

Full Length Research Paper

Socioeconomic profile and farm management practices of smallholder cocoa farmers in three cocoa producing districts in Southwestern Ghana

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There is paucity of knowledge about the current socioeconomic status and farm management practices of cocoa farmers in Ghana. And not up-to-date an accurate knowledge of socioeconomic profile and farm management practices of cocoa farmers is necessary to ensure sustainable cocoa production. In this study, we assessed socioeconomic profile and farm management practices of smallholder cocoa farmers in three cocoa producing districts in Southwestern Ghana. The study was conducted using a multi-stage sampling technique to select farmer households for interviews. In total, 180 farmer households were interviewed on socioeconomic characteristics and 60 of them were interviewed about their farm management practices. Statistical analyses were carried out through chi-square and regression analyses. Most (73.9%) of the farmers interviewed were males and 76.7% of them were above 40 years. The age and sex groups of farmers were significantly different among districts. 28.9% of farmers have no formal education, while 66.7% have up to basic education. Majority of the farmers (53.3%) have household size within the range of 6 to 10 persons. Ethnic backgrounds of farmers were mostly locals and migrants in the three districts. About 78.3% cultivate hybrid type of cocoa. The methods of land acquisition as well as farmers experience in cocoa farming were different in the three districts. On farm management practices, about 75% applied fertilizer on their farms, 73.3% adopted manual means of weeds control, and over 80% of farmers applied insecticides against pest. The present study has revealed significant differences in factors of socioeconomic characteristics and farm management practices of smallholder farmers in cocoa-growing areas of Ghana and has implications for achieving sustainable cocoa production.

Key words: Cocoa, socioeconomic factors, farm maintenance, West Africa.

INTRODUCTION

Cocoa (*Theobroma cacao* L) is one of the most important cash crops cultivated throughout the humid tropics of

West Africa, Southeast Asia, South America and the Caribbean (Ruf and Schroth, 2004), but majority of the

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world's cocoa comes from the West African sub-region (Asare, 2005; Boateng, 2008). Cocoa is one of the major foreign exchange earners for some countries in Africa such as Ghana, Cote d'Ivoire, Nigeria, and Cameroon (Nkamleu et al., 2010).

Cocoa is a small tree of about 4 to 8 m tall and is grown primarily in three tropical regions, namely, Southeast Asia, Latin America, and West Africa. However, the vast majority of the world's cocoa comes from West Africa, where it is estimated that the crop is cultivated on over five million of hectares of land (Ruf and Schroth, 2004). Within the West Africa, cocoa production has for the past 100 years been the leading export of the region (Gockowski et al., 2004) and accounts for about 55% of total household income (IITA, 2002).

In Ghana, the cocoa sector is critically important as it accounted for 8.2% of national GDP and 30% of total export earnings in 2010 (Ghana Statistical Service, 2010). Ghana is the second largest producer and second largest world exporter of cocoa beans after Cote d'Ivoire. About 90% of the country's cocoa is grown on smallholder farms. It is estimated that 700,000 households in Ghana are growing cocoa, mostly on 2 to 3 hectares of land (ICCO, 2010) and the crop accounts for over 67% of total household income (Kolavalli and Vigneri, 2011). Cocoa cultivation in Ghana depend mostly on rain fall and cocoa farmers continue to rely on traditional methods such as the hoe and cutlass method for farming (GAIN, 2012). It is noteworthy that although Ghana is one of the top producers of cocoa in the world, yields are a bit low compared to Cote d'Ivoire (Mohammed et al., 2011).

