to deploy appropriate techniques on their farms and post-harvest practices that guarantee the quality of cocoa	2.60	0.658
Farmers Business School promotes interaction/among farmers	2.65	0.649
Farmer Business School increases farmers' income, profit and standard of living	2.65	0.612
Farmer Business School has encouraged the registration of farmers' group	2.73	0.545
Farmer Business School upgrades cocoa farmers' business knowledge and Skills	2.74	0.789
Farmer Business School helps our community to grow into a small closely knitted group with common interests and it creates a feeling of belonging among the farmers	2.83	0.476
Farmer Business School allows farmers to know the right market for cocoa beans	2.86	0.549
Farmer Business School helps farmers to know how profitable Agric business is and agriculture in general using the right practices	2.94	0.790
General Perception Index	2.57	0.719

Source: Field Survey, 2022

The farming experience of the respondents was 17.37 years. The average farming experience among participants and non-participants indicates that farmers have rich experience in the cultivation of cocoa and hence could affect how they do things, make certain decisions, and access information from other sources directly and indirectly (Kwapong et al., 2021). Participants average income (GHC 5349.55) was higher than that of non-participants (GHC 3945.79). This could be attributed to an increase in the average yield per acre of participants (6 bags per

acre) and also to the various skills training participants receive during Farmer Business School to enhance their production and improve their income (Bannor et al., 2022).

Factors Influencing Participation in Farmer Business School

Table 5: Factors Influencing Farmers' Participation in Farmer Business School

Socio-Economic Variables	Coefficient	Marginal effect	Z - value
Sex	0.529	0.188	-2.74***
Age	-0.122	-0.004	-1.86*
Education	0.039	0.0138	2.25**
Household size	0.083	0.030	1.51
Farm size	0.282	0.099	1.94*
Farming Experience	0.142	0.050	1.69*
Access to credit	0.321	0.117	3.84***
Marital status	-0.006	-0.002	-0.38
Religion	0.059	0.091	0.52
Land Tenure System	-0.104	0.277	1.71
Membership in cooperative society	0.043	0.003	1.06*

Source: Field Survey, 2022.

Log likelihood -165.765, Pseudo R2 = 0.147, LR chi2(8) = 56.91***

NB: * significant at 10%; ** is significant at 5%; *** is significant at 1%

Table 5 (five) presents the binary probit model results of the factors that influence cocoa farmers (participants and non-participants) to participate in Farmer Business School. Sex, age, education, farming experience, access to credit, and farm size were the factors that influenced farmers' participation in Farmer Business School.

The result shows that the sex of farmers was significant (at 1%) and positive. This means that males are more likely to participate in Farmer Business School than female farmers in cocoa production. The marginal effect showed that the likelihood of males participating in Farmer Business School increased by 18%. This indicates that men are more active in public activities than females, and female farmers are mostly involved in reproductive roles or domestic roles such as child care, cooking meals, washing and cleaning, and others, thereby reducing the time available for them to participate in various extension services or farmer groups or associations (Awunyo-Vitor et al., 2016). The results contradict the findings of Bannor et al. (2022), which indicate that sex does not influence cocoa farmers' participation in Farmer Business School. The results indicate that as the age of farmers increases, farmers are less likely to participate in Farmer Business School. The marginal effect showed that as the age of farmers increased, participation in Farmer Business School decreased by 0.4%. This means that as farmers age, they lose the desire to participate in the Farmer Business School, and there might also be issues with their health and physical strength to move to various meetings of FBS. In other words, the youth are likely to involve themselves, and the youth are characterised by innovative activities, less risk aversion, little fear

of failure, less conservation, higher physical strength, and a larger willingness to acquire information and improve their skills. Education was significant (at 5%) and positive. This means that years of formal education enhanced cocoa farmers' participation in Farmer Business School. The marginal effect showed that a year increase in formal education enhanced the likelihood of participating in Farmer Business School by 1.38%; other factors held constant. Educated cocoa farmers could better access information through different sources than those less educated or those without formal education (Avane et al., 2022). This makes the educated farmer more knowledgeable about agricultural information, such as training programmes like Farmer Business School.

