DETERMINANTS OF MANAGERIAL ABILITIES OF SMALL SCALE COCOA FARMERS: AKINYELE LGA OF OYO STATE OF NIGERIA

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ABSTRACT

This study is an empirical adventure into an attempt to increase the production of export crops through better farming practices. Specifically, it looks into the determinants of managerial ability of small scale cocoa farmers in Akinyele Local Government Area of Oyo state. Multistage sampling technique was employed for the study. Data for the study were collected from 72 cocoa farmers with the aid of structured questionnaires. The data were analyzed using descriptive and principal component technique. The study revealed that the first component is observed to contain about one fifths of the total variation in the forty-five variables. Only five components account for the rest of the variation. An index of 0.98 provides how well this particular solution accounts for all the variables taken together and it also shows that the variables are not different from each and account for all the groups. The result further shows that, source of labour, purchase of fungicide, variety of cocoa grown, source of credit, number of man days for land preparation and planting as well as effectiveness of spraying have negative impact on the managerial abilities of small scale cocoa farmers in the study area. Those variables not considered may indicate no influence on management ability of cocoa farmers in the study area. Refocusing policies to enhance emphasis on efficient technological development adequate infrastructural support stable and efficient institutional support efficient input supply and delivery systems and other cost effective support services in agriculture is recommended by this study.

Keyword: Cocoa, farmers, managerial ability, principal component technique.

INTRODUCTION

Agriculture is an important occupation in Nigeria with over 70% of the population depending on it directly or indirectly for livelihood. It provides the bulk of employment, income and food for the rapidly growing population as well as supplying raw materials for agro-based industries. The agricultural export sub sector plays a major role in the foreign exchange earning of the country. In the aspect of foreign exchange the significance of cash crops cannot be underestimated most especially in the pre-independence and early independence periods in the Nigeria's history (CBN. 1997). The role of the agricultural export crop sub-sector before the oil boom of 1970's was substantial. During the early period of independence this sub-sector accounted for larger proportion of the Gross Domestic Product (GDP) (Shittu, 1997; Fashina, 1999; Oduwole 2004; CBN 1986). With this large contribution to domestic output, the sub-sector dictated to a large extent the pace for growth and development of the Nigerian economy. However, the gravest problem was caused by the government's decision to stress the industrial sector above all others. This decision to abandon the known-agriculture-for the unknown-rapid large-scale industrialization-was a fundamental error. The capital and the skill needed for rapid, large-scale industrialization were not sufficiently available. Also, Nigeria's neglect of the agricultural sector aggravated already problematic food shortages.

Given the instability in oil prices and the estimated low reserves of the country's petroleum, the performance of the agricultural sector especially the export sub sector and its ability to earn foreign exchange still make this sector an important force to reckon with in the country's development process. In fact, the fortune of many developing countries and the extent to which development can be accelerated are in-extricably tied to their agricultural commodity trade. Thus, there is urgent need to increase agricultural production especially cash crops and more importantly cocoa production as a pre-requisite to expanding Nigeria's participation in international trade and enhance the country's export trade diversification. The bulk of the foreign exchange the country earned from non-oil export was accounted for by the Cocoa. This crop has remained the second largest foreign exchange earner after the crude oil (CBN, 1998). The crop accounts for not less than 0.6% of the total export earning, and 24% of agricultural export earnings between 1960 and 2003 (Oduwole 2004, Sanusi and Obatolu 2005).

Problem statement

Of great significance to the Nigerian agricultural sector is the agro-forestry sub-sector, which is the integration of cash/trees, food crops and/or animals in an interactive manner (Okadi 2007). Cash crops have witnessed tremendous structural and fundamental changes in the areas of production, marketing and distribution (Fashina and Oduwole. 1999). Cocoa is a high value cash crop among farmers in the major producing areas in Nigeria. The bulk of cocoa output is derived from numerous small scale farmers who live in rural areas which are devoid of social amenities (such as electricity,

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pipe borne water, hospitals and schools). The contribution of the crop to the GDP of the economy was so large but tragically starts to decline year after year. The decline was attributed to the neglect of the agricultural sector.