Many factors account for the low productivity of cocoa including socioeconomic characteristics and farm management practices (Baffoe-Asare et al., 2013). Studies on the socioeconomic characteristics and farm management practices of cocoa farmers have been reported from many cocoa-growing areas (Juhrbandt and Ba`rkmann, 2008; Bisseleua et al., 2013; Vaast and Somarriba, 2014). In Ghana, there is a plethora of studies on socioeconomic characteristics of smallholder cocoa farmers (ISSER, 2001; Baffoe-Asare et al., 2013). Studies on farm management practices such as fertilizer application have also been reported (Appiah et al., 1997; Ghana Cocoa Board, 2002). Evidence suggests that growth in the cocoa sub-sector has been achieved through the adoption of improved farming practices (Baffoe-Asare et al., 2013). However, there is a dearth of knowledge about differences in socioeconomic characteristics and farm management practices of cocoa farmers in cocoa growing areas in Ghana. Up-to-date and accurate knowledge of the socioeconomic profile and farm management practices of cocoa farmers is necessary for sustainable cocoa production (Aneani, 2012).

The purpose of this study was to investigate socioeconomic status and farm management practices of

smallholder farmers of Ghana. Specifically, the objectives of the study were to: (1) evaluate differences in socioeconomic characteristics and farm management practices among the three cocoa districts; and (2) determine the relationships between factors of socioeconomic characteristics and farm management practices.

MATERIALS AND METHODS

Study area

The present study was carried out in three districts producing cocoa in Southwestern Ghana. The three districts were Twifo-Heman Lower Denkyira district (5° 50' - 5° 51' N, 1° 50' - 1° 10' W) in the Central Region, Bia district (6° 20' N - 6° 38' N, 2° 58' - 3° 58' W) in the Western Region and Atwima-Mponua district (6° 32' - 6° 75' N, 2° 00' - 2° 32' W) in the Ashanti Region. Mean monthly temperature in the selected districts is between 24 and 30°C. The average annual rainfall in the three districts is above 2000 mm. Vegetation type varies from wet semi equatorial to moist semi deciduous forest (Forestry Commission, 2010). Geology comprises of the Lower Birrimian rock series, a pre-Cambrian formation that dominates the Ghanaian forest zone (Forestry Commission, 2010). The underlying rocks are acidic in nature. However, illegal lumbering and farming along the reserves serves as the main source of livelihood for the inhabitants.

Data collection

The data used in this study was obtained from smallholder cocoa-growing farmer households using a multi-stage sampling procedure. The first stage in the selection of farmers' involved purposive selection of three cocoa growing districts since the chunk of the country's cocoa comes from those districts. The second stage involved random selection of two communities per district based on willingness to cooperate and history of cocoa production. In total, 180 cocoa farmer households were interviewed for socioeconomic characteristics and 60 households for farm management practices. Thirty households per community were selected for evaluation of socioeconomic characteristics of farmers. Data collection was achieved using a semi-structured questionnaire for interviewing of farmers. The first part of the interviews was for socioeconomic characteristics. The questionnaire used was pre-tested on a sample size of 60 households based on the number of plots demarcated per community and adjustments made before used (Larson et al., 2011). Household heads were asked specific questions relating to their age, sex, marital status, educational background, ethnic group, years of farming cocoa, family size and sources of energy and water. The second part of the interviews was about farm management practices; 10 household heads per community, including those surveyed for socioeconomic characteristics were interviewed about routine farm management practices. Farmers were asked various questions about fertilizer application, weeding, herbicide and pesticide applications, and pruning of trees. Data were also collected on ways of land acquisition, sources of labour and varieties of cocoa planted.

Statistical analysis

Descriptive statistical analysis was performed to summarize factors of socioeconomic characteristics and farm management practices of cocoa farmers. The results of the descriptive statistics are

presented in the form of tables and graphs. In order to determine differences in factors of socioeconomic characteristics and farm management practices among the three districts chi-square analysis was carried out. The factors were coded following a binary choice model as either present (1) or absent (0). Regression models were used to evaluate the relationships between factors of socioeconomic characteristics and farm management practices. The models were fitted separately between factors of socioeconomic characteristics, and fertilizer application, pest and disease control, and weeds control and pruning. Data analysis was achieved using SPSS software and a p-value of ≤ 0.05 was considered as significant.

