3.8.2. Data collection

The data collection process was done between February 8th and March 2nd, 2014. It was mainly by interviewing the respondents in their farms and homes. The Twi language was the main language because it is one of the main languages spoken in the study area. At least forty (40) minutes was spent on each respondent to collect all the needed information to satisfy the study. The data collection exercise was done with the help of two research assistants who are extension agents with the Cocoa Health and Extension Division (CHED) of the Ghana COCOBOD. They were taken through the research problem, research questions, relevance of the study, the questionnaire and the expected outcome of the study.

3.9 Data Analysis

Coding was first done for data collected from the field. The Microsoft Excel 2010 and the Statistical Package for Social Sciences (SPSS) version 16.1 were the two computer software programmes used in the analysis of data that was collected from the field. Both descriptive and inferential statistics were conducted for the analysis of the data. The important statistical measures that were used to summarize and categorize the research data were means, percentages, frequencies, and standard deviations. The qualitative data were partly analysed on the spot during data collection to avoid forgetting and to be able to fill the gaps in the quantitative data. The inferential statistics included chi square test of independence, and multiple linear regression analysis.

The following equations were developed for the regression analysis:

Objective 1: $INFACC = a+B_1SX + B_2AG + B_3MS + B_4EL + B_5HS + B_6FO + B_7OW + B_8FS + B_9LT + B_{10}OC + B_{11}YF + B_{12}CA + B_{13}FM + B_{14}DM + B_{15}GM + B_{16}INPR + B_{17}INSK + B_{18}ATTO + B_{19}ACMT + Ɛ$

Objective 2: $INFUSE = a+B_1SX + B_2AG + B_3MS + B_4EL + B_5HS + B_6FO + B_7OW + B_8FS + B_9LT + B_{10}OC + B_{11}YF + B_{12}CA + B_{13}FM + B_{14}DM + B_{15}GM + B_{16}INPR + B_{17}INSK + B_{18}ATTO + B_{19}ACMT + Ɛ$

Objective 3: $INFUSE = a+B_1FRQINF + B_2TMSINF + B_3CLANINF + B_4CINF + B_5RVINF + Ɛ$

Where
a = y intercept,
Ɛ = error,
B = slope of the relationship,
INFACC = Access to agricultural information,
INFUSE = Use of agricultural information.
SX = Sex,
AG = Age,
ML = Marital status,
EL = Educational,
FM = Farm size,
FO = Farm ownership type,
LT = labour availability,
HS = Household size,
YF = Years in farming,
OW = other work,
OC = Cultivation of other crops,
AC = Access to credit,
FM = Frequency of market visit,
DM = Distance to market,
GM = Group membership,
INNPRO = Innovation Proneness,
INFSK = information seeking behaviour,
ATTTO = attitude towards improved farming practices,
ACHMO = achievement motivation,
FRQINF = Frequency of information access,
TMSINF = Timeliness of information access,
CLANINF = Clarity of language used for dissemination,
CINFO = Clarity of language disseminated and
RVINF = Relevance of information disseminated

Gamma co – efficient was used to measure the strength of association between dependent and independent variables in the Chi square analysis. The value of the

coefficient ranges from -1 to +1 with the sign telling the direction of the relationship. A negative sign means that as one increase the other decreases and a positive sign means as one goes up so does the other, the closer the value to +1 or -1, the stronger the relationship (Göktaş & İşçi, 2011). Cohen's (1988) categories for interpreting the strength of correlation coefficients were used to explain the strength of the associations. 0.1 to 0.29 means small, 0.3 to 0.49 means medium and 0.5 to 1.0 means large.

3.10 Analytical Methods

Five main concepts were used as the basis of analysis for the study. They were the socio-economic characteristics of the farmers, the institutional factors and the farmers' orientation towards improved farming. The rest were access to agricultural information, use of agricultural information and farmers' livelihood outcomes. The variables that were used for socio-economic characteristics were gender, age, marital status, educational level, labour availability, off-farm work and additional crops cultivated. The institutional factors included; access to credit, frequency of market visit, distance to market and group membership. The following variables were used to explain farmers' orientation towards improved farming; information seeking behaviour, attitude towards improved farming practices, achievement motivation and innovation proneness.

The variables that were used for access to agricultural information included frequency of access, timeliness of access to information, clarity of language for dissemination clarity of information disseminated and the relevance of the information. The use of information was arrived at using the frequencies of use of information. Finally, the variables that were used to explain 'livelihood outcomes' included; cocoa yield per

hectare, farmers' average annual income, satisfaction of basic needs and assets possessed by respondents.

3.10.1 Level of access to agricultural information

In the determination of the level of access to agricultural information, the number of sources that a respondent have access to were taken into consideration. There is a higher level of access if the numbers of sources are more and vice versa (Rehman et al., 2013). The indicators considered in the determination were; frequency of access to the information, timeliness of access of the information, clarity of language used in the dissemination, clarity of information disseminated and relevance of information disseminated. Farmers were first asked to state their sources of agricultural information out of nine possible sources. A Likert scale of 1 – 5 was used for the administration as in Table 3.4.

Table 3. 3: Table of indicators measuring level of access to agricultural information.

Parameter	Likert Scale				
	1	2	3	4	5
Frequency of access	Yearly	Every six months	Quarterly	Monthly	Weekly
Timeliness of access	Never on time	Rarely on time	Sometimes on time	Often on time	Always on time
Clarity of language	Never clear	Rarely clear	Sometimes clear	Often clear	Always clear
Clarity of information	Never clear	Rarely clear	Sometimes clear	Often clear	Always clear
Relevance of information	Never relevant	Rarely relevant	Sometimes relevant	often relevant	Always relevant

In analysing the likert scale, the items were combined into a single composite score (Boone & Boone, 2012). With a minimum score of 5 and maximum 175, the

composite scores were then trichotomized into Low (5 – 61), moderate (62 – 119) and High (120 – 175) as used by Rehman et al. (2013).

3.10.2 Level of use of agricultural information.

The level of use of agricultural information was based on the frequency of use of the sources indicated by the farmers based on a scale of 1 to 4 namely; 1 = never, 2 = rarely, 3 = sometimes and 4= always. The sources were COCOBOD/MoFA, Input dealers, NGOs/private extension and TV. The rest were Radio, Farmer groups and Friends.

A summation of the frequency of usage of the information from these sources was done and based on a total score of 28, three levels were arrived at. The respondents who did not use the information accessed often were termed low level users (1 – 10), moderate (11 – 18) users are the farmers who used accessed information adequately and high level users (19 – 28) used information frequently. Baah (n.d) termed these classes of farmers as low, medium and high class respectively.

3.10.3 Level of farmers' attitude towards improved farming practices

The attitude of the farmers towards improved farming practices were evaluated by their degree of agreement (Jha, 2009). A set of statements were presented to respondents and asked to express their agreement or disagreement according to a five point scale. Each degree of agreement was given a numerical value from one to five, thus a total numerical value was calculated from all responses. Table 3.5 presents the likert scale for the measurement of farmers' attitude towards improved farming practices.

Table 3. 4: Scale for measuring farmers' attitude towards improved farming practices

Statement	Likert Scale				
	1	2	3	4	5
Positive	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Negative	Strongly agree	Agree	Neutral	Disagree	Strongly disagree

A total of 8 statements were presented for the attitude analysis, four positive statements and four negative statements. The maximum and minimum scores were 40 and 8, respectively. For the description of responses to each question, the scale was further trichotomized as High (30 - 40 points), Moderate (19 - 29) and low (8 - 18).

3.10.4 Level of Innovation Proneness

In the determination of innovation proneness, farmers were presented with ten agricultural innovations that were familiar to them and asked which ones they use on their farms and how quickly they accepted these technologies based on a measurement scale. For every innovation, respondents were required to rank their responses on a scale of 1 to 4 (Table 3.6). With a total score of 40 and a minimum of 10 three levels were arrived at as in Table 3.5.

Table 3. 5: Scale for the measurement of innovation proneness

Likert scale	1 = not accepted 2 = accepted after most people have accepted, 3 = accepted after consulting others and 4 = accepted whenever exposed to it
Categories	low (10 – 20), moderate (21 – 30) and High (31 – 40)

3.10.5 Level of Farmers' Information Seeking Behaviour

Eight different practices were used to assess farmers' information seeking behaviour. Farmers were asked their frequency of seeking new information on these practices on

the farm which increases production levels using a scale of 1 – 5 (Table 3.7). The responses were added into a single score and with a minimum score of 8 and a maximum score of 40, farmers were categorized into low, moderate and high (Table 3.6).

Table 3. 6: Scale for the measurement of information seeking behaviour

Likert scale	1 = never, 2 = rarely, 3 = sometimes, 4 = often and 5 = always
Categories	low (8 – 18), moderate (19 – 29) and High(30 – 40)

3.10.6 Level of farmers' Achievement Motivation

Achievement motivation was operationally defined as the desire of the farmer to produce more and more in the production process. Respondents were presented with eight (8) statements on practices on the farm that increase and protect cocoa yield and were asked for their response on a five scale category (Table 3.8). The responses were then added and out of a total score of 40 and a minimum of 8, a categorization of low, moderate and high levels of achievement motivation were determined.

Table 3. 7: Scale for the measurement of farmers' achievement motivation.

Likert scale	1 = never, 2 = rarely, 3 = sometimes, 4 = often and 5 = always
Categories	low (8 – 19), moderate (20 – 30) and High(31 – 40)

3.10.7 Level of Farm Yield

Cocoa yield was measured by considering the cocoa yield per hectare of farm size. The yield was put into three different categories based on Baah (n.d). He classified cocoa farmers' into three according to their yield levels and technology used; low technology users with an average yield of (350kg/ha), medium technology users with

an average yield of (650/Ha) and high technology users with an average yield of (1400kg/ha).

3.10.8 Level of farmers' average annual Income

Farmers' income was computed by summing all the income they receive for the year from the following: Sale of cocoa, Income from animal sales, Income from sales of other crops, Food crops and animals consumed, Food crops given as gift, Income from wages and salaries, income from remittances and Income from personal services on the farm. A summation of the amount stated for the various income sources was used as the farmers' average annual income. The incomes were put into two categories; low and high. Farmers whose income was less than the mean income were considered as low and those whose incomes were above the mean were classified as high.

3.10.9 Level of farmers' wellbeing

In order to measure the wellbeing of the farmers, the following items were stated and farmers were asked to rank on a three-point scale their level of satisfaction. The items were daily food needs, clothing, water, shelter, education and health. A summation of the scores for each item was used as a grade for wellbeing. The satisfaction score for each farmer were put into three different categories (Table 3.8)

Table 3. 8: Scale for the measurement of wellbeing

Category	Range
Low	< 9
Moderate	10 – 15
High	16 – 18

3.10.10 Level of Basic household assets possession

In measuring the level of household assets possession, farmers were asked to mention the assets they possessed from a possible list of ten. Value for assets possessed was determined by summing all the assets possessed based on a scale of 1 to 5 according to the value of the product on the market. The assets were valued according to a scale of 1 – 5. Out of a total score of 23, the farmers were categorized into three; low, medium and high (Table 3.9).

Table 3. 9: Scale for the measurement of household assets possession.

Scale for assets measurement					Categories of farmers	
1	2	3	4	5	Category	Scale
Radio	TV	Mist Blower	Motor	Car	Low	0 - 9
Phone	Mattress				Moderate	10 - 16
Knapsack sprayer	Bed				High	17 - 23
	Bicycle					

3.11 Summary

This chapter provided a summary of the whole process from the research design, study area and selection of population. It also described data collection tools and process and how the data analysis processes and procedures. Operationalization of concepts used in the work was also explained.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

This chapter deals in depth with the presentation of the results of this work and a further discussion of the findings. The chapter looks also at a description of farmers' characteristics and the institutional factors influencing cocoa production. It considers cocoa farmers' level of access to and use of agricultural information. The next section takes a look at the livelihood outcomes of the cocoa farmers under study. It also looks at the relationship between farmers' characteristics, institutional factors and access to and use of agricultural information. It also considers the relationship between the level of access to agricultural information and its use. The next section discusses in detail the relationship between the level of use of agricultural information by the respondents and their livelihood outcomes.

4.2 Farmer Characteristics

Farmer characteristics comprising farmers' social, economic and orientation towards improved farming are discussed in the section.