In 2001 a New Agricultural Policy and the Integrated Rural Development Policy were initiated to ensure national food security, attain self-sufficiency in basic food production, enhance employment opportunities and achieve high growth rate for the economy. These policies are being implemented by the National Economic Empowerment and Development Strategy (NEEDS) - a medium term economic reconstruction agenda aimed at value reorientation, wealth creation, poverty reduction, job creation and elimination of corruption. In order to fast track the gains of the 2001 New Agricultural Policy, there came the Presidential Initiatives in Agriculture (PIA) (2004). The PIA gave priority to four different crop-based expansions of production and utilization programmes (e.g. cassava, rice, tree crops and vegetable oil) and livestock and fisheries programme with a view to curtail the huge foreign exchange expended in their For the Tree Crops Initiative (TCI) Government's objective is the rapid multiplication and distribution of high yielding, disease resistant and early maturing planting seeds, seedlings and plantlets to farmers at subsidized rates. Despite the fact that programmes were formulated toward developing and improving agricultural productivity in Nigeria, yet the realization of these objectives are seriously in doubt. The falling cocoa production output in Nigeria (Table-1) is blamed on a number of factors such as:

(i) Use of crude/simple implements which require so much labour on small holdings
(ii) Largely old and illiterate farming practitioners
(iii) Non-economic use of time resource
(iv) Non use of economic and accounting principles in the management of these cocoa farms
(v) Prevailing land tenure system that makes individual ownership transitory and promote small holdings
(vi) Ignorance of nature and consequence of errors of type 1 and II.
(vii) Limited capital input and credit financing
(viii) Poor storage system and unstable prices

Table-1. Nigeria Cocoa Production Output.

Year	Cocoa production output ('000Tonnes)	Change in production
1970	305	-
1971	257	-48
1972	241	-16
1973	215	-26
1974	214	-1
1975	216	+2
1976	181	-35
1977	193	+12
1978	157	-35
1979	151	-6
1980	153	+2
1981	174	+21
1982	156	-18
1983	140	-16
1984	140	0
1985	160	+20
1986	148	-12
1987	100	-48
1988	253	+153
1989	256	-3
1990	244	-12
1991	268	+24
1992	292	+24
1993	306	+14
1994	323	+17
1995	203	-10
1996	323	+10
1997	325	+2
1998	345	+20
1999	165	-100
2000	170	+10
2001	171	+1
2002	172	+1
2003	185.5	+13.5
2004	202	+16.5
2005	215.4	+13.5
2006	228	+12.5

Source: Central Bank of Nigeria Statistic Bulletin, 2006, Federal Ministry of Agriculture and Rural Development and State Ministries of Agriculture.

Many development specialists now feel that raising small scale farmers output by increasing their management practices with corresponding increase in farm income is essential for economic development and political stability. Also, cocoa was among Nigeria's leading source of foreign exchange before the oil boom, and until now it is still Nigeria's largest agricultural foreign trade commodity and has helped to boost the economies of the major producing states in Nigeria. This study therefore focuses on cocoa-producing households, which according to Koppelman and French (2005) is the level at which all farm decisions are made. Therefore, a

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research into the managerial ability of small scale cocoa farmers would provide more relevant information concerning cocoa farming business and capable of change the negative trend and thereby elevating the nations' Gross Domestic Product (GDP) in the non oil sector.

The objectives of this study are to:

a) investigate the socio-economic factor influencing cocoa farmer's managerial ability;
b) examine the problems associated with managerial capabilities of cocoa farmers in the selected local government area; and
c) make policy recommendations.

Theoretical and conceptual framework

Production in general sense is the combination of inputs and its management to evolve a material called output. In agriculture, production requires factors classified as land, labour, capital and management. These resources need to be effectively managed in addition to adequate production technology to achieve maximum output vis-à-vis income.

Of the four basic factors of production, management has until recently being relegated to the background. This study focuses on management aspect of factor of production.

Ajobo (1975) defines as the aspects of human endeavour that guide the activities of individuals and organizations This guiding principle arises because decisions have to be made and action taken to fulfill goals and desires in a world of uncertainty and scarce resources. As actions are consequent to decision making, it is apparent that decision making is the central core of management which is a continuous process through an individual or organizations existence and are closely related to decision making. The management problem in agriculture sector is on the efficient combination of factor of production to obtain adequate economic returns to these factors be they land, labour or capital (hired or circulating financial or otherwise).