RESULTS

Socioeconomic characteristics

About (32.8%) of the cocoa farmers in the three districts were between 41 and 50 years of age. However, distribution of number of farmers in age groups ($\chi^2 = 22.1$, $p < 0.05$) varied among the three districts. There were more people above 60 years in the Twifo-Heman Lower Denkyira district, whereas most of the farmers in Atwima-Mponua district and Bia district are between 41 and 50 years (Table 1). Males formed 73.9% of the farmers and 83.8% of them were married. Sex group of farmers was significantly ($\chi^2 = 2.9$, $p < 0.05$) different among the three districts. Most (66.7%) of the farmers had only basic level education and household size was mostly 6 to 10 persons. Ethnic backgrounds of farmers in the districts were different ($\chi^2 = 81.9$, $p < 0.001$). Major source of water used by farmers in all the three districts was borehole. About 98% of the farmers depended on the national grid for their source of electricity.

Farmers differed in terms of experience, that is, number of years in cocoa cultivation in the three districts ($\chi^2 = 22.7$, $p < 0.05$). Most of the farmers in Twifo-Heman Lower Denkyira district (53.3%) and Bia district have been involved in cocoa over 16 years, whereas (31.7%) of farmers in Atwima-Mponua district have 6 to 10 years of experience in cocoa farming. Overall, about 52.8% of farmers have access to extension services in the three districts.

More than half (57.2%) of the farmers cultivated about 0.4 to 2.0 hectares of cocoa farm whereas 11.1% owned cocoa farms greater or equal to 6.4 hectares. Means of acquisition of land for cocoa cultivation varied among the districts ($\chi^2 = 30.3$, $p < 0.001$). In total, about 58% of farmers obtained land for cocoa cultivation through inheritance whereas only 2.8% did outright purchase. In Twifo-Heman Lower Denkyira district about 85% of the farmers interviewed inherited land for cocoa cultivation as compared to Atwima-Mponua district and Bia district, which are, 62.5% and 46.7, respectively. Majority (78.3%) of farmers cultivated hybrid type of cocoa but the proportion of farmers who cultivated the various cocoa varieties was different in the districts ($\chi^2 = 21.3$, $p < 0.001$). Source of labour on cocoa farms was mostly self

(44.4%) followed by the use of hired farm laborers (35.6%) and then family members (20%).

Fertilizer application

In total, 75% of the farmers interviewed apply fertilizer on their farms. About 46.7% of farmers apply *Asasewura* fertilizer (locally formulated fertilizer). The types of fertilizer used, however, differ in the three districts ($\chi^2 = 31.3$, $p < 0.001$). For instance most of the farmers in Twifo-Heman Lower Denkyira district (55%) use *Asasewura* fertilizer, whereas those in Bia district used mostly (65%) *Cocofeed* fertilizer. Farmers in Atwima-Mponua district used equal proportions of *Asasewura* and *Sidalco* fertilizers. The most (51.7%) common method of fertilizer application in all the three districts was broadcasting. Foliar method of fertilizer application was recorded in Twifo-Heman Lower Denkyira district and Atwima Mponua district, whereas ring method of fertilizer application was recorded only in the Twifo-Heman Lower Denkyira district. In Bia district, the only method of fertilizer application was broadcasting. Three periods of fertilizer application were recorded and about half (51.2%) of farmers apply fertilizer in April-June period (Table 2). The type of fertilizer applied was positively correlated with farm size ($r^2 = 0.11$, $p < 0.05$), farmers' experience ($r^2 = 0.11$, $p < 0.05$) and access to extension services ($r^2 = 0.11$, $p < 0.05$). Farmers' age was negatively related to the period of fertilizer application ($r^2 = -0.001$, $p < 0.05$), although, younger cocoa farmers apply more fertilizers than older farmers. Access to extension services was positively correlated with method of fertilizer application ($r^2 = 0.09$, $p < 0.01$). The quantity of fertilizer applied differed in the three districts ($\chi^2 = 7.9$, $p < 0.01$) and was positively influenced by farmers' age ($r^2 = 0.32$, $p < 0.05$), sex ($r^2 = 0.32$, $p < 0.05$) and type of land acquisition ($r^2 = 0.32$, $p < 0.05$).