4.2.1 Social characteristics of respondents

The social characteristics include variables such as gender, age, marital status, and educational status, household size and type of farm ownership. Table 4.1 displays the summary of the farmers' social characteristics.

Gender Distribution of Respondents

Table 4.1 show that majority (75%) of the respondents were males indicating that males are the dominant sex of household heads in cocoa farming in the Sefwi-Bekwai Cocoa District. The majority of the respondents being males is as a result of the target population (heads of households) who are mostly males provided there is marriage and even if a wife has a land from her family, it is usually cultivated with the male being the leader thus part of the family's farm. In the District the females are usually owners of the annual crops which they sell to take care of the daily needs of the households. This result is collaborated by Danso-Abbeam, Aidoo, Osei-Agyemang & Ohene Yankyera (2012) who found majority (91%) of cocoa farmers to be males. This finding is also similar to other countries in the West African sub-region where about 72.5% male cocoa farmers population is reported (Ogunleye & Oladeji, 2007).

Age of respondents

Majority of the farmers (72.7%) were between the ages of 35 and 60 years. This was followed by (14.6%) of the respondents who were above 60 years (Table 4.1). The results obtained shows that majority of the farmers (72.7%) are quite strong to undertake most of the difficult activities of farming. The mean age of the farmers who were interviewed was found to be 48.2 years. The minimum age of the farmers was 21 years and the maximum age was 80 years.

This shows a relatively ageing population of cocoa farmers and with only 12.7% of the youth engaged in cocoa farming indicating that they are not interested in cocoa farming. The low participation of the youth in cocoa farming is as a result of scarcity of land in the area which could only be inherited by children or bought from the chiefs at a very exorbitant price. With respect to age, 61.5% of the sample size was less than

50 years. This is a good news given that most studies (for example MASDAR, 1998; MMYE, 2008; Baah et al, 2010) have stated that most of the cocoa farmers have become old.

Table 4. 1: Social Characteristics of Farmers

Variable	Category	Frequency	Percentage
Sex	Male Female	195 65	75 25
Age	Up to 34 35 – 60 >60 (Old)	33 189 38	12.7 72.7 14.6
Marital status	Married Single	192 67	73.8 26.2
Educational Level	Low(≤JHS) High(>JHS)	224 36	86.2 13.8
Household Size	1 – 5 >5	104 156	40.0 60.0
Farm ownership	Solely owned Others	217 43	83.5 16.5

Source: Field Data, 2014

Marital Status Distribution of Respondents

The data presented in Table 4.1 depicts that majority of the respondents representing 73.8% were married, 26.2% of them were also single. According to Hainmueller, Hiscox & Tampe (2011), 76% of all cocoa farmers in Ghana fall within the married bracket. This agrees with the findings of this study where greater majority of 73.8% are married. Danso-Abbeam et al. (2012) also reports of 87% of cocoa farmers being married. The results also agree with findings from other cocoa producing West African countries where marriage percentages of cocoa farmers are high (Lawal, Torimiro, Banjo, & Joda, 2005; Adeogun, Olawoye, & Akinbile, 2010).

Educational Level of Respondents

Empirical data presented in Table 4.1 indicates that 86.2% of respondents had education up to the Basic level and below whiles 13.6% had education above the Basic level. This finding is not different from what has been reported in Ghana as Baah (2008) states that about 76.2% of cocoa farmers in Ghana had received education up to the basic level. The cocoa farmers survey also reveals about 73% of cocoa farmers in Ghana ending their formal education at Junior High / Middle school and below (Hainmueller et al., 2011). The results are also similar to the situation in the West African sub-region where farmer education levels are generally described as low (Ogunleye & Oladeji, 2007).

Household Size Distribution of Respondents

The data in Table 4.1 revealed that 60% of the respondents had a family size of above five (5) whiles 40% had a family size of five (5) and below. The average household size of the study was 6 which is similar to that reported by Hainmueller et al (2011) who found an average size of 5 in their cocoa farmers' survey in Ghana. Adebiyi & Okunlola (2013) report of 76.7% of cocoa farmers in Oyo State in Nigeria having a household size of 6 and above which generally is in conformity with this finding.

Farm ownership type

The data in Table 4.1 shows that majority (83.5%) of the farmers owned their farms and the remaining 16.5% were either share croppers or farmers who operated both sole proprietorship and sharecropping. Baah, Anchirinah, Badger & Badu-Yeboah (2012) also report of 80% of cocoa farmers operating their own farms.

4.2.2 Economic characteristics of farmers

This section summarizes the economic characteristics of farmers. It includes labour availability, engagement in off-farm work, additional crops cultivation, farm size and farming experience.

Engagement in off-farm work

The data presented in Table 4.2 depicts that more than half of the respondents representing 55.4% were not engaged in any off – farm work, while 44.6% engaged in off – farm work. This is in conformity with the report by Hainmueller et al (2011) who report of 40% Ghanaian cocoa farmers engaging in other jobs. The data also revealed that out of the 116 respondents who were engaged in off-farm work, 42.2% of them were engaged in trading, 36.2% in artisanal work, 6% in teaching and 15.5% in other activities (Appendix III). It is important to note that some of the farmers were involved in secondary occupations to help boost their household income. The seasonality of farming activities is such that farmers are not assured of regular income throughout the year; therefore a secondary occupation will help the farmers to cope with uncertainties in farming and household activities.

Farm Size

A mean farm size of 2.82 hectares was recorded indicating that farmers generally cultivated smaller piece of land. The majority of farmers, 60.8 % owned farms between 0 and 3 hectares and 39.2% cultivated farm size of above 3 hectares (Table 4.2). This finding is consistent with Danso-Abbeam et al. (2012) who states that, majority of cocoa farmers operate farms of between 1 – 5 Hectares. It also agrees with studies carried out in other countries in the sub-region (Oluyole and Sanusi,

2009; Agbongiarhuoyi et al., 2013). However, Hainmueller et al. (2011) in their survey report of 41% over estimation of cocoa farm sizes by farmers in Ghana.

Table 4. 2: Economic Characteristics of Farmers

Variable	Category	Frequency	Percentage
Off-farm Work	Yes No	116 144	44.6 55.4
Farm Size (Ha)	0 - 3 >3	158 102	60.8 39.2
Years in Farming	>10 <10	67 193	25.8 74.2
cultivation of other crops	Yes No	256 4	98.5 1.5
Availability of labour	Family only Two sources Family + hired + Self Help Group	34 111 115	13.1 42.7 44.2

Source: Field Data, 2014

Farming experience

The data in Table 4.2 shows that 25.8% of farmers had farmed between 1-10 years, whiles 74.2% had been in cocoa farming for more than 10 years. Longer years in farming come with experience thus familiar with most practices on the farm. This is confirmed by Danso-Abbeam et al. (2012) who report that majority of cocoa farmers (79%) have an experience of greater than 10 years. Ogunleye & Oladeji (2007) are of the view that engaging in cocoa farming for a period above five years is long enough to gather all the experience needed. Thus conclusion can be drawn that most farmers interviewed had great experience.

Cultivation of additional crops

The majority (98.5%) of the respondents cultivated additional crops apart from cocoa with only 1.5% cultivating only cocoa (Table 4.2). The data also revealed that 90.4%

of farmers cultivated more than four (4) crops aside cocoa and 9.6% cultivated four (4) or less additional crops (Appendix III). Aneani et al. (2011) report of farmers cultivating food crops such as plantain, cassava, maize, banana and tree crops such as oil palm, citrus and coconut which confirms the finding of this study. Farmers in the District depends on the crops usually annual crops for their daily meals and sell the surplus to cater for their protein needs such as fish, meat and many more.

Labour availability

The data in Table 4.2 depicts that, 13.1% of the respondents used only one type of labour either family or hired. 42.7 % used a combination of two labour sources and 44.2% used a combination of all three sources; family, hired and self-help group (SHG) with the SHG been an occasional option. Cocoa farming is a labour intensive activity and farmers' incomes are generally low as such the main labour source is the family (Baah, 2006; Abenyaga & Gockowski, 2001). They occasionally rely on other sources like the hired and SHG since some of the operations are technical and very laborious hence, the high percentage of use of all three sources. This is also in conformity with Idris, Rasaki & Folake, Hakeem, 2013; Adebiyi & Okunlola, 2013 who revealed that most of the farmers used both family and hired labour in their farming operations.

4.3 Description of respondents' orientation towards improved farming

Orientation towards improved farming include the variables of social and psychological dimension of individual respondent such as attitude towards improved farming practices, innovation proneness, achievement motivation and information seeking behaviour which are addressed in this section.

4.3.1 Attitude of farmers towards improved farming practices

From Table 4.3 it could be inferred that farmers attitude were unfavourable towards "Empty bottles of agro-chemicals can be used in the homes", with a mean of 4.70. This was followed by "Fermenting cocoa for 5 days is the best" with a mean value of 3.42, "Planting haphazardly increases yield" with a mean value of 3.29 and the then "Pods from my farm are very good for planting" with a mean value of 2.32 for the negative statements. From the same table, attitude of farmers was favourable towards "Over application of herbicides is harmful to the environment" with a mean value of 4.58. This was followed by "Pruning helps prevent cocoa black pod" with a mean value of 4.58, followed by "Row planting will increase my yield" with a mean value of 3.78 and "Spacing of 3m*3m is the best" being the least with a mean value of 3.60 for the positive statements.

A summary the results in Table 4.3 show 50.4% of the respondents had a high level whiles 12.3% had a low level (Appendix iiib). Therefore, most (50.4%) of interviewed farmers in the study area showed a relatively favourable attitude towards improved farming practices. The high percentage of farmers in the high level category might be as a result of the high level of awareness of farmers on modern improved practices of farming as a result of the numerous sources of agricultural information. In agreement with this finding is Goswami (2012) who found out that majority of fish farmers in West Bengal had a more favourable attitude towards scientific fish culture.

Table 4. 3: Frequency Scores of farmers' attitude towards improved farming practices.

Statement	1	2	3	4	5	Mean
Fermenting cocoa for 5 days is the best	40	47	7	96	70	3.42
Agro-chemicals bottles can be used again in the homes	0	2	12	49	197	4.70
Pods from my farm are very good for planting	131	40	5	44	10	2.32
Planting haphazardly increases yield	44	34	49	69	64	3.29
Spacing of 3m*3m is the best	10	14	91	99	46	3.60
Pruning helps prevent cocoa black pod	1	4	13	66	176	4.58
Row planting will increase my yield	13	10	77	83	77	3.78
Over application of herbicides is harmful to the environment.	0	15	6	52	187	4.58

Source: Field Data, 2014

Key: 1=strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree for negative statement and 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree and 1 = strongly disagree for positive statement.

4.3.2 Information Seeking Behaviour of Farmers

Farmers were asked how often they seek information on major practices in cocoa production and other farming activities. The mean values for farmers' information seeking behaviour were calculated. Table 4.4 shows the Mean values of farmers' information seeking behaviour. Table 4.4 indicates that information seeking on disease control on cocoa was high. This was attested to by a mean of 3.39 out of a total of 5. This was followed by information seeking on pest control on cocoa with a mean value of 3.38; information seeking on recommended agro – chemicals for cocoa followed with a mean value of 3.35. Shade management in cocoa cultivation followed with mean value of 2.28 then information seeking on farm sanitation was next with a value 2.26, information seeking on raising nurseries (2.16), information

seeking on cultivation of other crops (2.08) with information seeking on raising of animals being the least with a mean of (1.80).

A summary of farmers information seeking behaviour (Appendix iiib) revealed that the number of respondent who were in the moderate level were in the majority (51.2%) and 13.5% of the respondents were in the high level of information seeking. Therefore, the majority (64.7%) of interviewed farmers in the study area were in the moderate level and above of information seeking behaviour. The plausible reason for the high level of information seeking among cocoa farmers is that cocoa farming has numerous challenges thus the seeking for remedies. Additionally there are a number of sources of information available to farmers as such farmers are able to report any problem they encounter on their farms for restoration.

Table 4. 4: Frequency Scores of farmers' Information Seeking Behaviour

Activity	1	2	3	4	5	Mean
Farm sanitation	77	58	110	10	5	2.26
Pest control on cocoa	6	8	168	38	40	3.38
Disease control on cocoa	4	7	156	70	23	3.39
Recommended agro-chemicals	11	23	124	68	34	3.35
Cultivation of other crops	93	71	80	15	1	2.08
Raising of animals	124	70	60	5	1	1.80
Nursery management	80	71	98	9	2	2.16
Shade management in cocoa cultivation	73	62	104	20	1	2.28

Source: Field Data, 2014. Key = 1= never, 2 = rarely, 3= sometimes, 4 = very often, 5=always.

