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

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Abstract

Farmer Business School (FBS) is an educational programme aimed at improving the knowledge and skills of farmers in various aspects of agriculture, including financial management and marketing. The purpose of the paper is to examine the effect of FBS on household welfare among cocoa producers in the Atwima Nwabiagya North District of Ghana. Data was collected from a sample of 330 cocoa farmers, 200 of which participated in the FBS programme and 103 who did not. The study employed a range of statistical techniques to investigate the effect of FBS on cocoa growers, thus, independent samples t-test, binary probit model, Kendall's Coefficient of Concordance and perception index. The results of the study suggest that involvement in the FBS programme has a positive significant influence 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 against those who didn't take part. The research's findings offer evidence that FBS programmes can play a vital role in enhancing the welfare of farmers, particularly in developing nations where agricultural livelihoods play a crucial role in economic growth and poverty reduction. The study highlights the importance of investing in education and training programmes for farmers to improve their skills, knowledge, and overall well-being.

Keywords: Binary probit; cocoa farmers; farmer business school; financial management; household welfare (Jel code: Q16)

INTRODUCTION

There are different concepts and approaches in the extension being carried out to give technical support and assistance to enhance smallholder farmers' productivity and livelihood in the agricultural sector (Chilemba and Ragasa, 2018). Extension programmes are frequently used to encourage change in the agriculture industry. For a long time, extension relied on the linear top-down transmission of technology, in which researchers produced and justify the technology, extension agents disseminated it, and farmers eventually embraced it. (Knook et al., 2018). Technology transferred top-down and linearly was subjected to critiques and it did not address the needs of farmers hence various alternative extension approaches were designed where farmers play a remarkable core participating role in the learning process, the transformation of practices and exchanging of various ideas between farmers and extension agents.

The Farmer Business School (FBS) is one of the participatory approaches being used in the agricultural sector to assist farmers such as Ghanaian cocoa farmers. FBS is an all-inclusive adult learning partaking mutual method that aims at modifying smallholder farmers' perspectives by sensitizing them to market possibilities and opportunities to improve income, productivity, and nutrition or farm commercialization (GIZ, 2012; FAO, 2011). The FBS seeks to empower growers and enhance collaboration and trust between value chain actors, farmers and other stakeholders to provide long-term benefits to the livelihood and productivity of the intended households (CGIAR, 2022).

The Farmer Business School instruction occurs at the village level and can be initiated by a wide range of people or organizations, including cooperatives, farmer associations, or public sector extension services. Farmers gather whenever it's convenient, typically for an entire season, to coordinate lessons learned with the many phases of a particular agricultural cycle. Farmers may improve farm operations, adhere to a more effective cropping schedule, and, most significantly, recognize what they had been lacking in making agriculture a viable business like any other by using a learning-by-doing methodology to develop their entrepreneurial and management skills (Verma, 2019). Growers work together in smaller teams at their own pace with materials created especially for the schools during seasonal training courses that are organized by extension workers and lead farmers who have received training in facilitation. (FAO, 2011; Verma, 2019). The meetings, which include observations, dialogues, and conversations, encourage the exchange of information and knowledge rather than being largely about lecturing. Some of the key characteristics of FBS include; paying attention to the substance rather than the training environment, experiential learning (learning by doing), farmer-to-farmer learning and matching the farm season (FAO, 2011).

Farmers must develop their skills and work within a framework that allows them to learn from their own and other people's experiences to effectively manage complicated farm management opportunities and challenges in marketing and production (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, enhanced farmers' trust, and improved 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, FBS in Africa has seen fast growth due to crop adaptation for a variety of crops such as cotton, sesame, rice, horticultural products, cashew, and cocoa, among others (Verma, 2019). The GIZ Sustainable Cocoa Business Initiative created the FBS idea for smallholder farmers first in Ghana, Nigeria, Cameroon and Ivory Coast 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, more than 1,300,000 small-scale growers in various nations have received FBS training (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 learnt, adjusted, and suppressed by changing the circumstances (including immediate stimuli) in which it happens. Once a behaviour is linked to a punishment or reward, the chance of the continuation of the activity alters. As a result, learning theories suggest that business literacy may be learnt, which supports the concept of Farmers' Business School programmes. This theory was chosen because it connects how individuals may learn to be monetarily sound and how they can improve their living conditions. The exchange theory proposed by Robson and Ladner (2006) claimed that procedural, interactional, interpersonal, and informational variables play a role in learning. Individuals' financial literacy levels, according to this idea, are determined by the manner of knowledge exchange, the level of contact, and the sort of information and how it is gained. The theory of planned behaviour is a belief-behaviour linkage theory. A person's attitude toward perceived behavioural control, behaviour and subjective norms all influence their behaviour and behavioural intentions (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 FBS on small-scale farmers' crop revenues in central Malawi's Dedza area. Crop revenues from two groups of farmers—FBS participants and non-participants, as well as FBS graduates and dropouts—were assessed using propensity score matching and difference-in-difference approaches. According to the study, there were no discernible differences in crop income and output between farmers who completed the FBS and those who did not, and taking