Pest and disease control

Pest and disease control was achieved through mainly spraying of cocoa farms with insecticides for capsids and fungicides for black pod disease (Table 3). About 38.3% of cocoa farmers spray cocoa farms against capsids thrice in a year. Overall, about (78.3%) of the farmers apply 1 to 3 containers/ha (a container is equivalent to 1 L) of insecticide on farms and this was mostly (61.7%) achieved in April-June period. The amount of insecticide applied, frequency of spraying per year as well as periods of spraying cocoa farms against capsid were not statistically different in the three districts ($p > 0.05$ for all analysis). Frequency of spraying against black pod disease differed in the three districts ($\chi^2 = 28.0$, $p < 0.01$). Farmers in Bia district, commonly spray farms thrice per year whereas those in Twifo-Heman Lower Denkyira

Table 1. Summary of socioeconomic characteristics of farmers interviewed.

Factors	Group	Twifo-Heman LowerDenkyira district	Atwima-Mponua district	Bia district	Total frequency
Age	≥ 20	0	3	2	5
	21-30	4	2	4	10
	31-40	4	12	11	27
	41-50	13	22	24	59
	51-60	18	9	12	39
	>60	21	12	7	40
Sex	Male	49	41	43	133
	Female	11	19	17	47
Marital status	Married	52	47	52	157
	Single	8	13	8	29
Formal education	Basic level	43	39	38	120
	Secondary	4	1	3	8
	None	13	20	19	52
Household size	1-5	27	25	21	73
	6-10	30	30	36	96
	≥ 11	3	3	3	11
Ethnicity	Akan	58	43	29	130
	Sefwi	1	3	28	32
	Other	1	14	3	18
Source of electrical energy	National grid	60	59	59	178
	Lantern	0	1	1	2
Source of water	Bore hole	57	55	38	150
	Hand-dug well	1	3	21	25
	Bore hole/stream	2	2	1	5
Farmers' experience (years)	1-5	9	11	14	34
	6-10	13	19	15	47
	11-15	6	19	13	38
	≥ 16	32	11	18	61
Farm size (hectares)	0.4-2	44	30	29	103
	2.4-4	12	14	19	45
	4.4-6	1	6	5	12
	≥ 6.4	3	10	7	20
Access to extension service	Yes	21	36	36	93
	No	39	24	24	87
Land acquisition	Inheritance	51	25	28	105
	Shared cropping	6	24	25	55
	Leasehold	3	8	4	15
	Outright purchase	0	3	2	5

Table 2. Results on fertilizer application by farmers in their cocoa farms

Factors	Groups	Twifo-Heman Lower Denkyira district	Atwima- Mponua district	Bia district	Total frequency
Period of year of application	January-March	1	4	1	6
	April-June	11	6	13	31
	July-September	0	2	2	5
	October- December	2	0	0	2
Quantity apply/ha	1-3 bags	8	4	8	21
	1-3 L	5	9	7	21
	> 3 L	1	0	1	2
Method of application	Broadcasting	6	8	16	31
	Ring application	6	0	0	6
	Foliar application	2	5	0	7
Frequency of application per year	Once	11	10	13	21
	Twice	1	3	3	14
	Thrice	2	0	13	9
Type of fertilizer	<i>Asasewura</i>	11	6	3	21
	<i>Cocofeed</i>	0	1	13	14
	<i>Sidalco</i>	3	6	0	9

Table 3. Data on results of spraying of cocoa farms for control of capsids and black pod disease.

Factors	Group	Twifo-Heman Lower Denkyira district	Atwima-Mponua district	Bia district	Total frequency
Frequency of spraying insecticide against capsids	Once	5	3	1	9
	Twice	4	8	5	18
	Thrice	6	7	10	23
	> 4 times	5	1	2	8
Quantity of insecticides sprayed	1-3 L	14	14	18	47
	4-6 L	6	5	0	11
	> 6 L	5	1	1	2
Periods of year application of insecticide	April-June	10	11	15	37
	July-September	3	4	3	10
	October-December	1	2	0	3
	January-March	6	3	0	9
Frequency of spraying fungicide against black pod disease	Once	9	8	0	17
	Twice	8	3	2	13
	Thrice	0	4	11	16
	≥ 4 times	3	4	5	12
Period of application of fungicides	April-June	17	11	7	38
	July-September	3	8	11	22
	October-December	0	1	1	1