4.3.3 Farmers' innovation proneness

Innovation proneness was operationally defined as how quickly farmers accepted some agricultural innovations. Using the means, it could be deduced that "mistletoe removal" was easily accepted with an adoption rate mean of 3.36. It was followed by "pruning" with a mean of 3.35, "periodic removal of black pod" with a mean of 3.19 and "chemical fertilizer" with a mean of 2.75. "Chemical weed control" followed with a mean of 2.62, "hybrid seedlings" with a mean of 2.26, "regular harvesting" with a mean of 2.03, "Drying healthy and unhealthy beans separately" with a mean of (1.51) with "row planting" being the least with an adoption rate mean of 1.33. Table 4.5 displays the mean values of farmers' innovation proneness.

Majority of the respondents (61.5%) were within the moderate level of innovation proneness whiles 17.3% were within the high level of innovation proneness (Appendix iiib). The results show that farmers in the District normally sought further explanations from colleague farmers' who have used innovation before they put them into practice themselves. The high percentage of farmers in the moderate level could be as a result of the wait and see attitude of farmers. Some farmers often wait to see results on people's farms before they also adopt. This present finding is in conformity with Singha & Baruah (2012) who found out that most dairy farmers had moderate level dairy innovation adoption under different farming system.

Table 4. 5: Frequency Scores of Farmers' Innovation Proneness

Activity	1	2	3	4	Mean
Row planting	219	10	16	15	1.33
Pruning	9	23	95	133	3.35
Use of hybrid seedlings	95	42	83	40	2.26
Raising of nurseries	113	60	59	28	2.01
Chemical fertilizer	47	35	113	56	2.75
Mistletoe removal	3	17	45	195	3.66
Chemical weed control	28	89	98	45	2.62
Regular harvesting	115	55	55	35	2.03
Periodic removal of black pod	2	47	110	101	3.19
Drying healthy and unhealthy beans separately	194	25	16	25	1.51

Source: Field Data, 2014

Key: 1 = innovation not adopted, 2 = after most of the people have accepted/adopted it, 3 = after consulting others who are more knowledgeable and using it and 4 = whenever i become exposed to it.

4.3.4 Farmers' achievement motivation

The respondents were asked eight (8) agricultural practices which help increase and protect the yields of cocoa. From the results obtained in Table 4.6, "regular weed control" had the highest mean of 4.62 followed by regular mistletoe removal (4.52), regular removal of black pods (4.47) and regular pruning with a mean of 4.34. Yearly application of the recommended number of insecticides followed with a mean of 3.78, followed by yearly application of the recommended number of fungicides (2.77), regular fertilizer application (2.53) with regular harvesting not when all pods are ripped being the least observed with a mean of 2.18.

A summary of the results in Table 4.6 shows that majority of the respondents (47.3%) had a moderate level of achievement motivation whiles 17.3% had a low level of achievement motivation (Appendix iiid). It could be seen from the result that over 70% of the respondents were at the moderate level and beyond. This could mean that farmers' level of achievement motivation is relatively high by carrying out activities

that enhances the yields from their farms but inference from Table 4.8 is that critical activities such as fertilizer application which promotes fruiting is highly low (2.53) and fungicides (2.77) and insecticides (3.78) application which protects the fruits from insects and diseases damage are also relatively low.

Table 4. 6: Frequency scores with regard to achievement motivation

Activity	1	2	3	4	5	Mean
Regular pruning	9	11	2	98	140	4.34
Regular mistletoe removal	3	3	7	91	156	4.52
Regular weed control	0	1	7	81	171	4.62
Regular fertilizer application	47	98	79	1	35	2.53
Application ≥ two times fungicides yearly	0	103	115	42	0	2.77
≥ three times application of insecticides	0	5	84	133	38	3.78
Regular harvesting not all pods are ripped?	115	38	56	47	4	2.18
Regular removal of black pod?	2	2	20	85	151	4.47

Source: Field Data, 2014

Key: 1 = never, 2 = rarely, 3 = sometimes, 4 = often 5= always

4.5 Description of institutional factors of the respondents

The institutional factors considered include access to credit, frequency of market visit, distance to the market, and group membership (Table 4.8).

Frequency of agro-input market visit and distance to agro-input market

The data presented in Table 4.8 depicts that majority of the respondents (75.4%) resided in areas less than 10km to the nearest markets, 24.6% resided above 10 km to the nearest market. The majority of respondent (85.4%) only went to the market when the need arose, with 14.6% going every market day.

Access to credit

The results in Table 4.8 show that a slimmer majority of respondents (51.2%) had access to credit with 48.8% not having access to credit. Sources of credit in the District for farmers include the banks, NGOs, input dealers and the license cocoa buying companies. 77.4% had credit from informal sources, 16.5% had credit from the banks whiles 6.1% had it from combination of two or more sources (Appendix III). The high level of access to credit by the farmers plausibly is a result of the high liberalization which has brought a number of providers and intense competition into the sector. Some of the service providers usually provide farmers with the credit in the form of agro-inputs in exchange for the sales of cocoa beans to them.

Table 4. 7: Institutional factors of respondents

Variable	Category	Frequency	Percentage
Access to credit	Yes No	133 127	51.2 48.8
Group membership	Yes No	117 143	45.0 55.0
Distance to market	<10km >10km	196 64	75.4 24.6
Frequency of market visit	Every market day. When there is the need.	38 222	14.6 85.4

Source: Field Data, 2014

Group membership

From the data in Table 4.8, 45.0% of respondents were members of a group with 55.0% not belonging to any group. It was realized during the study that, before farmers are reached with information or any other service such as inputs, financial assistance, it was perfectly done through the formation of groups. These groups served as a conduit through which agricultural information are channelled before subsequent delivery of agro – inputs. Belonging to a group in the District also served

as a platform for the exchange of ideas, knowledge and experiences among farmers in the groups. The greater majority (97.4%) of those in a group belonged to agricultural group whiles only 2.6% belonged to social groups. Additionally, majority 49.6% of those who belonged to group did that to have access to credit and to learn, 48.7% joined only to learn and only 1.7% joined only to have access to credit (Appendix III).

4.6 Access to and use of agricultural information

This section of the results and discussion is concerned with information on farmers' access to agricultural information and their frequency of use of the information.

4.6.1 Sources of agricultural information

Table 4.9 shows farmers source of agricultural information. From the results obtained, it can be deduced that radio is the most accessible with a percentage of 94.5% followed by Television with 75.0%. Family/Friends (70.8%) was the next followed by extension sevices (49.2%), input dealers (39.2%), farmer groups (21.9%), NGOs/Private extension providers (20.0%), Newspapers (12.3%) and LBCs (10.4%). This finding is consistent with that of Owolade & Kayode (2012) in their study on information-seeking behaviour and utilization among snail farmers in Oyo state in Nigeria. They report of about 65% and 76% of farmers receiving information from radio and television respectively. This could be as a result of radio and TV being the cheapest means of passing information to farmers (Ayandiji, 2003) and it being the effective medium of reaching farmers with information (Kock, Harder & Saisi, 2010). A small standard deviation of 0.21 for the access to radio means the responses were not varied whiles a relatively higher value of 0.50 for access to COCOBOD/MoFA means the responses were varied.

Table 4. 8: Rank order, mean and standard deviation of agricultural information sources based on their access

Source	Frequency	% (N = 260)	Rank	Mean	Std Dev.
Radio	248	95.4	1	0.95	0.21
TV	195	75.0	2	0.75	0.43
Family/Family	184	70.8	3	0.71	0.45
COCOBOD/MoFA	127	49.2	4	0.49	0.50
Input Dealers	102	39.2	5	0.39	0.48
Farmer groups	57	21.9	6	0.21	0.41
NGOs/Private ext.	52	20.0	7	0.20	0.40
Newspapers	32	12.3	8	0.12	0.32
LBCs	27	10.4	9	0.10	0.30

Source: Field Data, 2014

4.6.2 Level of access to agricultural information

Respondents with access to the first seven sources (Table 4.9) indicated their level of access to the information sources with the help of their frequency of access, timeliness of access, clarity of language, clarity of information and relevance of the information. Figure 4.2 displays respondents' level of access to the top seven sources. Figure 4.2 indicates that majority of the respondents (62.3%) had a moderate level of access to agricultural information followed by 25.4% of low level of access. The respondents in the high level of access were 12.3%. With over 70% of respondents above the low level of access, cocoa farmers in the district could be said to have a relatively a high level of access to agricultural information.

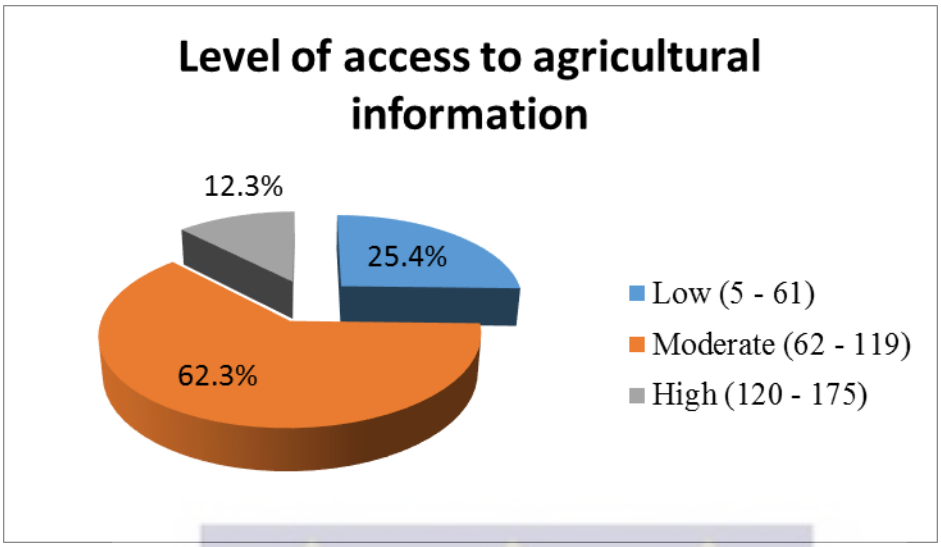

Figure 4. 1: Level of access to agricultural information

4.6.3 Use of agricultural information

Table 4.10 displays the means of use for the various sources of agricultural Majority of the respondents used the information received from their family/Friends with a mean of (3.85) followed by information from input dealers with a mean of (3.62). The use of information from COCOBOD/MoFA followed with a mean of (2.44). T.V placed 8th with a mean of (2.25) then Radio followed also with a mean of (2.19). The high use of information from family/friends, input dealers, COCOBOD/MoFA and farmer groups could be attributed to the face to face contact which allows for feedback whiles the less use of Radio and TV could be attributed to the one way communication most especially the television. It is also consistent with Ronald, Dulle, Honesta (2014) who found out that majority of rice farmers (93.8%, 80.0% and 66.2%) in Kilombero in Tanzania preferred farmers own personal experience, family/parents and Neighbours and or friends respectively for extension information. It is also confirmed by Daudu, Chado & Igbasha (2009) in their work on agricultural information sources utilized by farmers in Benue state in Nigeria. However, these

findings are in contrast with Baah (2008) who observed of family and other farmers as the main sources of information and rather radio was the most preferred information.

Table 4. 9: Rank order, mean and standard deviation of agricultural information sources based on their use

Source	Mean	Standard Deviation	Rank
Family/Friends	3.85	0.35	1
Input dealers	3.62	0.59	2
COCOBOD/MoFA	3.44	0.66	3
Farmer Groups	3.33	0.47	4
LBCs	3.30	0.45	5
NGOs/private extension	3.21	0.69	6
Newspapers	2.94	0.46	7
TV	2.25	0.80	8
Radio	2.19	0.82	9

Source: Field Data, 2014

Key: 1=never, 2= rarely, 3 = sometimes and 4 = always

4.6.4 Level of use of agricultural information

Farmers with access to the top seven sources (Table 4.9) indicated how often they use the information from the sources. Figure 4.3 shows a distribution of the level of use of agricultural information from the top seven sources. Results show that majority of the farmers (48.1%) used the accessed information on a low level (1 – 10), 44.2% of respondents were within the moderate level of use (11 – 18) and 7.7% of respondent were within the high level of use (20 – 28) of agricultural information. It could therefore be concluded that majority (94.3%) of the cocoa farmers in the District used agricultural information moderately and below.