The problem of management is more acute for small holders who personally face the difficulty of earning a net income that is inadequate for their needs Management on cocoa farms is a very important aspect of cocoa production and therefore cocoa production should be more of a business than a way of life. Profit from cocoa cultivation can be increased through good management practices of the farmers. There are five major resources which the farmers need to manage on their farms and these resources are, the soil, climate, the tree, human resources and time (Ajobo 1975). Decisions have to be made on farm, particularly, when farmers are faced with limited resources and alternative courses of action and therefore he must make some choices (Oji, 2002). Farmers make decisions on a number of pre harvest and post-harvest activities such as what to produce, input use, harvest and post-harvest issues, which according to William (2003) affect production, processing, distribution, prices and costs. Farming decisions are made to maximize farm

objectives subject to available material and human resources. However, the available literature shows that men have continued to dominate farm decision making, even in areas where women are the largest providers of farm labour (Amaechina 2002, Enete and Amusa, 2010).

METHODOLOGY

The study area

The study was carried out in Oyo State; Oyo State is in the South West of Nigeria. Southwestern Nigeria produces 95 percent of total cocoa produced in the country (Alabi, 2003). Oyo State has 33 Local Government Areas (LGAS) with State Capital in Ibadan. It has about 5,591,589 people as at the last census of 2006, which are mostly small-scale farmers Oyo State Agricultural Development Project OYSADEP has grouped the state into four zones on ecological basis. The four zones are (1) Ibadan/Ibarapa zone, (2) Ogbomosho zone, (3) Saki zone and (4) Oyo zone. The study concentrates on Ibadan/Ibarapa zone where cocoa farming is popular. The major cocoa producing L.G.A.S in Ibadan/Ibarapa zone are Lagelu L.G.A, Oluyole L.G.A. Ona Ara L.G.A, Egbeda L.G.A, Akinyele L.G.A. and Iddo L.G.A. The State lies in Latitude.

The annual average rainfall is between 1200 - 2200 mm, relative humidity is between 80-85%. Rainy period is between 240-260 days/year, dry period is 96-125 days/year. The rain has a bimodal distribution, with peaks in June and in September and a period of lower precipitation in August. December to February constitute a major dry season. The main vegetation types are mostly Evergreen forest in the south and derived Savannah of Saki zone where there is mixed semi deciduous forest and dry deciduous forest. The soils are mainly Alfisols and Entisols. Agriculture is the principal occupation of men; women frequently farm independently of their husbands and, in general, are engaged in gainful activities such as food processing and petty trading in addition to their domestic responsibilities.

Sampling procedure and sample size

Data collection was done through the use of structured questionnaire. The target population for this study is cocoa farmers in Oyo State. The sampling technique method used is multistage sampling. Ibadan/Ibarapa Zone was purposively selected for this study because it has the highest concentration of cocoa farmers in the state. Akinyele Local government area (LGA) was randomly selected from LGAs that make up Ibadan/Ibarapa Zone. Eight villages were also randomly chosen from the list of the villages in the LGA obtained from Oyo state Agricultural Development Project (OYSADEP) in Ibadan. They are: Akinyele, Ikereku, Alabata, Iroko, Fasola, Saanu/Oyedeji, Elekuru/Abanla and Sango Ibon/Jarija. 14 farmers were further selected from each village that subsequently gave 112 farmers that constituted the sample size for the study. Only 72 of the returned questionnaires were found useful. The relevant

information in the returned questionnaires was coded and analysed using descriptive statistics and principal component analysis.

Analytical techniques

Descriptive statistics such as frequency distribution, mean, range and percentages were used for socio-economic variables while principal component analysis (PCA) was used to capture the selected variables that influenced managerial capabilities of the respondents. In the realization of this study, software programs commercially known as Minitab (1991) and Systat (1990) were used. Minitab (1991) statistical software was used in regression analysis for the substitution of missing values and systat (1990) was principally utilized for the derivation and subsequent rotation of principal components.

The Principal component model

The component analysis involves resolution of a set of variables into a new set of composite variables or principal components that are uncorrelated with one another. This is accomplished by the analysis of the correlation among the variables. The result of this is a yield of factors which convey all the essential information of the original set of variables.

Principal component analysis (PCA) is a multivariate statistical technique that addresses itself to the study of interrelationships among a set of observed variables all the variables in PCA are considered as dependent variables that is a function of some underlying latent are supposed to be orthogonal that is, uncorrelated one therefore look for the best linear combination of these variables that account for more of the variance in the data as a whole than any other linear combination of variables (Mazlum, *et al.*, 1999).