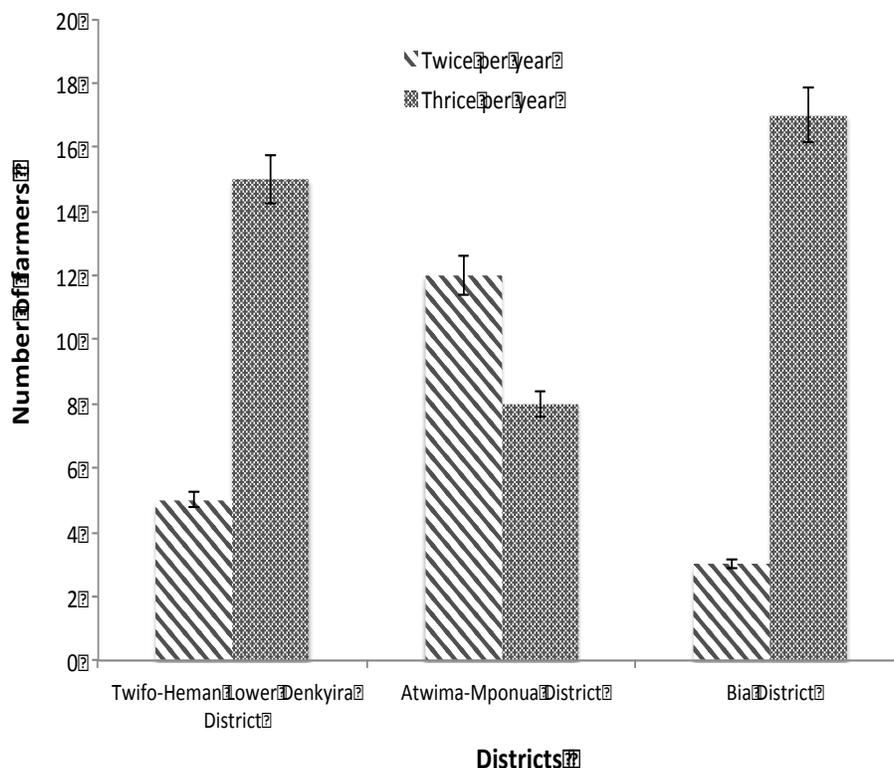


Figure 1. Comparison of frequencies of weeding cocoa farming farms in the three districts. Error bars represent \pm 95% confidence limits.

district and Atwima-Mponua district spray once per year. The most common period of spraying against black pod disease was in April-June (63.3%), followed by July-September (36.7%). A few of the farmers spray in October-December. Frequency of spraying against capsid positively related to farmers age ($r^2 = 0.08$, $p < 0.05$), experience ($r^2 = 0.08$, $p < 0.01$) and farm size ($r^2 = 0.08$, $p < 0.001$). Means of land acquisition positively influenced the period of spraying against capsid ($r^2 = 0.08$, $p < 0.05$).

Weeds control and pruning

About 73.3% of farmers adopted manual means of weed control using hoes and cutlasses; 25% used both manual methods and herbicides and 2.2% used only herbicides. The 2.2% of the farmers who apply herbicides on their farms used mainly *Glyphos*. No significant difference in the methods of weeds control was detected in the three districts ($p > 0.05$); although, frequency of weeding varied ($\chi^2 = 14.8$, $p < 0.001$). In Bia district and Twifo-Heman Lower Denkyira district, farmers commonly control weeds in farms thrice in a year, whereas in Atwima-Mponua district, they mostly weed farms twice in a year (Figure 1). Significant difference ($\chi^2 = 15.4$, $p < 0.01$) was found in the frequency of pruning of cocoa trees in the

three districts (Figure 2). With exception to educational status of farmers, none of the other socioeconomic variables correlated with weed control and pruning of cocoa farms. Educational status of farmers was positively related to the frequency of pruning ($r^2 = 0.14$, $p < 0.01$). The periods of pruning were the same in the three districts as 70% of the farmers prune cocoa trees between January and March (Figure 3).