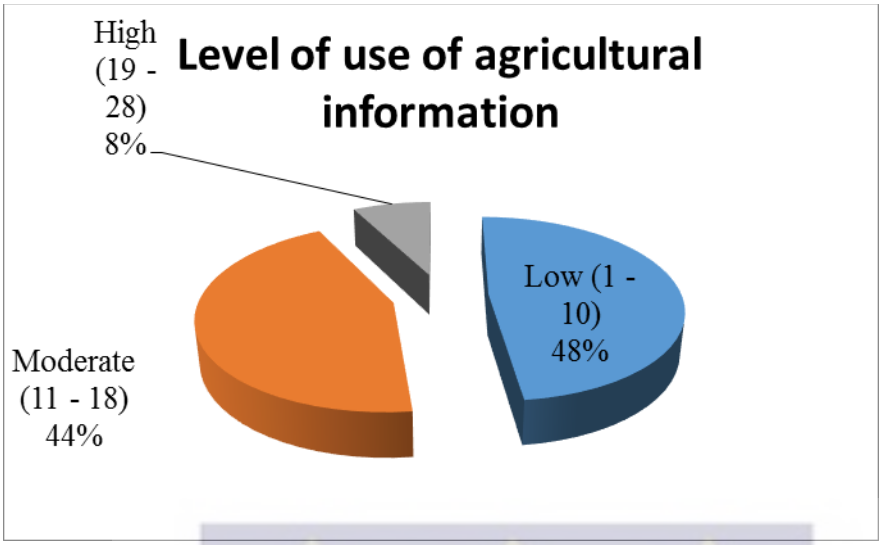

Figure 4. 2: Level of use of agricultural information

4.7 Livelihood Outcomes

This section of the study deals with farmers livelihood outcomes. Four main indicators were used in this study to measure livelihood outcomes; yield, farmers' average annual income, satisfaction of basic needs and farmers' assets possession.

4.7.1 Level of yield per hectare

The mean yield of cocoa per hectare for the period 2011/12 and 2012/13 cocoa season was 491.80 kg. The minimum yield was 2kg and the maximum was 1,280kg. The average yield of 491.80 is in conformity with LMC-WCF (2011) which estimates Ghana's average cocoa yield to be a little above 500kg/Ha after the production of over one million metric tonnes in 2010/2011 cocoa season. The LMC-WCF (2011) also estimates cocoa yields in West Africa to be under 500kg/Ha out of a possible 1000kg/Ha. Majority of the respondents (55.8%) were within the low level of cocoa yield, 39.2% were within the moderate level of cocoa yield and 5.0% were within the high level of cocoa yield. The summary is presented in Table 4.11. The majority of

farmers were with the low level of yield as a result of low level of use of agricultural information as in Figure 4.3.

Table 4. 10: Level of farmers' average yield per Hectare

Category	Frequency	Percentage
Low (2 – 350kg)	141	54.2
Moderate (351 – 650kg)	106	40.8
High (above 650)	13	5.0
Total	260	100

Note: Minimum = 2kg/Ha, Maximum = 1280kg/Ha, Mean = 491.80, N=260 and S.D = 234.301

Source: Field Data, 2014.

4.7.2 Farmers' average annual income

Farmers' average annual income consisted of all the income farmers received during the year. Table 4.12 shows a summary of farmers' average annual income. The mean average annual income of farmers was GH¢ 6,427.92 with a standard deviation of 4423.05. The minimum income level was GH¢ 1,046 per year and the maximum was GH¢ 29,133 per year. From the results most of the respondents (63.5%) were in the low level income category and 36.5% were in the high level income category. Table 4.12 shows a distribution of the farmers' average annual income.

Table 4. 11: Level of farmers' average annual income

Category	Frequency	Percentage
Low (< GH¢6428)	165	63.5
High (> GH¢6428)	95	36.5
Total	260	100

Note: Minimum = GH¢1,046, Maximum = GH¢29,133, Mean = GH¢6427.92, S.D = 4423.05 and N= 260
Source: Field Data, 2014.

4.7.3 Farmers wellbeing

Results from Figure 4.4 show that majority of the farmers (69.6%) had a high level of wellbeing (16 - 18). Also 30.4% of the farmers had a moderate level of satisfaction of basic needs while no farmer was in the low level of wellbeing. The high percentage of farmers within the high level of satisfaction could be attributed to the provision of free basic education, provision of boreholes and the existence of the national health insurance scheme in Ghana. Additionally, majority of farmers grow additional crops to feed their families and sell the surplus. The mean wellbeing level was 16.1; minimum wellbeing level was 12 while the maximum wellbeing level was 18. With no farmer in the low level category, a conclusion could be reached that farmers are able to satisfy the basic things that make life bearable.

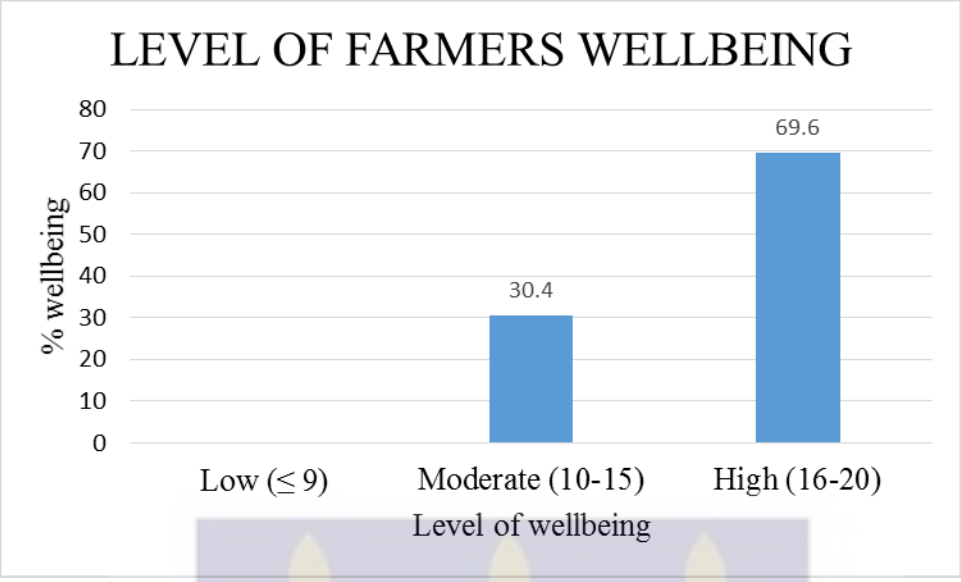

Figure 4. 3: Farmers' Level of wellbeing.

Note: Range 1 = never 2 = sometimes difficult, 3 = always
Minimum = 12, Max = 18, Mean = 16.1

4.7.4 Assets possession by farmers

From the results in Table 4.13, majority of the farmers' (96.9%) possessed beds and mattresses. This was followed by radio (93.5%), mobile phone (82.3%), knapsack sprayers (81.5%), television (69.2%), mist blower (26.9%), bicycle (23.1%), motor (8.1%) and Car (4.6%). Furthermore, the results show that majority of the farmers bought these items through their farming activities. The mean scores for sources of funds for purchase of these items were 79.42%, 9.1% and 27.3% respectively for farming, gift and other occupations.

Table 4. 12: Assets possession by farmers

Asset	Frequency	Percentage (%*)	Source of funds for purchase (%*)		
			Farming	Gift	Other
Bed	252	96.9	80.6	3.2	16.3
Mattress	252	96.9	80.6	3.6	15.9
Radio	238	93.5	81.5	6.3	12.2
Phone	214	82.3	65.4	14.0	20.6
Knapsack	212	81.5	91.0	2.8	6.1
Television	180	69.2	72.8	7.2	20.0
Mist blower	70	26.9	82.9	10.0	7.1
Bicycle	60	23.1	85.0	1.7	13.3
Motor	21	8.1	90.5	-	9.5
Car	12	4.6	63.9	9.1	27.3

Source: Field Data, 2014. Note: %* = Respondents who possessed the household assets and %** = sources of funding for the purchase.

4.7.5 Farmers level of assets possession

The results show that majority of the respondents representing 58.6% were in the low level category of assets possession followed by 36.9% in the moderate level whiles as low as 4.6% were in the high level category of assets possession (Figure 4.5).

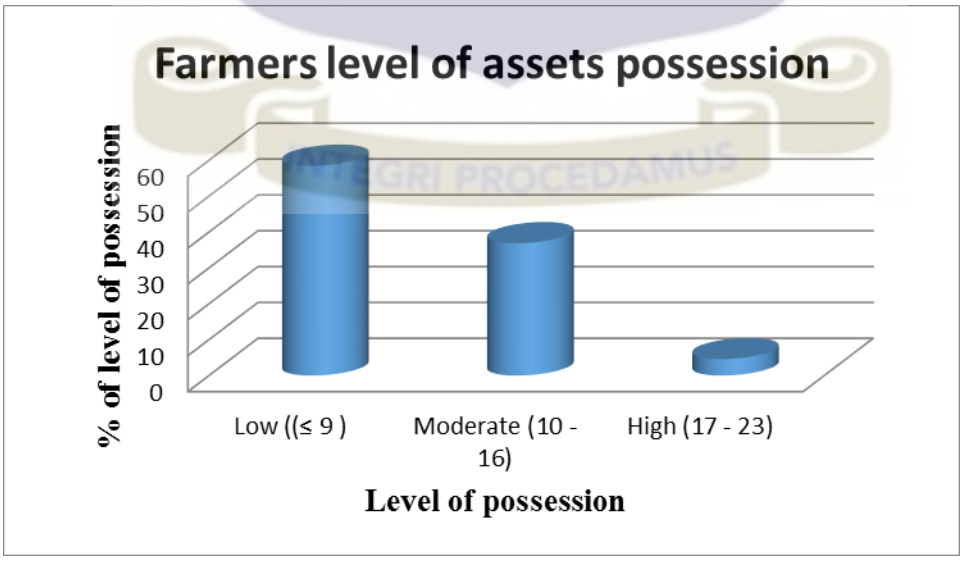

Figure 4. 4: Farmers' level of assets possession.

4.8 Relationship between farmer characteristics, institutional factors and access to agricultural information

This section discusses the relationship between farmer characteristics comprising social, economic and their orientation towards improved farming. It also looks at the relationship between the institutional factors of the farming environment and access to agricultural information.

4.8.1 Relationship between farmers' social characteristics and access to agricultural information.

The data in Table 4.14 show a significant relationship (χ_2 = 12.450; p = 0.002 education and access to agricultural information by farmers. Education is generally believed to increase farmers' ability to obtain, process and analyze information disseminated by different sources and helps them to make appropriate decision to utilize agricultural information through reading and analyzing in a better way. The educational level of a farmer usually affects individual's enthusiasm to learn about new things and to use them. The results show that educational level of farmers is a significant determinant of access to agricultural information.

This result is similar to Rehman et al. (2013) who found out that education of respondent had a significant relationship with their access to agricultural information.

Table 4. 13: Relationship between farmers' social characteristics and access to agricultural information.

Variable 1	Variable 2	$\chi 2$ ($\alpha = 0.05$)	df	p
Sex	Access	4.783	2	0.091
Age	Access	1.848	4	0764
Marital status	Access	3.086	2	0.214
Educational Level	Access	12.450	2	**0.002**
Household Size	Access	1.921 0.278	2 2	0.383 0.870
Farm ownership	Access	6.979	4	0.137

4.8.2 Relationship between farmers economic characteristics and access to agricultural information

Table 4.15 displays the economic characteristics and its relationship with access to and use of agricultural information. There was a significant relationship between farm size and their access to and use of agricultural information ($\chi 2$ =7.344, p = 0.025). This indicates that farm size has a significant relationship with access to agricultural information. Usually increasing farm size leads to an increase in farm yield if all the good practices are observed; increase in yield of cocoa also increases the incomes of farmers who are then able to look for information to use.