Farming experience in cocoa production was significant (at 10%) and positive. This indicates that experience in cocoa production improves the probability of participating in Farmer Business School. The marginal effect revealed that an increase in production experience by a year boosted the probability of participating in Farmer Business School by 5%; other factors held constant. The plausible reason could be that, for many years, farmers who produced cocoa might have attended several other farm management training programmes and workshops, and hence, knowing the importance of such training programmes, they were more likely to join Farmer Business School. Their extended stay in the cocoa industry will also improve their relationship with agricultural extension agents, who play an important role in advising farmers to participate in training programmes such as Farmer Business School.

Access to credit, farm size, and membership in cooperatives were significant (at 1%, 10%, and 10%, respectively) and positive. This implies that farmers who had access to credit, those with large farm sizes, and those who were members of cooperative societies were more likely to participate in Farmer Business School. Large-scale farmers could be more business-minded. These farmers could be interested in learning and acquiring knowledge that enhances productivity (Bannor et al., 2022).

The Effect of Farmer Business School on Yield of Cocoa Farmers (Participants and Non-Participants)

Table 6: Independent T-Test (Effect of FBS on Yields of Participants and Non-Participants of Farmer Business School)

Yield	Levene's Test for Equality of Variance		t-test for Equality			95% Confidence Interval of the Difference			
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference Std.	Error Difference	Lower	Upper
Equal variance assumed	182.053	.000	15.637	301	.000	3.569	.228	3.121	4.019
	3	0	7					3.221	3.918
Equal variance not assumed			274.69	9	.000	3.569	.176		
			20.20	4					

Source: Field Survey, 2022

The results from Table 6 (six) indicate that there is a statistically significant difference in the yield (bag/acre) of participants in the Farmer’s Business School (FBS) and that of non-participants. Levene’s test p-value of 0.000 suggests that this difference is unlikely to have occurred by chance. This finding is supported by the work of Bannor et al. (2022), who also found that participation in the FBS leads to an increase in the average yield per acre of participants. This suggests that the education and training provided through the FBS have a positive impact on the agricultural productivity of participants, allowing them to achieve higher yields from their farms. These results highlight the potential of the FBS to not only improve the financial well-being of farmers but also to increase the efficiency and sustainability of their farming practices. By equipping farmers with the necessary skills and knowledge, the FBS can play an important role in promoting food security and improving the livelihoods of rural communities.

Table 7: Independent T-Test (Effect of FBS On Income of Participants and Non-Participants of Farmer Business School)

Levene's Test for Equality of Variance	t-test for Equality		95% Confidence Interval of the Difference						
	F	Sig.	T	Df	Sig (2-tailed)	Mean Difference Std.	Error Difference	Lower	Upper
Income	21.34	.00	-	301	.000	-	1837.210	-	-
Equal variance assumed	3	0	3.55	346.85	.000	6524.167	1516.990	10136.0	2912.31
			1	4	-	-	17	6	
			-	-	6524.167	-	-	-	
Equal variance not assumed	1	4.301	1	4.301	.000	6524.167	1516.990	10136.0	2912.31
			1	1	4.301	6524.167	1516.990	10136.0	2912.31

Source: Field Survey, 2022

Table 8: Challenges Participants Face During Farmer Business School

Constraints	Mean	Ranks
Farmer Business School content does not address the needs of farmers	2.02	1 st
No follow-up visits after training	2.71	2 nd
Farmer Business School certificates were not issued to graduating farmers	3.26	3 rd
Farmer Business School facilitators were not present to facilitate the training sessions, leading to farmers dropping out	3.99	4 th
There were no field visits (visiting fellow Farmer Business School participants in other districts to learn what other Farmer Business School farmers are doing)	4.47	5 th
Farmers were not allowed to ask questions	5.49	6 th
Farmer Business School facilitators not providing participating farmers with manuals	7.00	7 th
No promotion of peer interaction through an exchange program	7.73	8 th
Farmers had no access to loans	8.36	9 th
Kendall's Wa=0.69		
Chi-Square=1103.40		
P-value=0.000		