DISCUSSION

The results of present study agree with previous studies that cocoa farming is a male dominated occupation (Aneani et al., 2012; Boateng et al., 2014; Osarenren and Emokaro, 2015; Taiwo et al., 2015). Generally, most of the farmers were in the middle age group suggesting the future of cocoa production in the study areas is blissful. More than half of the farmers had received basic education and this however, may or may not guarantee for the adoption of research recommendations.

Household size was between 6 and 10 persons, which presuppose that farmers may have more family members to help in the daily routines of the farm. According to Effiong (2005), a relatively large household size enhances the availability of family labour, which reduces constraints on labour demand in agricultural production.

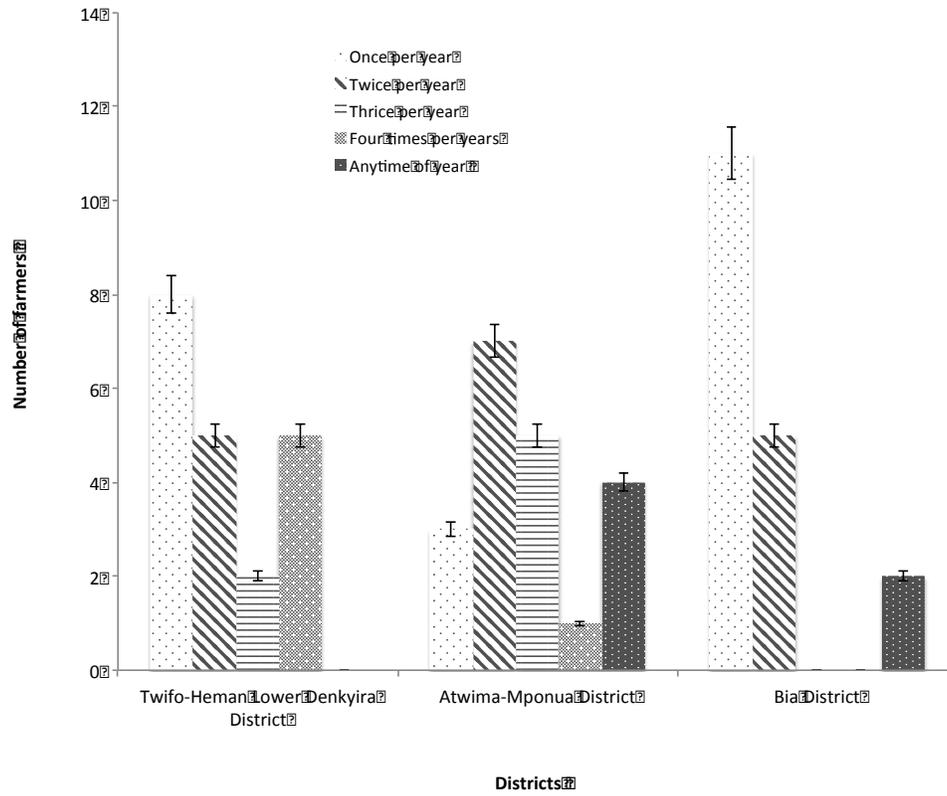


Figure 2. Comparison of frequencies of pruning cocoa trees in districts. Error bars represent \pm 95% confidence limits.