part in the programme had a marginally favourable effect on crop income and productivity (US \$20 annually on average).

Boer (2013) researched to determine the condition of the market and entrepreneurial orientation among Rwandan potato growers, as well as the inadequacies that a farmer's business school strategy could address. Farmers' attitudes toward entrepreneurship were overwhelmingly positive. Kahiu (2016) conducted descriptive research on the effect of farmers' education on livestock productivity. The study found a high link between farmer knowledge of livestock rearing, socioeconomic status, livestock productivity and Farmer Field School (FFS). The Cobb-Douglas relationship was used by Jones (2008) to measure the link between productivity and education. 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 growers through FBS and found that participants of the FBS were more competitor-oriented, customer-oriented, and had more inter-functional coordination than non-participants. The impact of one's livelihood (social, physical, human, and financial capital) on partaking, as well as the implications of participation on productivity and per capita spending, were all examined by Bannor et al., (2022) in their study of Ghana's cocoa farmers' participation in FBS. They discovered that involvement in FBS had a favourable influence and a variety of effects on the per capita spending and productivity of cocoa growers. Tham-Agyekum et al., (2022) argued that the FBS does provide cocoa growers with three key advantages; entrepreneurial proclivity, market orientation, and livelihood outcomes.

The discussions so far prove that the FBS model can churn out great outcomes. This assertion is supported also 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. Yet, there is a knowledge gap for the reason that there have been few studies on the FBS in Ghana that have examined its relationships with household welfare. It is against this premise, that the research is being conducted to assess the effect of FBS on the production of cocoa growers in the Atwima Nwabiagya North District, Ghana. Specifically, the study sought to 1. analyze cocoa farmers' perception towards FBS 2. assess the factors influencing cocoa farmers' participation in FBS 3. examine the effect of cocoa growers' participation in FBS and their household welfare 4. examine challenges cocoa farmers encounter during Farmer Business School.

MATERIALS AND METHODS

The Atwima Nwabiagya North District in Ghana's Ashanti region was the site of the current study. It is one of the forty-three districts in Ghana's Ashanti Region. It was formerly a part of the larger Atwima Nwabiagya District until that district's northern portion was divided off to establish Atwima Nwabiagya North District on March 15, 2018, and the remaining portion was renamed Atwima Nwabiagya Municipal District when it was upgraded to municipal district assembly level later that year. The capital city of the Atwima Nwabiagya North District is Barekese, which is sited in the western portion of the Ashanti Region.

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 time, data access, money, location, 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 technique for gathering data from 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 just once throughout the data collection process. This study made use of a quantitative approach where numerical

data were gathered and analyzed quantitatively. This afforded the researchers in gathering measurable information about the target audience for statistical inference through data analysis.

A population can be defined as all the units of interest from which a sample is chosen. In this study, the population covered all registered cocoa farmers in the Atwima Nwabiagya North District who have joined the FBS 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 1250 registered, 200 participants (i.e., 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 phase, a purposive sampling method was used to select three operational areas in the district. In the second phase, a random sampling method was employed 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, the respondents in the chosen communities were also chosen using a random sampling procedure. The study gathered data from primary sources through the use of a structured questionnaire focusing on research objectives.

The researchers collected data with 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. The questionnaire was self-administered to enhance participants' privacy. To make meaning out of the data collected and entered into the Statistical Package for Social Sciences (SPSS) software. The entered data were further cleaned to ensure uniformity among other things. Different analytical tools were used to analyze the various objectives of the study.