The first principal component may be viewed as the single best summary of linear relationships exhibited in the data. The second component is the next best linear combination of variables under the condition that the second component is orthogonal to the first components. The second one must account for the proportion of variance not accounted for by the first one. Subsequent components are similarly defined until all the data are exhausted. PC requires as many components as there are variables.

Principal component model may be compactly specified as

$$Zj = aj_iF_i + aj_2F_2 + aj_3F_3 + \ldots\ldots\ldots\ldots\ldots\ldots +aj_nF_n$$

Where each of the n observed variables is described linearly in terms of the n new uncorrelated components F_1, F_2, F_3, ……. F_n each of which in turn is defined as a linear combination of the n original variables. In all, forty-five variables selected and used in the orthogonal transformation exercise are:

Age of farmer (X_1), level of education (X_2), family size (X_3), farm size (X_4), man day of family labour engage (X_5) source of labour (X_6), land acquisition (X_7), reason for setting up the farm (X_8) crops interplanted with cocoa (X_9) purchase of improved seedlings (X_{10}) purchase of insecticide (X_{11}) purchase of fungicide (X_{12}) purchase of herbicide (X_{13}), purchase of fertilizer (X_{14}), labour cost (X_{15}), transportation (X_{16}), amount spent on improved seedling (X_{17}), amount spent on insecticide (X_{18}), amount spent on fungicide (X_{19}), amount spent on herbicide (X_{20}), amount spent on fertilizer (X_{21}), amount spent on labour (X_{22}), amount spent on transport (X_{23}), age of cocoa farm (X_{24}), variety of cocoa grown (X_{25}), secondary occupation of farmer (X_{26}), market place (X_{27}), place where highest price is obtained (X_{28}), sales period (X_{29}), reason for selling late/early (X_{30}), least input cost place (X_{31}), source of credit (X_{32}), average revenue for cocoa farm last year (X_{33}), average revenue from crops inter planted with cocoa last year(X_{34}), total revenue/year (X_{35}), average expenditure/year (X_{36}), number of man days for land preparation/planting/ha (X_{37}), number of man days for pruning and weeding/ha (X_{38}), number of man days for fertilizer application and spraying (X_{39}), number of man days for harvesting/processing (X_{40}), time of spraying (X_{41}), effectiveness of spraying (X_{42}), average pods broken/day (X_{43}), frequency of weeding (X_{44}), and reasons for secondary occupation(X_{45}).

RESULTS AND DISCUSSIONS

Socioeconomic characteristics of cocoa farmers

Table-2 shows the socioeconomic characteristics of cocoa farmers in the area of study. Majority (about 93.1 %) of cocoa farmers in the area are above 40 years. The mean age was 59 years. This implies that cocoa farmers in the area are dominated by old people. This result confirms Adetunji *et al.*, (2007) and Gray (2001) that cocoa farmers in West African countries in general have an average age of 50 years and above. About 65.3% of the farmers had no formal education. This has implication in there are ability to adopt technology that can improve their efficiency and resource use. However, farmers have the tendency to bear as many children as possible in the belief the greater the opportunity to use them as source of family labour. The family size was high in the area with an average of about 6 persons per cocoa household. Land was mainly acquired through inheritance. 53% of cocoa farmers have farm size less than hectare. Hired labour is prominent among the farmers most especially during peak period of weeding and harvesting. Labourers are paid in cash at pre-arranged daily rate usually ranging from ₦500-₦1200 depending on operation to be performed. Only, 16% of the farmers in the area obtained any forms credit assistance from formal credit institutions but receiving regular visit from extension agents.

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Table-2. Socioeconomic characteristics of cocoa farmers.