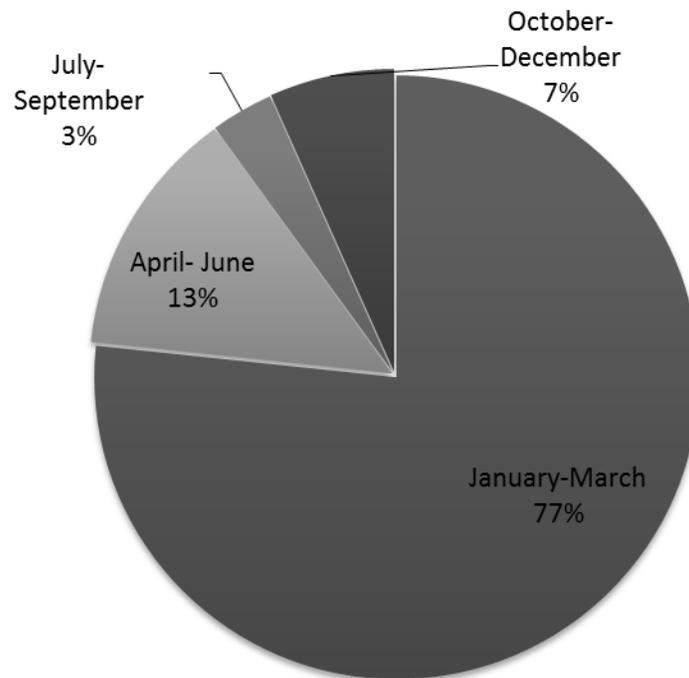


Figure 3. Proportions of farmers pruning cocoa trees in different periods of the year.

The maintenance of cocoa farms and subsequent increase in productivity is often associated with farmers' experience. In this study, majority of the farmers have gained experience in their quest to cultivate cocoa. For instance, farmers in Twifo Heman Lower Denkyira district have gained more experience regarding the variety to be cultivated and pattern of rainfall over time. It is of general opinion that experienced farmers have better knowledge about climatic conditions and market situations and are thus expected to run more efficient and profitable enterprise (Effiong, 2005). The farm size distribution of the cocoa farmers showed that most cocoa farmers were smallholders growing cocoa on 0.4 to 2.0 hectares of farmland. This observation agrees with previous report by Osarenren and Emokaro (2015), who observed majority of smallholders growing cocoa on less than 10 hectares of farmland. In this study, most of the farmers cultivate hybrid cocoa variety as recommended by Cocoa Research of Ghana (CRIG) for higher productivity. Wiredu et al. (2011) in a related study reported that the adopters of hybrid cocoa varieties gained an additional yield of 0.32 ton/ha. Land acquisition by farmers in the different districts was mostly by inheritance as some land owners tend to give out parcels of land for shared croppers to manage. Findings of the study showed that most farmers had access to extension service delivery. This assertion is in line with previous study conducted by Onumah et al. (2014) who reported that about 83.7% of cocoa farmers in Ghana have access to extension service.

The use of fertilizers on cocoa farms has been reported to boost production. For example, studies have shown that fertilizer application increased yields from 250 to 1,500 kg per hectare after the 4th year of application (Ghana Cocoa Board, 2002). The results of this study showed that most farmers have adopted the use of fertilizers on their farm for higher productivity whilst few do not apply due to financial difficulty. The type of fertilizer applied varied in the districts as majority preferred "Asasewura" fertilizer to "Cocofeed" and "Sidalco" fertilizers since it was the first to be introduced by the Cocoa Research Institute of Ghana. The common method of fertilizer application in the different districts was broadcasting, while majority applied once in a year. This observation is in line with previous study by Baah et al. (2011), who reported that most farmers applied fertilizers once annually and preferred the broadcasting method of application. The recommendation of the Cocoa Research Institute of Ghana (CRIG, 1987) is that fertilizers should be applied once a year at the beginning of the rains (April-May) and the quantity of fertilizer applied should be three bags per acre. This recommendation had been adopted by majority of farmers in the study areas.

Smallholder cocoa farmers in Ghana use insecticides and fungicides to control capsid and black pod disease infestations. Of concern, however, is the fact that the

amount of application differ in the different study sites. The use of agrochemicals is more common in the Bia district since most farmers perceived it as an efficient means of controlling weeds. The wrong use of chemicals on cocoa farms exposes farmers to some risks due to the hazardous effects. The residual effect of the chemicals on cocoa also constitutes concern if the chemicals are not properly handled. According to Atu (1990), pesticides are toxic and can have serious health hazards to human beings.