In analyzing cocoa farmers' perception towards FBS, the perception index was used. This involved presenting statements to the farmers to be rated on a three-point Likert scale (disagree=1, neutral=2, and agree=3). 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 growers' participation in FBS, the binary probit model was used. The binary probit model is a statistical model that is used to analyze 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 a result of a combination of independent variables that have a linear relationship with the latent variable, which is unobserved and has a normal distribution. The association of the independent factors with the latent variable can be represented mathematically as:

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

where y is the latent variable, $\beta_0, \beta_1, \beta_2, \dots, \beta_k$ are the coefficients of the explanatory variables X_1, X_2, \dots, X_k , and ϵ is the error term. It is assumed that the error term has a normal distribution 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:

$$\Pr(y \leq 0) = \Phi(-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k))$$

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. By determining the values of the coefficients that maximize the possibility of actually witnessing the data given in the model, maximum possibility estimation can be used to estimate the coefficients of the independent variables. 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 response variables. In conclusion, a binary probit model is a useful tool for analyzing 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 probability of participation, the binary probit model can help researchers and policymakers better understand the factors that affect farmer involvement 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	(1=Male and 0=Female)	+/-
Farm size	(acres)	+/-
Household size	Number of people in household	+
Education	Years of formal education	+
Access to credit	(1=Yes and 0=No)	+/-
Farming Experience	Years	+
Marital status	(1=Married and 0= Others)	+/-
Age	Years	+
Religion	(1=Christian and 0=Others)	+/-
Land Tenure System	(1=Owner and 0=Others)	+/-
Membership in cooperative	(1=Yes and 0=No)	+/-

The impact of FBS involvement on household welfare levels (yield and income) was examined using the independent samples t-test. A comparison was made between non-participants and participants of the FBS. This style was adopted from Tham-Agyekum et al., (2022). In examining the challenges cocoa farmers encounter 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 $D = R - A$

M = total number of respondents

N = total number of challenges being ranked

R = sum of ranks given to a particular challenge

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

RESULTS AND DISCUSSION

Demographic profile of the farmers

Table 2 shows that there was more male than female respondents. Similar findings were made by Avane et al., (2022) and Ankuyi et al., (2022), who found that men traditionally cultivate the majority of

Ghana's cocoa while women typically grow food crops and vegetables. The majority of the respondents were married. This finding is similar to Tham-Agyekum et al., (2022) and Awoyemi et al., (2019) who discovered that most cocoa producers are married. A large number of married respondents suggests that more family members will likely be available for cocoa production in the study area. This is a positive development as it means that family members can assist with the farm work, reducing the need for paid labour and saving money. Christians also formed the majority of the cocoa farmers sampled. The majority of the cocoa farmers were farming on lands that were rented, family-owned or shared. A large percentage of cocoa farmers lacked access to loans. This finding is in line with a study by International Cocoa Organization (2014) and the International Food Policy Research Institute (2018) which revealed that only a few cocoa growers have access to credit. These findings highlight the need for continued efforts to improve credit access for cocoa growers in Ghana, as this can have a significant impact on the farmers' livelihoods and the sustainability of cocoa production. The majority of the cocoa farmers were members of cooperative societies. This finding is in line with a study done by Agbo (2009) who found that most cocoa farmers belonged to cooperative societies.

Table 2: Demographic features 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		Total
	Others	Christianity	
Non-participants	20	83	103
Participants	41	159	200
	Land Tenure System		Total
	Others	Owner	
Non-participants	90	13	103
Participants	173	27	200
	Access to credit facilities		Total
	No	Yes	
Non-participants	71	32	103
Participants	136	64	200
	Membership in cooperative society		Total
	No	Yes	
Non-participants	19	84	103
Participants	33	167	200

Source: Field Survey, 2022

The mean age of the respondents in years was 59 (table 3). This means that cocoa farming in the study area is undertaken by aged folks. 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 indicates 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 mean household size of the respondents was

five (5). The mean household size of the non-participants is similar to 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 mean farm size of the farmers was 8.3 acres. According to the Ghana Statistical Service (2014), small-scale growers have farms of less than 12 acres (5 hectares). This indicates that small-scale farming is the predominant type of farming, 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 utilize some of their resources to care for their other household and children's needs. As a result, the number 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). Moreover, smallholder farmers often cultivate small areas since they lack access to large landholdings and live in poverty. Also, some smallholder farmers do it due to their restricted access to capital for business expansion (Anang et al., 2019).

The farming experience of 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, take certain decisions and access information from other sources directly and indirectly (Kwapong et al., 2021). Participants' average income (GHC 5349.55) was higher than 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 various skills training participants receive during Farmer Business school to enhance their productivity and improve their income (Bannor et al., 2022).