Variable	Frequency	Percentage	
Age (years)			
Less than 40	5	6.9	
41-50	12	16.7	
51-60	19	26.4	
61-70	23	31.9	
>70	13	18.1	
Total	72	100.0	
Mean			59.0
SD			10.0
Education level			
No formal	47	65.3	
Primary school completed	12	16.7	
Secondary school completed	8	11.1	
Tertiary education	5	6.9	
	72	100.0	
Family size			
1-5	30	41.6	
6-10	37	51.4	
11-15	4	5.6	
16-20	1	1.4	
Total	72	100.0	
Mean			6.0
SD			1.5
Source of labour			
Family labour	12	29.2	
Hired labour	44	61.1	
Family/Hired labour	7	9.7	
Total	72	100.0	
Farm size (Ha)			
< than 1	38	52.8	
1.0-2.0	23	31.9	
> than 2.0	11	16.3	
Total	72	100.0	
Mean			0.9
SD			0.2

Source: Field survey 2009.

The Table-3 below gives the eigen values, the proportion and the percentage cumulative variation in order of size of roots. The eigen value is significant when it is greater than or equal to one. The eigen values represent the amount of the total variance in the data accounted by each of the components. The first component is observed to contain about one fifths of the total variation in the forty-five variables. Only five components

account for the rest of the variation. The sum of squares of eigen-values indicates the relative importance of each component in accounting for a particular set of variables being analyzed. This provides an index of how well this particular solution accounts for all the variables taken together. Therefore, in this study, with an index of 0.98, the variables are not different from each and account for all the groups.

Table-3. Latent roots of the orthogonal transformation for the forty- five variables.

Component number	Eigen-value	Proportion (%)	% Cumulative variation
1	7.7714	17.7	17.7
2	3.8792	8.8	26.5
3	3.3331	7.8	34.1
4	3.0351	6.9	41.0
5	2.4524	5.6	46.5
6	2.1129	4.9	51.4
7	1.8376	4.2	55.6
8	1.7495	3.9	59.6
9	1.5996	3.6	63.2
10	1.3766	3.1	66.3
11	1.3183	3.0	69.3
12	1.2790	2.9	72.2
13	1.1633	2.6	74.9
14	1.1213	2.5	77.4
15	1.0483	2.4	79.8
16	1.0178	2.3	82.1

Source: Field survey 2009.

Table-4 gives zero order correlation coefficients that have more than 2.3 percent variation of the total output. In the first principal component some variables that feature are: farm size, purchase of fungicide, average total income from cocoa farm and average expenditure from cocoa farm. Almost all of these variables have high correlation coefficients. Component two linked together source of labour purchase labour service and total amount actually spent on labour. All these variables are very important factors to which the farmer must apply his managerial skills to make maximum profit that is labour must be efficiently used.

The third component brings together other interrelated variables, which farmers must manage in order to achieve success in their farm business. There are purchase of insecticide, amount spent on insecticide, time of spraying and effectiveness of these chemical on cocoa yield. They have high correlation coefficients. The farmer needs to display his managerial skill in knowing the right time for spraying.

Nearly all the purely socio economic variables are featured in the component four. These have high correlation coefficient. Age of the farmers is seen to be highly related to managerial ability of farmers. Other variables are: age of farm secondary occupation, place where highest price is obtained for cocoa beans and places where least prices are obtained for insecticides and fungicides. Principal component five linked together all the variables that have not featured in the proceeding components. They are family size, number of family members engaged in farming reasons for setting up cocoa farm purchase of transport service amount spent on transport, variety of cocoa grown market place for cocoa sources of credit and number of man days for land preparation/planting.

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Table-4. Zero order correlation coefficient, variables with components significant for output.

Variable	Components				
	1	2	3	4	5
X_1			0.2378		
X_2				0.3086	
X_3				0.2781	
X_4	0.2721				
X_5				0.2446	
X_6		-0.3872			
X_7				0.2561	
X_8					0.2825
X_9					
X_{10}					
X_{11}			0.3163		
X_{12}	-0.2436				
X_{13}					
X_{14}					
X_{15}		0.4612			
X_{16}					0.3050
X_{17}					
X_{18}			0.3271		
X_{19}					
X_{20}					
X_{21}					
X_{22}	0.4452				
X_{23}					0.3030
X_{24}				0.2561	
X_{25}					-0.2952
X_{26}				0.2752	
X_{27}					-0.2630
X_{28}				0.2475	
X_{29}					
X_{30}					
X_{31}				0.2718	
X_{32}					-0.2521
X_{33}	0.3107				
X_{34}					
X_{35}	0.3135				
X_{36}	0.2767				
X_{37}					-0.3134
X_{38}					
X_{39}					
X_{40}					
X_{41}			-0.3303		
X_{42}			-0.3433		
X_{43}					
X_{44}					
X_{45}					

Source: Field survey 2009.