Source: Field Survey, 2022

The results from Table 7 (seven) show that the difference in income between participants and non-participants of the Farmer’s Business School (FBS) is statistically significant. This is indicated by the low p-value (0.000) of Levene’s test, which is a test for equality of variances. A low p-value suggests that the variances between the two groups (participants and non-participants) are significantly different, and therefore the difference in income between the two groups is likely to be real and not due to chance. This conclusion is supported by the findings of a similar study by Bannor et al. (2022), which also found that participation in the FBS increases the income of participants. These findings suggest that participating in the FBS has a positive impact on the financial well-being of farmers, as they can increase their income as a result of their participation. Overall, the results from Table 7 (seven) and the study by Bannor et al. suggest that participation in the FBS is an effective way to improve the financial well-being of farmers, as it results in a statistically significant increase in income.

Challenges Participants Face During Farmer Business School

The three (3) most pressing constraints, as indicated in the table, were: farmer business school content does not address the needs of farmers (mean = 2.02); there are no follow-up visits after training (mean = 2.71); and farmer business school certificates are not issued to graduating farmers (mean = 3.26). The least three constraints were: farmer business school facilitators not providing participating farmers with manuals (mean = 7.00); no promotion of peer interaction through the exchange programme (mean = 7.73); and farmers having no access to loans (mean = 8.36). Kendall’s Coefficient of Concordance analysis showed that 69% of the farmers were in agreement with each other on the ranking of the constraints that impeded participants who attended Farmer Business School, and this represents a strong level of agreement in the ranking process. This study is similar to Chilemba and Ragasa’s (2018) findings, which revealed that Farmer Business School content did not address the needs of farmers, no follow-up visits after training, and Farmer Business School certificates not being issued to graduating farmers were some of the major challenges smallholder farmers in Malawi face in their participation in Farmer Business School. Therefore, there is a need to work on and address these challenges since they can go a long way towards negatively affecting the participation of farmers in the Farmer Business School.

CONCLUSION

Based on the results of the study, it can be concluded that Farmer Business School (FBS) has a positive impact on cocoa farmers and their households. The study found that FBS participation influenced farmers’ yield and income, suggesting that it can contribute to improving their overall welfare. Furthermore, the results of the study indicate that farmers have positive perceptions of FBS and that certain factors, such as sex, age, education level, farm size, farming experience, access to credit, and membership in a cooperative society, play a

significant role in determining farmers' participation in FBS. However, the study also revealed certain challenges that farmers face during FBS participation. The results showed that the FBS content does not always address the needs of farmers, there are insufficient follow-up visits after training, and certificates are not issued to graduating farmers. These challenges can negatively impact the effectiveness of the FBS programme and limit its potential to improve the welfare of cocoa farmers.

This study recommends that there should be regular review and updating of FBS content to ensure that it meets the changing needs and requirements of farmers, as well as the introduction of regular follow-up visits after training to monitor farmers' progress and provide ongoing support and guidance. There should be the implementation of a system to issue certificates to graduating farmers, as this can increase their motivation to participate in FBS and improve their livelihoods. The farmers should be encouraged to provide feedback on the FBS programme to help identify areas for improvement and ensure that the programme remains relevant and effective. In conclusion, FBS has the potential to positively impact the lives of cocoa farmers, but it is essential to address the challenges faced by farmers during the program. The above recommendations, if implemented, can help ensure that FBS achieves its full potential as a tool for improving the welfare of cocoa farmers.