Table 3: Profile of respondents (continuous variables)

Variable	Description	Participants (n=200)	Non-Participants (n=103)	Total
Age	Mean	58	61	59
	Std. Dev.	13.9	10.6	12.7
Farming Experience (Years)	Mean	18.33	15.50	17.37
	Std. Dev.	8.89	5.09	7.60
Years of Formal Education	Mean	6.22	8.88	7.11
	Std. Dev.	5.04	4.65	4.91
Farm size (acres)	Mean	8.57	7.77	8.3
	Std. Dev.	3.64	4.08	3.8
Household size	Mean	4.23	7.21	5.24
	Std. Dev.	2.56	2.76	2.63
Yield (Bags per acre)	Mean	6.23	2.66	5.01
	Std. Dev.	2.24	0.79	1.74
Annual Income (GHC)	Mean	5349.55	3945.79	4872.36
	Std. Dev.	5821.83	3200.04	4930.59

Source: Field Survey, 2022

Perception of cocoa farmers (participants) towards FBS

Informed by the theory of learning, the theory of planned behaviour and the exchange theory, these perception statements were asked to understand farmers' (participants) perception towards the FBS. The results of the participants' (cocoa farmers') agreement level with perception statements on FBS are shown in Table 4. The participants of the FBS agreed to the following statements; FBS facilitates easy access to fertilizers and agro-chemicals (Mean=2.52), FBS helps to teach farmers how to accurately measure their farmlands (Mean=2.54), FBS enlightens farmers to deploy appropriate techniques on

their farm and post-harvest practices that guarantee quality of cocoa (Mean=2.60), FBS promotes interaction/among farmers (Mean=2.65), FBS increases farmers' income, profit and standard of living (Mean=2.65), FBS has encouraged the registration of farmers' group (Mean=2.73), FBS upgrades cocoa farmers business knowledge and Skills (Mean=2.74), FBS helps our community to grown into a small closely knitted group with common interest and it creates a feeling of belong among the farmers (Mean=2.83), Farmer Business School allows farmers to know the right market for my cocoa beans (Mean=2.86) and Farmer Business School helps farmers to know how profitable Agric business is and agriculture in general using the right practices (Mean=2.94). In a study on how to enhance the market orientation of cocoa growers in Ghana through the FBS, Tham-Agyekum et al., (2022) found that partakers of the FBS were more oriented towards farming as a business. Their entrepreneurial orientation was also boosted through the FBS.

With a general perception index of 2.57, it is inferred that the sampled cocoa producers (participants) perceived Farmer Business School to be good or positive and favourable to them with regard to their farming activities. For all parties involved, especially development organizations, this is fantastic news, especially for those who want to empower these farmers through information and knowledge acquisition, development of skills, decision making and improving their production. Also, farmers' (participants) positive perception could be a result of the benefits they have gained from attending Farmers Business School. The above results are in line with Bannor et al., (2022) which showed that farmers who attend Farmer Business School gain some benefits such as learning about new and improved farming and business management methods.

Table 4: Perception of cocoa farmers

Perception Statements	Mean	SD
Farmer Business School facilitates easy access to a 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 enlightens farmers to deploy appropriate techniques on their farm 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 a common interest 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

Factors influencing participation in FBS

Table 5 shows the binary probit model results of the factors that influence cocoa farmers (non-participants and participants) to participate in Farmer Business School. Sex, age, education, farming

experience, access to credit and farm size were the factors that influence farmers' involvement in FBS. The result shows that the sex of farmers was significant (1%) and positive. This implies that males are more probable to partake in Farmer Business School than female farmers in cocoa production. The marginal effect showed that the likelihood for males to participate 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 caring, 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 findings contradict that 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 rises farmers are less probable to participate in Farmer Business School. The marginal effect showed that as the age of cocoa growers increases participation in Farmer Business School reduces by 0.4%. This means that as farmers age increases, they lose the desire to participate in the Farmer Business School. It might be an issue with their health and physical strength to move to various meetings of FBS and this in order words means that the youth are likely to involve themselves and the youth is characterized by innovative activities, less risk aversion, little fear of failure, less conservatism, higher physical strength, and a larger willingness to acquire information and improving their skills.