SUMMARY OF MAJOR FINDINGS

Table shows that the age of farmer, family size, number of family members engaged in farming level of education reasons for setting up cocoa farm, purchase of insecticide, amount on insecticide, amount on insecticide, purchase of labour service, amount spent on labour, purchase of transport service, spent on transport, age of cocoa farm, place where highest price is obtained for cocoa beans, secondary occupation, market place, average income from cocoa farm and total expenditure on farm as having positive impact on managerial ability of cocoa farmers in the study area. On other hand, source of labour, purchase of fungicide, variety of cocoa grown, source of credit, number of man days for land preparation and planting as well as effectiveness of spraying have negative impact on the managerial abilities of small scale cocoa farmers in the study area.

Those variables not considered may indicate no influence on management ability of cocoa farmers in the study area. These foregoing variables regarded as indicator of good management practices. But the paradox may be explained by:

i   Some of the variables might be subsets of those listed earlier on as affecting management ability of the former positively or negatively and
ii   Some of them might be carried out at such low levels that their effects are so negligible.

CONCLUSIONS

It could be seen that farmers' age has a positive impact on managerial ability. This may be because of the fact that as the farmer grows older, his experience widens and tendencies are that wastages are minimized in the management of resources.

Also level of education has a positive impact on their managerial ability because as farmer becomes more educated the better the ability to source more information for better resource management.

The number of family members engaged in farming activities is expected to have positive influence on the farmer managerial ability because the higher this number the less the time spent on supervision. Thus, the farmer can have more time for other productive activities.

The reasons for setting up the farm by farmers have positive influence on managerial ability. However, farmers' life would be considered failures if most of these objectives are not realized.

The purchase of labour service and the amount spent on labour have positive influence on the farmer's managerial ability. Efficiently utilized hired labour should return higher than amount spent on it.

The purchase of transport service and amount spent on the transport has positive impact on farmer's managerial ability. Better transport facilities normally reduce the costs involved in marketing either in puts or output.

The secondary occupation should positively influence managerial ability of farmers as it indicates better utilization of time and labour during scale period in cocoa agriculture market place for cocoa output has positive impact on the farmers managerial ability the nearer the market the greater the urge of farmers to increase output so as to reduce the unit cost of selling his cocoa beans in that place.

Farmers' income from cocoa farm has a positive influence on the farmers' managerial ability because the higher the income from the enterprise, the more the farmers would be willing to accept innovations that tend to increase their output. The following explanations may be made in respect of those variables that have negative impact on managerial ability of cocoa farmers in the study area.

Sources of credit have a negative effect on farmer's managerial ability. Time spent on traveling to and arranging for loan especially from institutional sources are better spent on their farms. Time of spraying and effectiveness of spraying negatively influenced managerial ability of farmers if spraying was usually done at the wrong time with an unapproved but cheaper sprayers and chemicals.

The variety of cocoa grown has negative impart or managerial ability of cocoa farmers. Thus reason for this could be that many of cocoa farmers in the areas still in possession of old Amelonde varieties, which hence lower yield thaw, the CRIN elite varieties.

Source of labour has negative influences on managerial ability of farmer, because time spent on traveling to negotiate for such labour could better be spent attending to farm duties.

RECOMMENDATIONS

These observations underscore the need for special programmes that empower and recognize the need of cocoa farmers, especially through education, finance and information. To increase the production output of cocoa in Nigeria will not be too difficult proposition to achieve it government and stakeholders in the sector have focused attention on the factors affecting managerial ability of small scales cocoa farmers in the country. To achieve this much desired productivity the following recommendation are suggested.

(a) The government should launch campaigns and policies that will attract youths to cocoa farming to save the future of cocoa production because those on farm presently are ageing and tired as revealed in the study with average age of cocoa farmer to be 59 years.

(b) There is high illiteracy among the farmers revealed in the study. There is need to extend the universal Basic Education programme of government (UBE) to accommodate illiterate farmers, through adult education classes by extension agents planned for farmers within the confines of findings that would make them improve their managerial ability.

(c) Refocusing policies to enhance emphasis on efficient technological development adequate infrastructural

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support stable and efficient institutional support efficient input supply and delivery systems and other cost other cost effective support services in agriculture.

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