The Chi square value for growing of additional crops and agricultural information access ($\chi 2$ = 6.401, p = 0.041) was significant indicating that growing of additional crops affected farmers access to information. This could be due the search of extra information to cater for the additional crops cultivated by the farmers. The cultivation of additional crops also increase the incomes of farmers thus motivates them to look for information to boost their yields.

Table 4. 14: Relationship between farmers' economic characteristics and access to information

Variable 1	Variable 2	$\chi 2$ ($\alpha = 0.05$)	df	p
Off-farm work	Access	3.361	2	0.186
Farm Size (Ha)	Access	7.344	4	**0.025**
Farming experience	Access	2.376	2	0.305
Growth of other crops	Access	6.401	2	**0.041**
Availability of labour	Access	32.165	4	**0.000**

The relationship between availability of labour and access to agricultural information was highly significant ($\chi 2 = 32.165$, $p = 0.000$) (Table 4.15). This implies that availability of labour to farmers determines farmers' access to agricultural information. Cocoa farming is very labour intensive; activities such as weeding, pesticide application and many more require some sought of experience especially the application of pesticides thus availability of labour to the farmer leads to they seeking for more information for use on their farms to increase their yields. This result is collaborated by Haliu (2008) who found out that improved farming practices required lots of labour thus families with lots of labour force use technologies on their farms more than those without.

4.8.3 Relationship between farmers' orientation towards improved farming and agricultural information access

The relationship between information seeking and access to agricultural information was highly significant ($\chi 2 = 56.742$, $p = 0.000$) (Table 4.16). This implies that farmers' information seeking behaviour is a determinant of their access to agricultural information.

With a Chi square value of ($\chi 2 = 13.229$, $p = 0.000$) (Table 4.16), a conclusion could be reached that there exist between achievement motivation and farmers' access to agricultural information a highly significant relationship. This shows that farmers' achievement motivations significantly determined their access agricultural information.

Table 4. 15: Relationship between farmers' orientation towards improved farming and access to information

Variable 1	Variable 2	$\chi 2$ ($\alpha = 0.05$)	df	p
Information seeking behaviour	Access	56.742	4	**0.000**
Achievement motivation	Access	13.229	4	**0.000**
Innovation proneness	Access	30.429	4	**0.000**
Attitude towards improved farming practices	Access	38.276	4	**0.000**

The innovation proneness of farmers had a significant relationship ($\chi 2 = 30.429$, $p = 0.000$) with access to agricultural information (Table 4.19). This result is a confirmation of Asres (2005) who found a statistically significant relationship between innovation proneness and access to productive role information of women. Similarly, in studying adoption behaviour of dairy farmers.

The Chi square values of ($\chi 2 = 38.279$, $p = 0.000$) (Table 4.16) show a highly significant relationship between farmers' attitude towards improved farming practices and their access to agricultural information. This implies that attitude of farmers towards improved practices significantly determined their access to agricultural information. Farmers with favourable attitude towards improved practices seek for information from diverse sources.

4.8.4 Relationship between institutional factors and agricultural information access

Table 4.17 displays the institutional factors and their relationship with access to and use of agricultural information. Access to credit had a statistically significant relationship with access to agricultural information ($\chi 2 = 13.739$, $p = 0.001$) (Table 4.17). Farmers in the District receive credit from the banks, agro – inputs from the NGOs, input dealers and the license cocoa buying companies. The significance of the relationship implies that access to credit leads to farmers having more access to agricultural information. It was observed that before credit is given to the farmers, it is usually done in groups which included trainings on good agricultural practices.

The study looked at the relationship between group membership and access agricultural information. The findings additionally reveals a highly significant relationship ($\chi 2 = 59.623$) (Table 4.17) between group membership and access to agricultural information. It was realized during the study that, before farmers are reached with information or any other service such as inputs, financial assistance, it was perfectly done through the formation of groups. These groups served as a conduit through which agricultural information are channelled before subsequent delivery of agro-inputs. This finding is in agreement with Katungi (2006) who found group participation to have stimulated information exchange among members as a result of each other's experience and knowledge.

Table 4. 16: Relationship between institutional factors and access to information

Variable 1	Variable 2	$\chi 2$ ($\alpha = 0.05$)	df	p
Access to credit	Access	13.739	2	**0.001**
Group membership	Access	59.623	2 2	**0.000**
Distance to agro-input market	Access	12.266	2	**0.002**
Frequency of agro-input market visit	Access	2.890	2	0.236

The distances from farmers residence to the nearest agro-input market had a significant relationship with access to agricultural information ($\chi 2 = 12.266$, $p = 0.002$). This means that the distance from a farmer to the market affected their access to agricultural information either negatively or positively. Longer distances to the nearest market centres known to be a place for the exchange of ideas and information serves as a discouragement for farmers to visit and vice versa. The distance from a farmer's residence to the nearest market also did have a significant relationship with the use of agricultural information ($\chi 2 = 6.558$, $p = 0.038$).

4.8.5 Identification of significant predictor variables of access to agricultural information

Regression analysis was carried out to determine the direction and strength of the relationship between the independent and the dependent variables. Since the P value in the ANOVA table is less than 0.05, (P= 0.000), this means the relationship is significant at 1% significance level therefore the null hypothesis cannot be accepted. The variation in access to agricultural information has been explained by the independent variables by 49.8%.

There is a statistically significant relationship between the independent variables and farmers' access to agricultural information (R^2 = 0.498, F (19, 240) = 12.515, p = 0.000). According to the results in Table 4.18, the following variables were found to be positively significant; availability of labour, group membership, information seeking behaviour of farmers and attitude towards improved farming practices whiles household size was negatively related.

Household size

There exists a negative significant relationship between household size and access to agricultural information. This implies that increasing household size will lead to a decrease in the access to agricultural information. From the table a unit increase in the size of household of a farmer leads to a decrease in 1.664 unit of agricultural information access implying farmers with large family size do not make effort to get information due to their inability to use because they spend much of their resources in catering for the family needs. Contrary to this result, increased exposure to information was noted among women farmers with larger family sizes (Kacharo, 2007). However, Fuglie (2008) established no relationship between household size and access to agricultural information.

Labour availability

From the study a unit increase in labour availability leads to the possibility of accessing agricultural information by 4.662 units.

Group membership

Belonging to a group serves as a platform for information exchange among members, access to group credit, inputs and also aid extension agents to reach members with

new practices. From the result, belonging to a group leads to 14.594 increase in the possibility of accessing agricultural information. The high coefficient of 14.594 signifies the significant role group membership plays in information sharing. This result is collaborated by Conley & Udry, (2010); Caviglia & Khan, (2001); Bandiera & Rasul, 2003 who report of group membership increasing the capacity of an individual to access information about current innovation and its benefit from other members. It also increases individual farmer's awareness and as a result increases the likelihood of adoption of new technology.

Information seeking behaviour

Information seeking by farmers exposes them to new practices for their production activities. There are lots of challenges with farming thus solutions are needed to them. The results from the study show that a unit increase in information seeking will lead to an increase of 1.062 unit of access to agricultural information. From the results in Table 4.4, information seeking was high in recommended agro-chemicals, pest and diseases control which are pivotal in cocoa farming. This result is shared by Regassa et al. (2011) who state that sharing of problems, asking and weighing options exposed people to a variety of hygiene and sanitation information than people with no such behaviour.

Attitude towards improved farming practices

Attitude of farmers towards improved farming practices was significantly related to access to agricultural information. Farmers with a favourable attitude towards improved farming practices will always look for information from genuine sources which would subsequently be used. A unit improvement in the attitude of farmers

leads a 0.645 unit increase in access to agricultural information. Table 4.18 presents significant predictor variables of farmers' access to agricultural information.

Table 4. 17: Significant predictor variables of access to agricultural information

Predictor variables	B	t	p - value
Household size	-1.664	-2.557	0.011
Availability of labour	4.662	2.401	0.017
Group membership	14.594	4.853	0.000
Information seeking behaviour	1.062	3.373	0.001
Attitude towards improved farming practices	0.645	2.384	0.018
$R^2 = 0.498$			
p value = 0.000			
Standard error = 18.41			

Source: own construct, 2014

Note: All significant and non-significant variables presented in appendix IIa

4.8.6 Relationship between farmer characteristics, institutional factors and use of agricultural information

This section discusses the relationship between farmer characteristics comprising social, economic and their orientation towards improved farming. It also looks at the relationship between the institutional factors of the farming environment and use agricultural information.

The data in Table 4.14 show a significant relationship ($\chi 2 = 15.155$; $p = 0.001$) between education and use of agricultural information by farmers. Education is generally believed to increase farmers' ability to analyze information disseminated by different sources and helps them to make appropriate decision to utilize agricultural information through reading and analyzing in a better way. The results show that educational level of farmers is a significant determinant use of agricultural information.

Similarly, Muneer (2008), found that education level of farmers affected their adoption of agroforestry farming, also it was found to have significant relationship

with the adoption of integrated pest management practices (Uwagboe, Akinbile & Oduwole, 2012).

Table 4. 18: Relationship between farmers' social characteristics and use of information

Variable 1	Variable 2	$\chi 2$ ($\alpha = 0.05$)	df	p
Sex	Use	0.006	2	0.997
Age	Use	4.235	4	0.375
Marital status	Use	2.082	2	0.353
Educational level	Use	15.155	2	**0.001**
Household size	Use	0.278	2	0.870
Farm ownership	Use	2.697	4	0.610

4.8.7 Relationship between economic characteristics of farmers and of agricultural information

There was a significant relationship between farm size and their access to and use of agricultural information ($\chi 2 = 10.999$, $p = 0.004$). This indicates that farm size has a significant relationship with use of agricultural information. Implementation of agricultural information normally goes with the use of money thus farmers with smaller farm sizes with lower yields are not able to invest in their farms. Zhang et al. (2012) assert of farmers with large farm sizes usually being wealthy thus there being the likelihood of they adopting high inputs innovation.

Table 4. 19: Relationship between farmers' economic characteristics and access to and use of information

Variable 1	Variable 2	$\chi 2$ ($\alpha = 0.05$)	df	p
Off-farm work	Use	3.879	2	0.144
Farm Size (Ha)	Use	10.999	4	**0.004**
Farming experience	Use	4.116	2 2	0.128
Growth of other crops	Use	1.265	2	0.531
Labour availability	Use	38.154	4	**0.000**

The relationship between availability of labour and use of agricultural information was highly significant ($\chi 2 = 38.154$, $p = 0.000$) (Table 4.15). This implies that availability of labour to farmers determines farmers' use of agricultural information. Cocoa farming is very labour intensive; activities such as weeding, pesticide application and many more require some sought of experience especially the application of pesticides thus availability of labour to the farmer leads to the use of agricultural information their farms to increase their yields. This result is collaborated by Haliu (2008) who found improved farming practices requiring lots of labour thus families with lots of labour force use technologies on their farms more than those without.

4.8.8 Relationship between farmers' orientation towards improved farming practices and agricultural information use

The relationship between information seeking and use of agricultural information was highly significant ($\chi 2 = 85.961$ $p = 0.000$) (Table 4.16). This implies that farmers' information seeking behaviour is a determinant of their use of agricultural information. This outcome is in agreement with Jayawardana & Sherief (2010) who observed a significant relationship between information seeking behaviour and farmers' adoption of organic farming. They concur that the seeking for information by

farmers enables them to have access to practices which must be strictly obeyed in the practice of organic farming.

With a Chi square value of ($\chi 2 = 15.966$, $p = 0.000$) (Table 4.16), a conclusion could be reached that there exist between achievement motivation and farmers' use of agricultural information a highly significant relationship. This shows that farmers' achievement motivation significantly determined their use agricultural information.

Table 4. 20: Relationship between farmers' orientation towards improved farming and access to and use of information

Variable 1	Variable 2	$\chi 2$ ($\alpha = 0.05$)	df	p
Information seeking behaviour	Use	85.961	4	**0.000**
Achievement motivation	Use	15.966	4	**0.000**
Innovation proneness	Use	36.560	4	**0.000**
Attitude towards improved farming practices	Use	61.990	4	**0.000**

The innovation proneness of farmers had a significant relationship ($\chi 2 = 45.36.560$, $p = 0.000$) with use of agricultural information (Table 4.19). Similarly, in studying adoption behaviour of dairy farmers, Singha & Baruah (2012) established a significant relationship between innovation proneness and some dairy practices.