REFERENCES

- Agbo, F.U. (2009). *Farmers' perception of cooperative societies in Enugu State, Nigeria. Agro-Science, 8*(3).
- Ajzen, I. (1985). *From intentions to actions: A theory of planned behavior. In Action control (pp. 11-39). Springer, Berlin, Heidelberg.*
- Anang, B. T., Bäckman, S., & Sipiläinen, T. (2020). *Adoption and income effects of agricultural extension in northern Ghana. Scientific African, 7*, e00219.
- Avane, A., Amfo, B., Aidoo, R., & Mensah, J. O. (2022). *Adoption of organic fertilizer for cocoa production in Ghana: Perceptions and determinants. African Journal of Science, Technology, Innovation and Development, 14*(3), 718-729.
- Awoyemi, A. O., & Aderinoye-Abdulwahab, S. A. (2019). *Assessment of the use of cocoa production management practices among cocoa farmers in Ekiti State, Nigeria. Agro-Science, 18*(2), 37-41.
- Awunyo-Vitor, D., Wongnaa, C. A., & Aidoo, R. (2016). *Resource use efficiency among maize farmers in Ghana. Agriculture & Food Security, 5*(1), 1-10.
- Baah, F., & Anchirinah, V. (2010). *Looking for convergence: Stakeholders' perceptions of cocoa extension constraints in Ghana. Journal of Science and Technology (Ghana), 30*(3).
- Bannor, R. K., Oppong-Kyeremeh, H., Amfo, B., Hope, L., & Kyire, S. K. C. (2022). *The Nexus Between Cocoa Farmers' Business Schools Participation and Impact to Support Livelihood Improvement Strategies in Ghana. SAGE Open, 12*(2).
- Bawa, S. K., & Kaur, N. (2014). *An analysis of efficiency-profitability relationship: a study of Indian public general insurers. Paradigm, 18*(1), 51-72.
- Boer, T. (2013). *Farmer business schools to strengthen entrepreneurship of potato farmers in Rwanda. Preparatory Analysis for Developing a Farmer Business School Approach for the Rwandan Potato Sector, Wageningen University.*
- Consultative Group on International Agricultural Research (CGAIR). (2022). *Farmer Business School*
- Chilemba, J., & Ragasa, C. (2018). *The impact of a farmer business school program on incomes of smallholder farmers: Insights from central Malawi (Vol. 23). Intl Food Policy Res Inst.*
- Donkor, E., & Owusu, V. (2014). *Effects of land tenure systems on resource-use productivity and efficiency in Ghana's rice industry. African Journal of Agricultural and Resource Economics, 9*(311-2016-5617), 286-299.
- Food and Agriculture Organization of the United Nations (FAO). (2011). *Farm Business School Handbook: Training of farmers programme for South Asia. FAO Corporate Document Repository, Regional Office for Asia and the Pacific, Bangkok, Thailand.*
- Ghana. Statistical Service. (2014). *Ghana Living Standards Survey Round 6 (GLSS 6): Poverty profile in Ghana (2005-2013). Ghana Statistical Service.*
- GIZ (2012). *A Business Approach to Diversification Concepts and Experience of the FBS: An FBS Approach to Cocoa Farming. Deutsche Gesellschaft für Internationale Zusammenarbeit*
- GIZ (2015). *Experiences with the Farmer Business School approach in Africa, Sector Network Rural Development Africa, Deutsche Gesellschaft für Internationale Zusammenarbeit*
- Goldhaber, D. (2000). *Theories of human development: Integrative perspectives. Mountain View, CA: Mayfield.*
- Haba, S. (2004). *Factors influencing the willingness to pay for agricultural information delivery technologies by cooperative-oriented agribusinesses in Rwanda: Evidence from the Abahuzamugambi Coffee Growers Cooperative of Maraba. Master's thesis, Texas A&M University. <http://handle.tamu.edu/1969.1/2414>*
- International Cocoa Organization (ICCO). (2014). *The Impact of the Cocoa-Led Growth Strategy on Smallholder Farmers in Ghana and Côte d'Ivoire. Retrieved from <https://www.icco.org/publications/the-impact-of-the-cocoa-led-growth-strategy-on-smallholder-farmers-in-ghana-and-cote-divoire.html>*
- International Food Policy Research Institute (IFPRI). (2018). *Access to credit for small-scale cocoa farmers in Ghana: Challenges and opportunities. Retrieved from <https://www.ifpri.org/publication/access-credit-small-scale-cocoa-farmers-ghana-challenges-and-opportunities>*
- Jones, D. C., Kalmi, P., Kato, T., & Mäkinen, M. (2008). *The effects of human resource management practices on firm productivity: Preliminary evidence from Finland (No. 1121). ETLA Discussion Papers.*