Education had a beneficial and significant (5%) impact. The farmers' involvement in Farmer Business School was therefore facilitated by their years of formal education. When all other characteristics were held constant, the marginal effect revealed that one additional year of formal education increased the likelihood of enrolling in Farmer Business School by 1.38%. Educated cocoa growers had better access to information from various sources compared to uneducated farmers (Avane et al., 2022). The educated farmer gains a greater understanding of agricultural facts, including training programmes like Farmer Business School. The farming experience was significant (at 10%) and beneficial in the production of cocoa. This shows that the likelihood of enrolling in Farmer Business School is increased by prior expertise in cocoa cultivation. When all other characteristics were held constant, the marginal effect showed that one extra year of farming experience increased the likelihood of enrolling at Farmer Business School by 5%. The likely explanation is that farmers who grew cocoa may have long since participated in other farm management training courses and workshops; as a result, they may have understood the value of such courses and were therefore more willing to enrol in Farmer Business School. Their prolonged presence in the cocoa sector will also strengthen their bonds with agricultural extension agents, who play a crucial role in encouraging farmers to take part in training programmes such as Farmer Business School.

Access to credit, farm size and membership of cooperatives were significant (at 1%, 10% and 10% respectively) and positive. This infers those cocoa growers who had access to credit, those with large farm sizes and those who are members of cooperative societies were more probable to partake in Farmer Business School. Large-scale farmers might have a stronger sense of business. These farmers might be eager to learn and gather the information that increased productivity (Bannor et al., 2022).

Table 5: Factors Influencing Farmers' Participation in FBS

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

Source: Field Survey, 2022.

Log likelihood -165.765, Pseudo $R^2 = 0.147$, LR $\chi^2(8) = 56.91^{***}$

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

The effect of FBS on the yield of cocoa farmers (non-participants and participants)

The results from Table 6 point out 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 0.00 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 partaking in the FBS leads to a rise 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 required skills and knowledge, the FBS can play an important role in promoting food security and improving the livelihoods of rural communities.

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

Yield	Levene's Test for Equality of Variance		t-test for Equality of Means						
	F	Sig	T	Df	Sig	Mean	Std. Err.	95%Conf. Int. Lower	Upper
Equal variance assumed	182.05	0.00	15.64	301	0.00	3.57	0.23	3.12	4.02
Equal variance not assumed			20.20	274.70	0.00	3.57	0.18	3.22	3.92

Source: Field Survey, 2022

The results from Table 7 show that the difference in income between non-participants and participants of FBS is statistically significant. This is indicated by the low p-value (0.00) 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 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.

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

Income	Levene's Test for Equality of Variance		t-test for Equality of Means						
	F	Sig	T	df	Sig	Mean	Std. Err.	95% Conf. Int. Lower	Upper
Equal variance assumed	21.34	0.00	3.55	301	0.00	-6524.17	1837.21	-10136.02	2912.32

Equal variance not assumed	- 4.30	346.85	0.00	-6524.17	1516.99	-9507.83	- 3540.51
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Source: Field Survey, 2022

Challenges participants face during FBS

The three (3) most pressing constraints, as indicated in the table 8 were; the Farmer Business School content does not address the needs of farmers (mean= 2.02), No visits beyond the training (mean= 2.71), Farmers who graduated from FBS were not given certificates (mean= 3.26). The last three constraints were; Farmer Business School facilitators not providing participating farmers with manuals (mean= 7.00), Exchange programmes don't encourage peer engagement. (mean= 7.73) and Farmers couldn't get loans (mean= 8.36). According to the examination of Kendall's Coefficient of Concordance, 69% of the farmers agreed on the ranked 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 does 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 to negatively affect the participation of farmers in the Farmer Business School.

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 visits beyond the training	2.71	2 nd
Farmers who graduated from FBS were not given certificates	3.26	3 rd
Farmers dropped out of the FBS because the facilitators were not there to lead the training sessions.	3.99	4 th
There weren't any field trips (visiting fellow FBS participants in other districts to learn what other FBS 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
Exchange programmes don't encourage peer engagement.	7.73	8 th
Farmers couldn't get loans	8.36	9 th
Kendall's $W_a=0.69$		
Chi-Square=1103.40		
P-value=0.000		

Source: Field Survey, 2022

4. Conclusions and Recommendations

From the results, the study concludes 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 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 programme. The above recommendations, if implemented, can help ensure that FBS achieves its full potential as a tool for improving the welfare of cocoa farmers.

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