The Chi square values of ($\chi 2 = 61.990$, $p = 0.000$) (Table 4.16) show a highly significant relationship between farmers' attitude towards improved farming practices and their and use of agricultural information. This implies that attitude of farmers towards improved practices significantly determined their access use of agricultural information. Farmers with favourable attitude towards improved practices seek for information from diverse sources and genuine information from genuine sources leads

to its usage. Ebrahim (2006) asserts of a significant relationship between attitude towards change by farmers and dairy practices adoption

4.8.9 Relationship between institutional factors and agricultural information use

Table 4.17 displays the institutional factors and their relationship with access to and use of agricultural information. Access to credit had a statistically significant relationship with use of agricultural information ($\chi 2 = 15.302$, $p = 0.000$) (Table 4.17). Farmers in the District receive credit from the banks, agro – inputs from the NGOs, input dealers and the license cocoa buying companies. The significance of the relationship implies that access to credit leads to the use of agricultural information by farmers. Access to credit also lead to farmers accessing agro – inputs and labour which are requirements for carrying out improved agricultural practices. Credit help farmers to purchase modern technologies which are expensive for many rural farmers, who are normally poor to acquire and utilise them without assistance (Benin et al., 2009).

The study looked at the relationship between group membership and use of agricultural information. The findings additionally reveals a highly significant relationship ($\chi 2 = 64.187$, $p = 0.000$) (Table 4.17) between group membership and use of agricultural information. Belonging to a group in the District also served as a platform for the exchange of ideas, knowledge and experiences among farmers in the groups. Fadiji et al. (2006) also identified group membership as significantly related with information usage due to the influence farmers have on each other in a group as a result of experience shared

Table 4. 21: Relationship between institutional factors and access to and use of information

Variable 1	Variable 2	$\chi 2$ ($\alpha = 0.05$)	df	p
Access to credit	Use	15.302	2	**0.000**
Group membership	Use	64.187	2	**0.000**
Distance to agro-input market	Use	6.558	2	**0.038**
Frequency of agro-input market visit	Use	6.272	2	0.828

The distances from farmers residence to the nearest market had a significant relationship with access to agricultural information ($\chi 2 = 12.266$, $p = 0.002$). This means that the distance from a farmer to the market affected their use of agricultural information either negatively or positively. Longer distances to the nearest market center known to be a place for the exchange of ideas and information serves as a discouragement for farmers to visit and vice versa.

4.8.10 Identification of significant predictor variables of the use of agricultural information

The following variables were found to be statistically significant and positively related to the use of agricultural information; labour availability, off – farm work, group membership and information seeking behaviour of farmers whiles household size of respondents was negatively related to the use of agricultural information. The R^2 statistic value of 0.514 means the independent variables are able to explain the variance in the dependent variable (use of agricultural information) by 51.4%, the p–value of 0.000 means the test is highly significant at 1% significance level.

Household size

From the results (Table 4.19), there is a decrease in 0.279 unit in the use of agricultural information when household size increased by one unit. This means that increase in the size of a household put pressure on the resources of the house making it difficult for them to invest in their farms. Amao & Awoyemi (2007) observed an increase in the size of households decreasing the adoption of improved varieties of cassava which Kafle & Shah (2012) attribute it to families with larger sizes paying much attention to non-farm activities which gives quicker returns to meet the increased needs of the family than their farms but contradicts Koskei et al. (2013) who found an increase in the size of household putting pressure on the demand for household needs and hence the need to produce more for family and earn more to cater for the household which could lead to agricultural information search and use on the farm.

Labour availability

Labour was positively significant with the use of agricultural information. There is the possibility of farmers using agricultural information by 0.919 units when labour availability increased by one unit. Labour was found by Nandi et al. (2012) as positively affecting adoption of innovation as labour availability is a requirement for technology adoption. Additionally, this result is collaborated by Haliu (2008) who established that improved farming practices required lots of labour thus families with lots of labour force used technologies on their farms more than those without.

Off – farm work engagement

The results of this study also show that there is a positive significant relationship between the use of agricultural information and the engagement in off – farm work. There is a possibility of using information by 1.118 units when a farmer engages in

off – farm work. Engaging in off – farm work brings additional income to the house aside the farming activity which is highly seasonal (Davis, 2003). However, Akudugu et al. (2012) observed a negative relationship between off-farm work and adoption of technologies, this is because they are likely to interfere in the farm activities.

Group membership

The positively significant influence of group membership on the use of agricultural information could be due to the fact that farmers usually interact among themselves in a group thus share innovations they have tried and were helpful to them. It might also be as a result of the stimulation of information exchange among members as a result of each other's experience and knowledge. Majority of farmers (97.4%) belonged to agricultural groups which only do not teach farmers but link them to sources to credit, agro–inputs which Ofuoku et al. (2006) mention as some of the benefit of belonging to a group which helps them in their use of recommendations from information sources. Belonging to a group was also a means of having regular access to Government and private extension services. From the results farmers belonging to a group increased their probability of using agricultural information by 2.996 units.

Information seeking behaviour

The result also shows that a unit increase in farmers' information seeking behaviour leads to 0.255 unit increase in the use of agricultural information. Similarly Asres (2005) established that as information seeking behaviour of farmers increases their utilization of accessed information also increases. Table 4.19 presents significant predictor variables of farmers' use of agricultural information.

Table 4. 22: Significant Predictor Variables of the use of agricultural information

Predictor variables	B	t	p - value
Household size	-0.279	-2.212	0.028
Availability of labour	0.919	2.458	0.015
Off – farm work	1.118	2.265	0.024
Group membership	2.996	5.133	0.000
Information seeking behaviour	0.255	3.679	0.000
$R^2 = 0.514$			
p value = 0.000			
Standard error = 3.57			

Source Author's own construct 2014

Note: All significant and non-significant variables are presented in appendix I

4.9 Relationship between level of access to agricultural information and level of use of agricultural information.

This study has revealed that the level of access to agricultural information by cocoa farmers in the Sefwi Bekwai Cocoa District affects their level of use of the information ($R^2 = 0.894$, F (1, 258) = 2181, p = 0.000) (Appendix 11c). This implies that increasing level of access to agricultural information leads to an increase in the use of agricultural information. Table 4.19 presents the actual variables of level of information access that predict the level of use of the information by farmers. The results indicate that variables such as frequency of access to the information, clarity of language used in dissemination and relevance of information disseminated significantly influenced level of use positively ($R^2 = 0.897$, F (5,254) = 440.16, p = 0.000). The relationship is significance at 1% significance and the variation in the use of agricultural information is explained by the independent variables by 89.7%.

The result suggests that a unit improvement in the frequency of access to agricultural information will lead to a 0.284 units increase in the level of use of information. This

means that when the source of information is always available, there is a high probability of use of the information by farmers. Their availability could lead to the seeking of further clarifications by the farmers thus clearing their doubt about the information. It also serves as a follow up check if the right things are being done the farmers. Similar to this result, Asiabaka & Owens (2002) established a significant positive relationship between the availability of information source and adoption by farmers. Furthermore, Adebiyi & Okunlola (2013) found a positive relationship between frequency of access to information by farmers and adoption of coca rehabilitation techniques which means regular access to agricultural information, they adopt the techniques available to them

From the results in Table 4.19, a unit improvement in the clarity of the language used in the dissemination of information leads to a 0.208 unit use of agricultural information. The clarity of language used in the dissemination plays an important role in the understanding and use of the information by the farmers, clarity of the language removes all vagueness about the information disseminated. Sani, Boadi, Oladokun & Kalusopa (2014) found language used in the dissemination of information as a barrier to its use in Nigeria. Additionally, language barrier or understanding of the language used in the dissemination of agricultural information was found by Daudu et al. (2009) as a barrier to the use of information in Benue state in Nigeria. The above literature implies that for information to be used there must be clarity which would be achieved if the language used in the dissemination is very common in the locality. In research to find out the influence of education on the dissemination of soil fertility information, Kimaru-Muchai, Mugwe, Mucheru-Muna, Mairura & Mugendi (2012) found out that about 99.6% of the farmers preferred the use of vernacular language in the dissemination.

Dissemination of relevant information leads to a 0.133 unit use of the information, implying dissemination to needed information to farmers at the right time is very necessary. From the results there is an increase in use of information if the information is relevant for a particular period. Poor relevance and usefulness of information led to the non-utilization of agricultural information by farmers in India (Babu, Claire, Asenso-Okyere, & Govindarajan, 2011). Table 4.20 present the significant variables for the level of use of information.

Table 4. 23: Relationship between level of agricultural information access and use.

Variable of access level	B	t	p - value
Constant	-0.802	-2.698	0.008
Frequency of access	0.284	3.805	**0.000**
Timeliness of access	0.079	1.307	0.193
Clarity of language used	0.208	2.450	**0.015**
Clarity of disseminated information	0.043	0.479	0.632
Relevance of information	0.133	2.026	**0.044**
R^2 = 0.897, p value = 0.000			
Standard error = 1.602			

4.10 Effect of the level of use of agricultural information on the livelihood outcomes of cocoa farmers

In order to obtain the relationship between farmers' level of use of agricultural information and their livelihood outcomes, the chi-square test of independence was used.

4.10.1 Effect of level of agricultural information use on yield of cocoa

The Contingency Table 4.21 below shows a Chi-square test of independence for farmers' level of use of agricultural information and their level of yield.

The table shows the results of a hypothesis test run to determine whether or not to reject the idea that the row and column classifications are independent. Since the p value in the table is less than 0.05, the null hypothesis cannot be accepted. It could therefore be deduced that there is a statistically significant relationship between level of use of agricultural information and level of yield of farmers at the 95.0% confidence level (χ^2= 39.863, df = 4, p = 0.000). This means increasing use of agricultural information in cocoa production comes with a corresponding increase in yield.

Table 4. 24: Effect of Level of agricultural information use on yield of cocoa

Level of farmers yield (Kg)	Level of use of Agricultural Information			Total
	Low (1– 10)	Moderate (11 – 19)	High (20 – 20)	
Low (≤350kg)	92(63.4)	47(32.4)	6(4.1)	145(100)
Mod (356 – 650kg)	29(28.4)	63(61.8)	10(9.8)	102(100)
High(>650kg)	4(30.8)	5(38.5)	4(30.8)	13(100)
Total	125(48.1)	115(44.2)	20(7.7)	260

χ^2= 39.863, df = 4, p = 0.000, < 0.05 (S), Gamma = 0.554.

Agricultural information transfer is a means of reaching farmers with new and improved ways of doing farming such as agro – chemicals to use, when and how to apply them, agronomic practices to undertake on the farm, where to obtain certain inputs among others. From the results, increasing use of these information helps increase the yields of farmers. This finding is supported by Ojo et al. (2013) who report of differential access to agricultural technologies and support services leading to differences in productivity of farmers. Furthermore, Agbebi (2012) observed

different levels of yield among fish farmers in Nigeria as a result of differences in the application of improved practices they received from extension officers. Ahmad, Jamal, Ikramullah & Himayathullah (2007) reports of tomato and onion farmers who utilize agricultural information recording higher yields than those without access to and use of agricultural information. The positive Gamma co - efficient of 0.554 implies a moderate effect of the agricultural information use on farmers' yield and the relationship is positive meaning as information use increased, there was a corresponding increase in the yield of cocoa.

4.10.2 Effect of level of agricultural information use on farmers' annual income

The Contingency Table 4.22 shows a Chi-square test of independence for farmers' level of use of agricultural information and their average annual income.

From the table there is a significant relationship between the level of use of agricultural information and the average annual income of farmers (χ^2= 15.825, df: 2, p = 0.000). This means that an increase in the use of agricultural information is likely to increase the incomes of farmers. The use of agricultural information is not only for cocoa production but for other cultivated crops and animals leading to the increase in production levels of all these crops and animals which have a direct bearing on the incomes of farmers. There is a report of a significant increase in the income of farmers who had access and utilized information from NAADS than those who did not utilize it (Benin et al., 2007). Also in agreement with this finding, Agbebi (2012) in his study of the assessment of the impact of extension services on fish farming in Ekiti state found out that the higher the access to and use of agricultural information in fish farming practices by the farmers, the higher their profit. Okwoche & Asogwa (2012) also arrived at the same result of that of the fish farmers for cassava farmers in Benue state in Nigeria. Rizvi (2011) in India also had similar results that information

use by farmers sent via the mobile phone resulted in an increase in productivity and incomes of farmers. There is a moderate effect of the level of use of information on farmers' level of annual income as indicated by a Gamma co – efficient of 0.433. The positive Gamma value implies that as information use increased, farmers' income also increased.