- Kahiu, I. G. (2016). *The Impact Of Farmer Field School On Live-stock Production: The Case Of Land O'lakes/United States Department Of Agriculture Kenya Semi-Arid Livestock Enhancement Support Project In Machakos County (Doctoral dissertation, United States International University-Africa)*.
- Kathan, D. and Steven W. (2009). *Farmer Business School Facilitators Manual for Training Farmers. (AGSF, FAO Rome and University of Kwazulu-Natal, South Africa) Pp1*
- Knook, J., Eory, V., Brander, M., & Moran, D. (2018). *Evaluation of farmer participatory extension programmes. The Journal of Agricultural Education and Extension, 24(4), 309-325.*
- Kwapong, N. A., Ankrah, D. A., Anaglo, J. N., & Vukey, E. Y. (2021). *Determinants of scale of farm operation in the eastern region of Ghana. Agriculture & Food Security, 10(1), 1-11.*
- Maton, C. C., Maton, M., & Martin, W. M. (2010). *Collaborating with a Financial Therapist: The Why, Who, What, and How. Journal of Financial Planning, 23(2).*
- Osarenren, C. O., Ejuetueyin, J. O., & Eweka, K. I. (2016). *Socio-economic characteristics of registered cocoa farmers in Edo State, Nigeria. Journal of Applied Sciences and Environmental Management, 20(2), 261-266.*
- Pavlov, I. (1960). *Conditioned reflexes: An investigation of the physiological activity of the cerebral cortex, trans. New York, NY: Dover Publications, Inc.*
- Robson, J., & Ladner, S., (2006). *Asset-based approaches to settlement services] in Canada. Discussion paper, SEDI.*
- Saunders, M., Lewis, P., and Thornhill, A. (2007). *Research methods. Business Students 4th edition Pearson Education Limited, England, 6(3), 1-268.*
- Tanny, T. F. (2018). *Survey research design. Unpublished Lecture Note, Department of Public Administration, Jagannath University, Dhaka.*
- Tham-Agyekum, E. K., Bakang, J. E. A., Quansah, M., Asiamah, M., Kokonu, P., & Nimoh, F. (2022a). *Hand pollination exercise and cocoa farmers' perceived change in livelihood: implications for extension practice in Ghana. International Journal of Agricultural Extension, 10(1), 183-193.*
- Tham-Agyekum, E. K., Nimoh, F., Bakang, J. A., Jones, E. O., Amankwah, K., Okorley, E. L., Kwarteng, J. (2022b). *Farmer Business School Participation in Ghana: Implications for Market Orientation, Entrepreneurial Proclivity and Livelihood Performance, Journal of Agriculture and Crops, Vol. 8, Issue. 1, pp: 1-6*
- Tham-Agyekum, E. K., Okorley, E. L., Kwarteng, J., Bakang, J.-E. A., & Nimoh, F. (2021). *Enhancing Market Orientation of Cocoa Farmers through Farmer Business Schools: The Ghana Cocobod Experience. Asian Journal of Agriculture and Rural Development, 11(1), 129-138.*
- Verma, S., Prasad, A. M., Kishore, A., & Saroj, S. (2019). *The Million Farmers School.*
- Verma, V., Verma, S., & Rani, E. (2019). *Chapter-1 Programme Planning and Evaluation, Multidisciplinary, 1.*
- WCF, W. C. (2010). *www.worldcocoafoundation.org. Retrieved November 21st, 2014, from www.top5ofanything.com:http://www.top5ofanything.com/list/c60de433/Cocoa-Bean-Producing-Countries*