In this study, most of the farmers applied manual hand weeding of cocoa farms with only very few farmers using herbicides. Hand weeding of cocoa farms is labour intensive and could potentially limit the size of cocoa farms that a farmer can effectively manage. This could perhaps explain the reason why cocoa farming is a male dominated profession (Aneani et al., 2012). The difference detected in frequency of weeding cocoa farms could be a factor of vegetation type and climate. The use of herbicides could be an indication that cocoa farmers are adopting chemical means of weed control and this might increase in the future. The results of this study is similar to that of Aneani et al., (2007), who indicated that few cocoa farmers (5.7%) used weedicides to control weeds on their farms, with the majority (92.7%) relying on manual weeding. However, the improper use of herbicides especially at the seedling stage could affect cocoa plant and might have consequence on the ecosystem (Owusu-Manu, 1985). The use of herbicides may affect the activities of soil microbes and hence decomposition of plant litter. Pruning of cocoa trees has the potential of minimizing the incidence of diseases and increase aeration thereby improve yield quality. The study shows that most of the farmers prune their cocoa farms at least once in a year, which is in line with CRIG recommendation (CRIG, 1987).

One of the major findings of this study is that it has revealed differences in factors of socioeconomic characteristics of farmers in the districts. For example, in this study, most farmers in Twifo Heman Lower Denkyira district were above sixty years, whereas farmers in other districts were between 41 and 50 years of age. The implication of this is that farmers in Twifo Heman Lower Denkyira district may not be as efficient and effective to adopt research recommendations since older people may not be able to adopt innovations (Baffoe-Asare et al., 2013). Experience largely influenced farmer's decisions regarding variety to be cultivated and time of planting. However, despite the rich experience gained by farmers in Twifo Heman Lower Denkyira district, this did not reflect on the performance of the cocoa farms compared to other districts where farmers have less experience. The reason could be that the farmers are older here. According to Oladele (2007), experience contributes to farmers' ability to improve on their farm operations or activities. Result of the study revealed differences in household size of farmers across the districts. That is

while farmers in Bia district had more family members to contribute to cocoa cultivation, farmers in Atwima Mponua and Twifo Heman Lower Denkyira districts on the other hand had few family members to assist in the daily routines of the farm. The study also showed variations regarding farm size of cocoa farmers in the three districts. For instance farmers in the Bia district possess large farmlands compared to those in Twifo Heman Lower Denkyira district whose farmlands are small due to excessive fragmentation.

In this study, binary regression model was used to determine the effect of socioeconomic variables on farm management practices in the three districts. Generally, six variables out of twelve included in the model were significant in explaining the relationship between socioeconomic variables and farm management practices. The positive sign of age of farmers indicate that young cocoa farmers in the study areas have greater likelihood of investing more in agrochemicals and easily to understand and apply innovations as directed by cocoa extension agents. This observation confirms previous study by Nkamleu and Adesina (2000) who reported that young cocoa farmers are generally more likely to adopt new agricultural technologies than older ones. The positive coefficient sign of farm size and frequency of spraying indicates that farmers with larger farm sizes are also more likely to spend more in agrochemicals like insecticides and fungicides. This supports previous studies by Nkamleu et al. (2007) who documented positive correlation between total area cultivated and adoption of agrochemicals. The coefficient of educational status of cocoa farmers is positively signed and significant indicating that educated farmers are more likely to know when to prune their cocoa trees within the cropping season.

CONCLUSION AND RECOMMENDATIONS

It can be drawn from the study that the country's cocoa cultivation is greatly affected due to ageing of experienced cocoa farmers and other related factors. The vast majority of Ghanaian youth with the requisite knowledge and skills perceived cocoa farming as unattractive and longtime venture whilst they look for jobs with better remuneration. The present study also revealed significant differences in factors of socioeconomic profile and farm management practices of smallholder cocoa farmers which may have a serious implication for the attainment of cocoa production targets for the country. The relationship between farm management practices and socioeconomic characteristics of cocoa farmers were thoroughly investigated.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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