Table 4. 25: Effect of Level of agricultural information use on farmers' income

Level of farmers average annual income (GH¢)	Level of use Of Agricultural Information			Total
	Low (1 – 10)	Mod (11 – 18)	High (19 – 28)	
< GH¢ 6428	93 (56.4)	65 (39.4)	7 (4.2)	165 (100)
> GH¢ 6428	32 (33.7)	50 (52.6)	13 (13.3)	95(100)
Total	125(48.1)	115(44.2)	20 (7.7)	260(100)

χ^2= 15.825, df: 2, p = 0.000, < 0.05 (S), Gamma = 0.433

4.10.3 Effect of Level of agricultural information use on farmers' wellbeing

The Contingency Table 4.23 shows a Chi-square test of independence for farmers' level of use of agricultural information and their wellbeing.

Since the p value in the table is less than 0.05, the null hypothesis cannot be accepted and that the rows and columns are independent at the 95.0% confidence level. Therefore, there is a statistically significant relationship between the level of farmers' use of agricultural information and their level of wellbeing (χ2= 13.538, df: 2, p = 0.001).

This means that an increase in the level of use of agricultural information by a farmer is likely to produce an increase in the level of wellbeing of the farmer. This could be linked to most of the farmers cultivating crops aside the cocoa production which serves as source of food and additional income especially when cocoa is not in season which also make use of agricultural information. Some also raised animals which provided them with their protein needs. There is a report of an improvement in the

food security and nutrition of farmers who had access and utilized information from NAADS than those who did not utilize it (Benin et al., 2007)

Table 4. 26: Effect of Level of agricultural information use on farmers' wellbeing

Level of Satisfaction of basic household needs	Level of use Of Agricultural Information			Total
	Low (1 – 10)	Mod (11 – 18)	High (19 – 28)	
Moderate (10 -15)	50(63.3)	28(35.4)	1(1.3)	79
High (16 – 18)	75(41.4)	87(48.1)	19(10.5)	181
Total	125(48.1)	115(44.2)	20(7.7)	260

$\chi 2$= 13.538, df: 2, p = 0.001, < 0.05 (S), Gamma value = 0.441.

Certification schemes which provide the platform for the dissemination of agricultural information is mentioned by KPMG (2013) of providing training for farmers on agronomic practices such as good pesticides application, protecting farmers from diseases, linking of farmers to credit, and training of farmers on extra income generating activities with it resultant effect on increase in yields and income leading to satisfaction of basic needs in theirs home. Similarly, Fengying et al. (2011) report of improvement in the quality of life of farmers', the improvement in the local economy and society as a result of utilization of information received from the village information centre. There is a moderate effect of the level of use of information on the level of assets possession as depicted by Gamma co - efficient of 0.441. There is also a positive relationship implying that as information became high, farmers' wellbeing also improves.

4.10.4 Effect of Level of agricultural information use on farmer's assets possession

The Contingency Table 4.24 below presents a chi-square test of independence showing the farmers' level of use of Agricultural information and their level of assets possession.

Since the P value is less than 0.05, the null hypothesis is not accepted. It could therefore be deduced that there is statistically significant relationship between the two variables (level of use of agricultural information and farmers' level of possession of household assets) ($\chi 2$= 12.014, df: 4, p = 0.017). The significant relationship could be attributed to the increase in farm yield as a result of the use of agricultural information. This leads to increase in income of farmers enabling farmers to own basic household assets. Similar to this finding, Mapila et al. (2011) observed that the use of rural agricultural innovations resulted in the positive impact on the total assets holdings of farmers. The Gamma co – efficient of 0.305 shows a weak effect of the information use on farmers' possession of assets. The positive Gamma value depicts a positive relationship, as information use increased farmers' assets possession also increased.

Table 4. 27: Effect of level of agricultural information use on farmers' possession of basic assets.

Level of possession of Basic household assets	Level of use Of Agricultural Information			Total
	Low (1 – 10)	Mod (11 – 18)	High (19 – 28)	
Low (<9)	83(54.6)	60(39.5)	9(5.9)	152(100)
Moderate (10 – 16)	40(41.7)	48(50.0)	8(8.3)	96(100)
High (17 – 23)	2(16.7)	7(58.3)	3(25)	12(100)
Total	125(48.1)	115(44.2)	20(7.7)	260(100)

$\chi 2$= 12.014, df: 4, p = 0.017, > 0.05 (S), Gamma = 0.305

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the study, presents the very important findings and succinctly presents the conclusions that were made as a result of the study. Key recommendations are then proffered.

5.2 Summary

The central objective of this study was to assess the effect of use of agricultural information on the livelihood of cocoa in the Sefwi Bekwai Cocoa District. The study therefore addressed the following issues:

(1) To ascertain the relationship between the farmers' characteristics, institutional factors and their level of access to agricultural information

(2) To determine the relationship between the farmers' characteristics, institutional factors and their level of use of agricultural information,

(3) To determine the influence of the level of use of agricultural information on the livelihood of cocoa farmers and

(4) To determine the relationship between the level of access to agricultural information and information use.

To address the above objectives, a largely quantitative research design was adopted for the study with survey as the main method. The sample size was made up of 260 cocoa farmers within the Sefwi Bekwai cocoa District in the Western Region. The study adopted the multi-stage sampling technique: Purposive, cluster and the simple random sampling technique. Primary data was largely used for the study. Data was

collected by the use of questionnaires and it was analysed using two computer software; Microsoft Excel 2010 and Statistical Package for Social Sciences (SPSS). Both descriptive and inferential statistics were conducted for the analysis of the data.

Objective 1

For objective one, a Chi square analysis proved that a significant relationship exists between educational level, farm size, growth of additional crops, labour availability, access to credit, group membership and access to agricultural information. There is also a significant relationship between distance to agro-input market, farmers' information seeking behaviour, achievement motivation, innovation proneness and farmers attitude towards improved farming practices at 5% significance level.

A multiple linear regression yielded an R^2 value 0.0.498 implying together the predictor variables have been able to explain 49.8 percent of the variability in the dependent variable (access to agricultural information). The analysis have shown that, three farmer characteristics namely: household size, farmers' information seeking behaviour and attitude towards improved farming practices all have significant influence on the level of farmers' access to agricultural information. Two institutional factors namely: labour availability, group membership influenced the level of farmers' access to agricultural information. A unit increase in household size will lead to 1.664 units decrease in access to agricultural information, an increase in labour availability by 1 unit will result in 4.662 unit increase in level of farmers' access to agricultural information, farmers belonging to group lead 14.594 units increase in level of farmers access

to agricultural information and a unit increase in farmers' information seeking behaviour will yield 1.062 units increase in level of access to agricultural information. Farmers with favourable attitude towards improved farming practices increase their access to agricultural information by 0.645 units.

Objective 2

For objective two, a Chi square analysis proved that a significant relationship exists between educational level, farm size, labour availability, access to credit, group membership and access to agricultural information. There is also a significant relationship between distance to agro-input market, farmers' information seeking behaviour, achievement motivation, innovation proneness and farmers attitude towards improved farming practices at 5% significance level.

A multiple linear regression yielded an R^2 value 0.514 implying together the predictor variables have been able to explain 51.4 percent of the variability in the dependent variable (use of agricultural information). The analysis have shown that two farmer characteristics namely: household size and farmers' information seeking behaviour all have significant influence on the level of farmers' use of agricultural information. Two institutional factors namely: labour availability and group membership influence the level of farmers' use to agricultural information. A unit increase in household size will lead to 0.279 units decrease in the use of agricultural information, an increase in labour availability by 1 unit will result in 0.919 unit increase in level of farmers' use of agricultural information, farmers belonging to a group lead 2.996 units increase in level of farmers use of agricultural information and a unit increase in farmers' information seeking behaviour will yield 1.062 units increase in level of access

to agricultural information. Farmers level of use of agricultural in increases by 0.255 when they seek for information.

Objective 3

The study also revealed that increase in the level of access to agricultural information leads to an increase in the use of agricultural information. A multiple linear regression yielded an R^2 value of 0.894 implying that the predictor variables have been able to explain 89.4 percent variability in the level of farmers' use of agricultural information. The analysis shows that frequency of access to the information, clarity of language used in dissemination and relevance of information disseminated significantly influenced level of use positively. The results suggests that a unit improvement in the frequency of access to agricultural information will lead to a 0.284 units increase in the level of use of information, a unit improvement in the clarity of the language used in the dissemination of information leads to a 0.208 unit use of agricultural information and the dissemination of relevant agricultural information leads to a 0.133 unit use of the information.

Objective 4

There is a statistically significant relationship between the level of use of agricultural information and the level of yield of cocoa, level of average annual income of farmers and level of farmers' wellbeing at 5%. There is also a statistically significant relationship between level of use of agricultural information and the level of possession of basic household assets at 5%.

5.3 Conclusion

The study established that three farmer characteristics namely; household size, information seeking behaviour and attitude towards improved farming practices all have significant influence on level of farmers' access to agricultural information. Two institutional factors namely; labour availability and group membership by farmers were also found to have significant influence on access to agricultural information.

Household size and information seeking behaviour of farmers all have significant influence on level of farmers' use of agricultural information. Two institutional factors namely; labour availability and group membership by farmers were also found to have significant influence on use of agricultural information.

The study revealed that farmers' level of use of agricultural information is likely to be influenced by their level of access to agricultural information with the significant determinant been frequency of access, clarity of language used and the relevance of the information.

Finally, the study found that the level of farmers' average yield per hectare, average annual income, level of farmers' wellbeing and possession of basic assets are likely to be influenced by their level of use of agricultural information. It can therefore be concluded that increasing farmer's level of use of agricultural information leads a positive improvement in their livelihood outcomes.

5.4 Recommendations

Based on the findings and conclusions of this study, the following recommendations are made:

It is observed that access to and use of agricultural information brought improvement in the livelihood of cocoa farmers. Thus actions that enhance farmers' access to and use are recommended.

From the results it is observed that the use of information where farmers are able to have a face to face interaction with the source is high thus the following are recommended:

- Service providers should have a frequent face to face interaction with the farmers which could be done through farmer field schools, rallies, farm demonstrations among others.
- Government agencies responsible for extension services and other non-state organizations that are into the provision of agricultural information should offer training programs for lead farmers in the communities. These people will then serve as contact farmers in their various communities. Additionally, routine training of input dealers in the various communities should be undertaken to improve upon their knowledge levels since they are a regular source of agricultural information.
- Cocoa farmers should be sensitized to subscribe to the various farmer groups that abound in their communities. In communities that do not have groups, it is recommended that groups even if not agricultural in nature should be formed through the facilitation of the extension agents in the area. This will make information easily accessible and enhance it use as per the results. Subscribing to farmer groups will also make accessible credit facilities to farmers to improve upon their production levels.

It is also recommended that the dissemination of information by service providers should be done using the predominant language in the area. This will make the farmers have a sense of belongingness and also make clear information disseminated. Additionally, dissemination of information should be timely, it should not be general. Appropriate messages should be disseminated for the season when those messages are needed. Farmers should be encouraged to have a behavioural change in their search for agricultural information since the sources would not be within their reach to address their problem at any particular point in time.

A further study into farmers access to agro-inputs is also recommended since it is a compliment to the use of agricultural information.

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APPENDICES

Appendix I: Questionnaire

UNIVERSITY OF GHANA

COLLEGE OF AGRICULTURE AND CONSUMER SCIENCES

AGRICULTURAL EXTENSION DEPARTMENT

The purpose of this research is to assess the livelihood outcomes of differential use of agricultural information by cocoa farmers'. The Sefwi Bekwai Cocoa District was chosen because of its high level of cocoa production in Ghana. You are considered a major stakeholder who can provide useful and insightful information on the topic and therefore i shall be very grateful if you can spare part of your time to be of assistance to me. You are assured of confidentiality and anonymity because the study is purely for academic purposes (Master of Philosophy degree in Agricultural Extension at the University of Ghana, Legon).

Village	
Respondent's name/Mobile	

SECTION I: SOCIO-ECONOMIC FACTORS OF HOUSEHOLD HEAD

1. Sex (1) Male (2) Female

2. Age [ ] years

3. What is your marital status? (1) Single 2) Married 3) Widowed

4. What is your highest educational level? 1) No formal education 2) Basic education 3) Secondary education 4) Tertiary education

5. How many years did you spend in school? .....

6. What is the size of your household? 1) Adult [ ] 2) Children < 18years [ ]

7. What is the type of ownership of your farm? 1) Sole Proprietorship 2) Sharecropper 3) Contract farmer 4) other specify…….

8. What other work do you do apart from farming?

#	Occupation
1st	
2nd	
3rd	
4th	

9. How many years have you been involved in cocoa farming? .....

10. What is the size of your cocoa farm? …….

11. What size of the farm is bearing? ……..

12. What type of labour do you use on your farm? (Please tick all that apply)

Type of Labour	Tick here
1. Family	
2. Hired	
3. self-help group	
4. Other specify	

13. Apart from cocoa which other crop(s) do you cultivate?

#	Crop	Tick here
1	Maize	
2	Plantain	
3	Cassava	
4	Cocoyam	
5	Oil palm	
6	Rice	
7	Vegetables	
8	Yam	
9	Pear	
10	Citrus	

SECTION II: ACCESS TO AGRICULTURAL INFORMATION.

14. Answer the questions with regard to access to extension services

#	Provider	Source	1	2	3	4	5
1	Cocobod/MoFA						
2	LBCs						
3	Input dealers						
4	NGOs/private extension						
5	TV						
6	Radio						
7	Newspapers/posters/leaflets						
8	Farmer groups						
9	Friends						

Frequency of access of information; 1 = yearly, 2 = every six months, 3 = quarterly, 4 = monthly and 5 = weekly
Timeliness of access of information; 1 = never on time, 2 = rarely on time, 3 = sometimes on time, 4 = often on time and 5 = always on time.
Clarity of language used in dissemination; 1 = never clear, 2 = rarely clear, 3 = sometimes clear, 4 = often clear and 5 = always clear.
Clarity of information disseminated; 1 = never clear, 2 = rarely clear, 3 = sometimes clear, 4 = often clear and 5 = always clear.
Relevance of information; 1 = never relevant, 2 = rarely relevant, 3 = sometimes relevant, 4 = often relevant and 5 = always relevant.

15. How often do you use the information from the sources you have mentioned?

Code	Source of service	1	2	3	4
1	Cocobod/MoFA				
2	LBCs				
3	Input dealers				
4	NGOs/private extension				
5	TV				
6	Radio				
7	Newspapers/posters/leaflets				
8	Farmer groups				
9	Friends				

1 = never, 2 = rarely, 3 = sometimes and 4= always.

Section III: Orientation towards improved farming

Information seeking behaviour

16. How often do you seek new information on the following activities?

Code	Activities	1	2	3	4	5
1	Farm sanitation					
2	Pest control on cocoa					
3	Diseases control on cocoa					
4	Recommended agro-chemicals to use					
5	Cultivation of other crops					
6	Raising of animals					
7	Raising of nurseries					
8	Shade management in cocoa cultivation					

1 = never, 2 = rarely, 3 = sometimes, 4 = very often and 5 = always

Achievement motivation

How regularly do you perform the following during the year?

#	Activity	1	2	3	4	5
1	Pruning for sunshine penetration					
2	Regular mistletoe removal					
3	Regular weed control (2 –4 times)					
4	Application of fertilizer					
5	Four to six times application of fungicides					
6	Four times application of insecticides					
7	Harvesting on time, not when majority of pods are ripe					
8	Removal of black pods					

1 = never, 2 = rarely, 3 = sometimes, 4 = often and 5= always.

Innovation proneness

27. Do you use the following and how do you accept them? Tick from option on the table.

Code	Agricultural practices	Use		How do you accept the idea?		
		Yes	No	1	2	3
1	Row planting					
2	Pruning of the trees					
3	Hybrid seedlings					
4	Raising of nurseries					
5	Chemical Fertilizer					
6	Mistletoe removal					
7	Chemical weed control					
8	Harvesting regularly and not when most pods are ripe					
9	Periodic removal of black pods					
10	Drying beans from diseased pods separately from beans from healthy beans					

1= after most of the people have accepted/adopt it.
2= after consulting others who are more knowledgeable and using it.
3= whenever i become exposed to it.

Attitude towards improved farming practices

28. To what degree do you agree on the following statement?

Code	Negative Statement	1	2	3	4	5
1	Fermenting cocoa for 5 days is the best					
2	Empty bottles of agro-chemicals can be used in the homes					
3	Pods from my farm are very good for planting					
4	Planting haphazardly increases yield					
	Positive statement	5	4	3	2	1
5	Spacing of 3m*3m is the best					
6	Pruning helps prevent cocoa black pod					
7	Row planting will increase my yield					
8	Too much application of herbicides is harmful to the environment.					

1=strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree for positive statement
5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree and 1 = strongly disagree for negative statement

Section IV: Institutional Factors

Credit access

29. Do you have access to credit for your production activities? (1) No 2) Yes

30. If yes what is the source of credit? (Tick all that apply)

C	1	2	3	4	5	6
	Bank	Money lender	Friends/family	PC	Input supplier	Other, please specify
T						

Market access

31. How frequently do you visit the market? (1) Not at all (2) Every market day
(3) When I have something doing there (4) other specify

32. How far is your residence from the market? ……km

<u>Group membership</u>

33. Are you a member of any social or agricultural group? (1) Yes (2) No

34. If yes name the group(s) ……

Section VI: Livelihood Outcomes

Farm yield

35. In the last season, how many bags of cocoa did you harvest per hectare?

Code	Crop	Yield (kg)
1	Cocoa	

36. Income (per annum)

Income	**GHC**
Sale of cocoa	
Income from animal sales	
Income from sales of other crops	
Food crops consumed	
Food crops given as gift	
Income from wages and salaries	
Income from remittances	
Income on personal services	
Others	

37. Farmers wellbeing

Indicate the level to which you are able to afford the following for your household?

Need	**Responses**		
	Never	**Sometimes difficult**	**Always**
Daily food needs			
Clothing			
Water			
Shelter			
Education			
Health			

37. Which of the following Assets do you possess?

Code	**Asset**	**Tick here**	**Source of funds for purchase**
1	Radio		
2	Bicycle		
3	Bed		
4	Mattress		
5	TV		
6	Motor		
7	Car		
8	Mist blower		
9	Knapsack sprayer		
10	Mobile phone		

Appendix II: Regression Analysis Tables

Appendix IIa: Effect of independent variables on access to agricultural information

Variable	Unstandardized coefficients		Standardized Coefficients	t	sig
	B	std error	B		
Constant	-12.208	17.507		-0.697	0.486
Sex	1.359	4.025	0.024	0.338	0.736
Age	0.088	0.149	0.042	0.591	0.555
Marital status	-2.182	3.907	-0.038	-0.559	0.577
Years of schooling	0.385	0.284	0.071	1.355	0.177
Household size	-1.664	0.651	-0.140	-2.557	**0.011**
Farm ownership	1.336	3.498	0.020	0.382	0.703
Other occupations	2.790	2.544	0.056	1.097	0.274
Years in farming	0.175	0.171	0.072	1.018	0.310
Farm size	-0.176	0.654	-0.014	-0.269	0.788
Labour availability	4.662	1.942	0.129	2.401	**0.017**
Growth of other crops	5.998	9.972	0.030	0.601	0.548
Access to credit	2.437	2.580	0.049	0.945	0.346
Frequency of market visit	-0.222	3.489	-0.003	-0.064	0.949
Distance to market	0.295	0.264	0.058	1.117	0.265
Group membership	14.594	3.007	0.291	4.853	**0.000**
Information seeking behaviour	1.062	0.315	0.209	3.373	**0.001**
Achievement motivation	0.168	0.204	0.044	0.825	0.410
Innovation proneness	0.213	0.343	0.037	0.623	0.534
Attitude towards improved farming	0.645	0.270	0.147	2.384	**0.018**
Dependent Variable: Access to Agricultural Information					
R^2 = 0.498, F (sig.) = 12.515 (**0.000**)					

Appendix IIb: Effect of independent variables on the use of agricultural information

Variable	Unstandardized coefficients		Standardized Coefficients	t	sig
	B	std error	B		
Constant	-3.594	3.397		-1.058	0.291
Sex	-0.012	0.781	-0.001	-0.016	0.988
Age	0.009	0.029	0.021	0.300	0.764
Marital status	-0.314	0.758	-0.028	-0.414	0.680
Years of schooling	0.058	0.055	0.055	1.057	0.292
Household size	-0.279	0.126	-0.119	-2.212	**0.028**
Farm ownership	0.637	0.679	0.048	0.939	0.349
Off – farm work	1.118	0.494	0.113	2.265	0.024
Years in farming	0.048	0.033	0.099	1.436	0.152
Farm size	-0.144	0.127	-0.058	-1.139	0.256
Labour availability	0.919	0.377	0.129	2.438	**0.015**
Growth of other crops	0.999	1.935	0.025	0.516	0.606
Access to credit	0.743	0.501	0.075	1.484	0.139
Frequency of market visit	-0.513	0.677	-0.037	-0.757	0.450
Distance to market	0.068	0.051	0.068	1.329	0.185
Group membership	2.996	0.584	0.303	5.133	**0.000**
Information seeking behaviour	0.225	0.061	0.0224	3.679	**0.000**
Achievement motivation	0.041	0.040	0.053	1.028	0.305
Innovation proneness	0.051	0.067	0.045	0.760	0.448
Attitude towards improved farming	0.094	0.052	0.108	1.790	0.075

Dependent Variable: Use of Agricultural Information

R^2 = 0.514, F (sig.) = 13.365 (**0.000**)

Appendix 11c relationship between information level of access and use

Parameter	B	t	p - value
Constant	-0.821	-2.962	0.003
access to information	0.186	46.705	0.000
R^2 = 0.894			
p value = 0.000			
Standard error = 1.607			

Appendix iii a : Operational framework for data collection.

Study Concepts	Variables	Information Required	Source of Information	Method of Data Collection
Socio-economic	1. sex 2. Age 3. Marital Status 4. Educational Level 5. Household Size 6. Farming experience 7. Farm Size 8. Type of Farm Ownership 9. Type of Labour 10. off – farm work 11. other crops cultivated	Gender, Age, Marital Status, Educational Level, Household Size, Farming experience, Farm Size, Type of Farm, Ownership type, Type of Labour, Other occupations, and Other crops grown	Farmers	Questionnaire Administration
Access to and use of agricultural information	1. Access to agricultural information 2. Use of extension service	Access to and use of agricultural information	Farmers	Questionnaire Administration
Farmers' orientation towards improved farming	1. Information seeking behaviour 2. Attitude towards improved farming practices 3. Production motivation 4. Innovation proneness	The extent of information seeking by farmers, rate of use of innovations, means of improving upon production and farmers' attitudes towards improved farming practices	Farmers	Questionnaire Administration
Institutional Factors	1.Credit access 2. Frequency of market visit 3. distance to market 4. Group membership	Credit access, frequency of visit, distance to market and Group membership	Farmers	Questionnaire Administration
Livelihood Outcomes	1. Yield 2. Farmers' average annual income 3. Satisfaction of Basic needs 4. Assets possession	Farmers' yield of cocoa, the farm income derived from various crops, other non-farm income, how well farmers are able to cater for their basic needs and assets owned by farmers	Farmers	Questionnaire Administration

Appendix III b: Descriptive statistics of independent variables

Variable	Categories	Frequency	Percentage
Type of group	Agricultural Social	114 3	97.4 2.6
Type of off-farm work	Teaching Trading Artisanal Others	7 49 42 18	6.0 42.2 36.2 15.5
Number of crops grown	≤4 >4	25 235	9.6 90.4
Reason for joining group	Learning Credit Both credit and learning	57 2 58	48.7 1.7 49.6
Sources of credit	Bank Informal From more than one source	22 103 8	16.5 77.4 6.1

Appendix iii c : Farmers orientation towards improved farming.

Variable	Category	Frequency	Percentage
Information seeking behaviour	Low Moderate High	92 133 35	35.4 63.1 1.5
Achievement motivation	Low Moderate High	45 123 92	17.3 47.3 35.4
Innovation proneness	Low Moderate High	55 160 45	21.2 61.5 17.3
Attitude towards improved farming	Low Moderate High	32 97 131	12.3 37.2 50.4